DOCUMENT RESUME

ED 414 186 SE 060 933

AUTHOR Allen, Nancy L.; Jenkins, Frank; Kulick, Edward; Zelenak, Christine A.

TITLE Technical Report of the NAEP 1996 State Assessment Program in Mathematics.

INSTITUTION National Assessment of Educational Progress, Princeton, NJ.; Educational Testing Service, Princeton, NJ.

SPONS AGENCY National Center for Education Statistics (ED), Washington, DC.

REPORT NO NCES-97-951

ISBN ISBN-0-16-049225-4

PUB DATE 1997-08-00

NOTE 647p.; Written "in collaboration with" 38 other individuals whose names appear on the title page.

AVAILABLE FROM U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328.

PUB TYPE Reports - Evaluative (142)

EDRS PRICE MF03/PC26 Plus Postage.

DESCRIPTORS Educational Assessment; Elementary Secondary Education; Evaluation Criteria; Evaluation Methods; *Mathematics Achievement; Mathematics Curriculum; Mathematics Education; *National Competency Tests; National Programs; National Surveys; *Standardized Tests; *Student Evaluation; Tables (Data)

IDENTIFIERS *National Assessment of Educational Progress; *State Mathematics Assessment (NAEP)

ABSTRACT

The purpose of this report is to provide technical information about the 1996 State Assessment in Mathematics. It provides a description of the design for the State Assessment and gives an overview of the steps involved in the implementation of the program from the planning stages through to the analysis and reporting of the data. The report describes in detail the development of the cognitive and background questions, the field procedures, the creation of the database and data products for analysis, and the methods and procedures used for sampling, analysis, and reporting. It does not provide the results of the assessment--rather, it provides information on how those results were derived. Chapters include: (1) "Overview: The Design, Implementation, and Analysis of the 1996 State Assessment Program in Mathematics"; (2) "Developing the Mathematics Objectives, Cognitive Items, Background Questions, and Assessment Instruments"; (3) "Sample Design and Selection"; (4) "State and School Cooperation and Field Administration"; (5) "Processing and Scoring Assessment Materials"; (6) "Creation of the Database, Quality Control of Data Entry, and Creation of the Database Products"; (7) "Weighting Procedures and Variance Estimation"; (8) "Theoretical Background and Philosophy of National Assessment Educational Progress (NAEP) Scaling Procedures"; (9) "Data Analysis and Scaling for the 1996 State Assessment Program in Mathematics"; and (10) "Conventions Used in Reporting the Results of the 1996 State Assessment Program in Mathematics." Appendices include: "Participants in the Objectives and Item Development Process"; "Summary of Participation Rates"; "Conditioning Variables and Contrast Codings"; "IRT (Item Response Theory) Parameters for Mathematics Items"; "State Assessment

+++++ ED414186 Has Multi-page SFR---Level=1 +++++

Program Reporting Subgroups; Composite and Derived Common Background Variables; and Composite and Derived Reporting Variables"; "Setting the NAEP Achievement Levels for the 1996 State Assessment in Mathematics"; "Correction of the NAEP Program Documentation Error in the 1992 State Mathematics Results"; "The Information Weighting Error"; and "Sample Design and Selection Tables." (Contains 78 references.) (ASK)

SE

NATIONAL CENTER FOR EDUCATION STATISTICS

TECHNICAL REPORT

NAEP 1996
State Assessment Program in Mathematics

0933

THE NATION'S REPORT CARD naep

U.S. Department of Education
Office of Educational Research and Improvement NCES 97-951

What is The Nation's Report Card?

THE NATION'S REPORT CARD, the National Assessment of Educational Progress (NAEP), is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969, assessments have been conducted periodically in reading, mathematics, science, writing, history/geography, and other fields. By making objective information on student performance available to policymakers at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement is collected under this program. NAEP guarantees the privacy of individual students and their families.

NAEP is a congressionally mandated project of the National Center for Education Statistics, the U.S. Department of Education. The Commissioner of Education Statistics is responsible, by law, for carrying out the NAEP project through competitive awards to qualified organizations. NAEP reports directly to the Commissioner, who is also responsible for providing continuing reviews, including validation studies and solicitation of public comment, on NAEP's conduct and usefulness.

In 1988, Congress established the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The Board is responsible for selecting the subject areas to be assessed from among those included in the National Education Goals; for setting appropriate student performance levels; for developing assessment objectives and test specifications through a national consensus approach; for designing the assessment methodology; for developing guidelines for reporting and disseminating NAEP results; for developing standards and procedures for interstate, regional, and national comparisons; for determining the appropriateness of test items and ensuring they are free from bias; and for taking actions to improve the form and use of the National Assessment.

The National Assessment Governing Board

NATIONAL CENTER FOR EDUCATION STATISTICS

Technical Report of the NAEP 1996 State Assessment Program in Mathematics

Nancy L. Allen
Frank Jenkins
Edward Kulick
Christine A. Zelenak

In collaboration with:

Nada Ballator
Luz Bay
Patrick B. Bourgeacq
Mary Lyn Bourque
Charles L. Brungardt
John Burke
James E. Carlson
Wen-Hung Chen
John J. Ferris
Luann Forinash
David S. Freund
Lucy M. Gray
James L. Green
Jeff Haberstroh
Mary Lynn Helscher
Penny James
Eugene G. Johnson
Chancey Jones
Bruce A. Kaplan
Tillie Kennel
Susan C. Loomis
John Mazzeo
Norma A. Norris
Patricia E. O'Reilly
Katharine E. Pashley
Jiahe Qian
Clyde M. Reese
Linda L. Reynolds
Tim Robinson
Alfred M. Rogers
Keith F. Rust
Mary Schulte
Connie Smith
Patricia M. Stearns
Spencer S. Swinton
Bradley J. Thayer
Steve Wang
Xiaohui Wang

U.S. Department of Education
Office of Educational Research and Improvement NCES 97-951

Prepared by Educational Testing Service under a cooperative agreement with the National Center for Education Statistics

U.S. Department of Education
Richard W. Riley
Secretary

Office of Educational Research and Improvement
Ramon C. Cortines
Acting Assistant Secretary

National Center for Education Statistics
Pascal D. Forgione, Jr.
Commissioner

Education Assessment Group
Gary W. Phillips
Associate Commissioner

August 1997

SUGGESTED CITATION
Allen, N.L., Jenkins, F., Kulick, E., & Zelenak, C.A. (1997).
Technical report of the NAEP 1996 state assessment program in mathematics.
Washington, DC: National Center for Education Statistics.

FOR MORE INFORMATION
Contact:
Arnold A. Goldstein
202-219-1741

For ordering information on this report, write:

National Library of Education
Office of Educational Research and Improvement
U.S. Department of Education
555 New Jersey Avenue, NW
Washington, D.C. 20208-5641

or call 1-800-424-1616 (in the Washington, DC, metropolitan area call 202-219-1651) or visit the World Wide Web site: http://www.ed.gov/NCES/naep

The work upon which this publication is based was performed for the National Center for Education Statistics, Office of Educational Research and Improvement, by Educational Testing Service.

Educational Testing Service is an equal opportunity, affirmative action employer.

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop SSOP, Washington, DC 20402-9328
ISBN 0-16-049225-4

TECHNICAL REPORT OF THE NAEP 1996 STATE ASSESSMENT PROGRAM IN MATHEMATICS

TABLE OF CONTENTS

Page

TECHNICAL REPORT OF THE NAEP 1996 STATE ASSESSMENT PROGRAM IN MATHEMATICS

LIST OF TABLES

Page

Page

TECHNICAL REPORT OF THE NAEP 1996 STATE ASSESSMENT PROGRAM IN MATHEMATICS

LIST OF FIGURES

ACKNOWLEDGMENTS

The design, development, administration, analysis, and reporting of the 1996 National Assessment of Educational Progress (NAEP) State Assessment program in mathematics was a collaborative effort among staff from the National Center for Education Statistics (NCES), the National Assessment Governing Board (NAGB), the Council of Chief State School Officers (CCSSO), Educational Testing Service (ETS), Westat, and National Computer Systems (NCS). This report documents the NAEP design, administration, and data analysis procedures used for the State Assessment. It also indicates what technical decisions were made and the rationale behind those decisions. The development of this report and of the State Assessment program is the result of the considerable knowledge, experience, creativity, and dedication of many individuals. I would like to acknowledge these individuals for their contribution to NAEP.

The NAEP 1996 mathematics state assessment was funded through NCES, in the Office of Educational Research and Improvement of the U.S. Department of Education. The Commissioner of Education Statistics, Pascal D. Forgione, Jr., and the NCES staff — Sue Ahmed, Peggy Carr, Arnold Goldstein, Steven Gorman, Larry Ogle, Gary W. Phillips, Sharif Shakrani, Maureen Treacy — and Alan Vanneman of the Education Statistics Services Institute, worked closely and collegially with the authors to produce this report. I would like to especially recognize and thank Shi-Chang Wu for his significant assistance and support in coordinating the organization and technical review of this report. I would also like to gratefully acknowledge Susan Ahmed, Ralph Lee, Andrew Kolstad, Stephen Gorman, and Shi-Chang Wu of NCES, and Don McLaughlin of American Institutes for Research (AIR), for conducting a technical review of this report.

Special thanks also go to the members of NAGB and the NAGB staff who provided advice and guidance in the preparation of this report, particularly Mary Lyn Bourque, who provided information for an appendix of this report.

ETS management and the Center for the Assessment of Educational Progress (CAEP) have been very supportive of NAEP's technical work. Special thanks go to Nancy Cole as well as to Henry Braun, Charles Davis, and Juliet Shaffer of ETS research management, and Archie Lapointe, Paul Williams, Steve Lazer, John Mazzeo, Clyde Reese, and Kim Whittington of CAEP. Significant contributions to the project were received from Nada Ballator, Jeff Haberstroh, and Chancey Jones.

The guidance of the NAEP Design and Analysis Committee on technical aspects of NAEP has been outstanding. During the period of analysis of the 1996 data, the members were Sylvia Johnson (chair), Albert Beaton, Jeri Benson, Jeremy Finn, Paul Holland, Huynh Huynh, Gaea Leinhardt, David Lohman, Anthony Nitko, Ingram Olkin, Tej Pandey, Juliet Shaffer, and Hariharan Swaminathan.

The design and data analysis of the 1996 National Assessment was primarily the responsibility of the NAEP research and data analysis staff at ETS with significant contributions from NAEP management, Westat, and NCS staffs. In addition to managing day-to-day data analytic operations, these staff members have made many innovative statistical and psychometric contributions. Major contributions were made by James Carlson, Frank Jenkins, Spencer Swinton, and Jiahe Qian. Jo-lin Liang was exceptional in her role as technical assistant. Eugene Johnson, Robert Mislevy, and Juliet Shaffer provided valuable statistical and psychometric advice.

The Divison of Data Analysis and Technology Research at ETS, under the leadership of John Barone, was responsible for developing the operating systems and carrying out the data analyses. David Freund and Alfred Rogers developed and maintained the large and complex NAEP data management systems, and Katharine Pashley managed database activities. Alfred Rogers developed the production versions of key analysis and scaling systems. Special recognition goes to Phillip Leung and Patricia O'Reilly for their expertise in the design and development of the NAEP Web site. Thanks also go to David Freund, Steven Isham, Bruce Kaplan, Debbie Kline, and Edward Kulick, for their continuing roles as leaders and developers of innovative solutions to NAEP data analysis challenges. Particular recognition goes to Edward Kulick, Steve Wang, and Xiaohui Wang, for their substantial contributions to NAEP data analyses. Many other members of this division made important contributions of their time and talent to NAEP data analyses and analysis software and data products, including John Ferris, Shuyi Hua, Laura Jerry, Gerry Kokolis, Phillip Leung, Laura Jenkins, Mike Narcowich, Jennifer Nelson, Norma Norris, Inge Novatkoski, Patricia O'Reilly, Katharine Pashley, Craig Pizzuti, Steve Szyszkiewicz, and Lois Worthington.

The staff at Westat contributed their talents and efforts in all areas of the sample design and data collection. Particular recognition is due to Rene Slobasky, Nancy Caldwell, Keith Rust, Debby Vivari, and Dianne Walsh for directing the sampling and data collection activities. Thanks are also due to John Burke, James Green, Penny James, and Lucy Gray.

Critical to the program was the contribution of NCS, which has been responsible for the printing, distribution, and processing of the assessment materials, as well as an increased role in the professional scoring. The leadership roles of Patrick Bourgeacq and Charles Brungardt are especially acknowledged. Thanks also go to Mary Lynn Helscher, Tillie Kennel, Linda Reynolds, Tim Robinson, Mary Schulte, Connie Smith, Patricia Stearns, and Brad Thayer.

Carol Crowley, Carol Manikin, Sharon Stewart, and Terri Stirling are acknowledged for their administrative assistance during the preparation of this report and in other related activities.

Carol Errickson also deserves special thanks for coordinating the design of the report's cover.

Special recognition and appreciation go to Christine Zelenak, editor of this report, for organizing, scheduling, editing, motivating, and ensuring the cohesiveness and correctness of the final report.

Finally, NAEP is grateful to the students and school staff members who participated in the assessment. Without their efforts, there would be no assessment.

Nancy L. Allen
Director of Data Analysis and Scaling
NAEP Research, ETS
July 1997

Chapter 1

OVERVIEW: THE DESIGN, IMPLEMENTATION, AND ANALYSIS OF THE 1996 STATE ASSESSMENT PROGRAM IN MATHEMATICS[1]

Nancy L. Allen and John Mazzeo
Educational Testing Service

1.1 OVERVIEW

In April 1988, Congress reauthorized the National Assessment of Educational Progress (NAEP) and added a new dimension to the program—voluntary state-by-state assessments on a trial basis in 1990 and 1992, in addition to continuing the national assessments that NAEP had conducted since its inception. In 1994, Congress authorized a third Trial State Assessment for administration in 1994. It should be noted that the word *trial* in Trial State Assessment refers to the Congressionally mandated trial to determine whether such assessments can yield valid, reliable state representative data. Enough experience had been gained for Congress to authorize State Assessments, rather than Trial State Assessments, to be conducted in 1996. In this report, we will refer to the voluntary state-by-state assessment program as the State Assessment program. The State Assessment program, which is designed to provide representative data on achievement for participating jurisdictions, is distinct from the assessment designed to provide nationally representative data, referred to in this report as the national assessment. (This terminology is also used in all other reports of the 1996 assessment results.) All instruments and procedures used in the 1990, 1992, 1994, and 1996 state and national assessments were previously piloted in field tests conducted in the year prior to each assessment.

The 1990 Trial State Assessment program collected information on the mathematics knowledge, skills, understanding, and perceptions of a representative sample of eighth-grade students in public schools in 37 states, the District of Columbia, and two territories. The second phase of the Trial State Assessment program, conducted in 1992, collected information on the mathematics knowledge, skills, understanding, and perceptions of a representative sample of fourth- and eighth-grade students and the reading skills and understanding of a representative sample of fourth-grade students in public schools in 41 states, the District of Columbia, and two territories.

The 1994 Trial State Assessment program once again assessed the reading skills and understanding of representative samples of fourth-grade students, this time in 44 participating jurisdictions. The 1994 program broke new ground in two ways. The 1994 NAEP authorization called for the assessment of samples of both public- and nonpublic-school students. Thus, for the first time in NAEP, jurisdiction-level samples of students from Catholic schools, other religious schools and private schools, Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS), and Bureau of Indian Affairs (BIA) schools were added to the Trial State Assessment program. Second, samples of students from the Department of Defense

---

[1] Nancy L. Allen is the Director of Data Analysis and Scaling, NAEP Research, Educational Testing Service. John Mazzeo is the Director of NAEP Reporting, Educational Testing Service.

Dependents Schools (DoDDS) schools participated as a jurisdiction, along with the states and territories that have traditionally had the opportunity to participate in the Trial State Assessment program.

The 1996 State Assessment program, described in this report, again collected information on the mathematics knowledge, skills, understanding, and perceptions of a representative sample of fourth- and eighth-grade students for a third time. In addition, grade 8 public- and nonpublic-school students were assessed in science (see the *Technical Report of the NAEP 1996 State Assessment Program in Science*, Allen, Swinton, & Zelenak, 1996).

A special feature of the 1996 State Assessments was the introduction of new rules for student inclusion in NAEP assessments. In order to assure that the mathematics results for state assessments in 1990, 1992, and 1996 are comparable, half of the schools selected for participation in the 1996 assessment used the old inclusion rules to determine whether students should be included in the assessment and the other half used the new inclusion rules. In addition to the two groups of schools using the old and new inclusion rules without offering students special testing accommodations, the 1996 national assessment included a third group of schools that used the new inclusion rules and offered students within those schools the accommodations to the standard NAEP administration procedures. More details on the procedures for student exclusion are presented in the report on field procedures for the 1996 State Assessment program (Westat, Inc., 1996). More details on the procedures used for student exclusion are presented in the report on field procedures for the 1996 State Assessment program (Westat, 1996).

The accommodations provided by NAEP in the national assessments were meant to match those specified in the student's individualized education plan (IEP) or those ordinarily provided in the classroom for testing situations. The most common accommodation was extended time. In the State Assessment, no special accommodations were offered.

The old and new inclusion rules are applied only when a student has been categorized in his or her IEP as a student with disabilities (SD) or as a student with limited English proficiency (LEP); all other students are asked to participate in the assessment. For this reason, the sample of students that were selected for most analysis and reporting purposes consisted of students from schools using either set of inclusion rules that were not categorized as SD or LEP students and students from the schools using the old inclusion rules that were categorized as SD or LEP. The advantage of this reporting sample is that it preserves trend with previous assessments and it makes use of most of the data from the assessment.

Special analyses that used the national mathematics assessment data to compare the old and new inclusion rules and examine the effect of offering testing accommodations, indicated little difference in proportions of students included in the assessment using the old and new inclusions. More students were included in the assessment when they were offered accommodations; however, a portion of students who would have participated in the assessment under standard conditions were assessed with accommodations when they were offered. A result of this is that fewer students were assessed under standard conditions when accommodations were offered.

Table 1-1 lists the jurisdictions that participated in the 1996 State Assessment program. Over 125,000 students at each grade participated in the 1996 State Assessments in the jurisdictions shown. Students were administered the same assessment booklets that were used in either NAEP's 1996 national mathematics or national science assessments.

Table 1-1

Jurisdictions Participating in the 1996 State Assessment Program in Mathematics

Jurisdictions			
Alabama	Georgia	Mississippi[2]	Pennsylvania[4]
Alaska[1]	Guam	Missouri[2]	Rhode Island
Arizona	Hawaii	Montana[3]	South Carolina[2]
Arkansas	Indiana	Nebraska	Tennessee[2]
California	Iowa	Nevada[1]	Texas
Colorado	Kentucky	New Hampshire[5]	Utah[2]
Connecticut	Louisiana	New Jersey	Vermont[1]
Delaware	Maine[2]	New Mexico	Virginia
DoDEA/DDESS[1/6]	Maryland	New York	Washington[1]
DoDEA/DoDDS[1/6]	Massachusetts[2]	North Carolina	West Virginia
District of Columbia	Michigan	North Dakota	Wisconsin
Florida	Minnesota	Oregon[3]	Wyoming

[1]Participated in the 1996 mathematics assessment program only.
[2]Participated in the 1992 and 1996 mathematics assessment programs but not in the 1990 program.
[3]Participated in the 1990 and 1996 mathematics assessment programs but not in the 1992 program.
[4]Grade 4 only.
[5]Grade 8 only.
[6]DoDEA is the Department of Defense Education Activity schools, DDESS is the Department of Defense Domestic Dependent Elementary and Secondary Schools, and DoDDS is the Department of Defense Dependents Schools.

The 1996 NAEP mathematics assessments were based on the same framework that was used to construct the 1990 and 1992 assessments. The mathematics framework and assessment specifications were developed for NAEP through a consensus project conducted by the Council of Chief State School Officers (CCSSO) under funding from the National Assessment Governing Board (NAGB). Subsequent to the 1992 assessment, assessment specifications were refined to bring the assessment more in line with the *Curriculum and Evaluation Standards for School Mathematics*, published by the National Council of Teachers of Mathematics (NCTM). Research conducted as part of the 1995 NAEP field test indicated that despite these specifications, the measurement constructs associated with the 1992 and 1996 instruments were sufficiently similar to justify the continuation of the current NAEP scale. Hence, for grade 8, 1996 provides an opportunity to report jurisdiction-level trend data for a NAEP mathematics instrument for those states and territories that participated in the 1990, 1992, and 1996 State Assessment programs. In addition, questionnaires completed by the students, their mathematics teachers, and principals or other school administrators provided an abundance of contextual data within which to interpret the mathematics results.

The purpose of this report is to provide technical information about the 1996 State Assessment in mathematics. It provides a description of the design for the State Assessment and gives an overview of the steps involved in the implementation of the program from the planning stages through to the analysis and reporting of the data. The report describes in detail the development of the cognitive and background questions, the field procedures, the creation of the database and data products for analysis, and the methods and procedures used for sampling, analysis, and reporting. It does not provide the results of the assessment—rather, it provides information on how those results were derived.

This report is one of several documents that provide technical information about the 1996 State Assessment. For those interested in performing their own analyses of the data, this report and the user guide for the secondary-use data should be used as primary sources of information about NAEP. Information for lay audiences is provided in the procedural appendices to the mathematics subject-area reports; theoretical information about the models and procedures used in NAEP can be found in the special NAEP-related issue of the *Journal of Educational Statistics* (Summer 1992/Volume 17, Number 2).

Under a cooperative agreement with the National Center for Education Statistics (NCES), Educational Testing Service (ETS) was responsible for the development, analysis, and reporting of the 1996 NAEP programs, including the State Assessment. ETS was responsible for overall management of aspects of the programs as well as for development of the overall design, the items and questionnaires, data analysis, and reporting. National Computer Systems (NCS) was a subcontractor to ETS on both the national and State NAEP programs. NCS was responsible for printing, distribution, and receipt of all assessment materials, and for data processing, scanning, and professional scoring. All aspects of sampling and field operations for both the national and State Assessments were the responsibility of Westat, Inc. NCES contracted directly with Westat for these services for the national and state assessments.

This technical report provides information about the technical bases for a series of reports that have been prepared for the 1996 State Assessment program in mathematics. They include:

- A *State Report* for each participating jurisdiction that describes the mathematics scale scores of the fourth-and eighth-grade public- and nonpublic-school students in that jurisdiction and relates their scale scores to contextual information about mathematics policies and instruction.

- The *NAEP 1996 Mathematics Report Card for the Nation and the States*, which provides both public- and nonpublic-school data for major NAEP reporting subgroups for all of the jurisdictions that participated in the State Assessment program, as well as selected results from the 1996 national mathematics assessment.

- The *Cross-State Data Compendium from the NAEP 1996 Mathematics Assessment*, which includes jurisdiction-level results for all the demographic, instructional, and experiential background variables included in the *Mathematics Report Card* and *State Report*.

- Two *Data Almanacs* for each jurisdiction, one for grade 4 and one for grade 8, distributed only in electronic form, that contain a detailed breakdown of the mathematics scale-score data according to the responses to the student, teacher, and school questionnaires for the public school, nonpublic school, and combined populations as a whole and for important subgroups of the public-school population. There are six sections to each almanac:

  ⇒ *The Distribution Data Section* provides information about the percentages of students at or above the three composite scale achievement levels (and below basic). For the composite scale and each mathematics content strand scale,[2] this almanac also provides selected percentiles for the public school, nonpublic school, and combined populations and for the standard demographic subgroups of the public-school population. Mathematics was previously assessed in 1990 and 1992 for grade 8 and in 1992 for grade 4 in the State Assessment program. For items that are common to 1990 and/or 1992, trend results are presented, as applicable.

⇒ *The Student Questionnaire Section* provides a breakdown of the composite scale score data according to the students' responses to questions in the three student questionnaires included in the assessment booklets.

⇒ *The Teacher Questionnaire Section* provides a breakdown of the composite scale score data according to the teachers' responses to questions in the mathematics teacher questionnaire.

⇒ *The School Questionnaire Section* provides a breakdown of the composite scale score data according to the principals' (or other administrators') responses to questions in the school characteristics and policies questionnaire.

⇒ *The Scale Section* provides a breakdown of selected items from the questionnaires according to each of the scales measuring mathematics content strands in the assessment.

⇒ *The Mathematics Item Section* provides the response data for each mathematics item in the assessment.

The state reports and the *Mathematics Report Card* will be available on the World Wide Web as they are publicly released; the almanacs will be placed on the web about a month after they are released on CD-ROM.

Organization of the Technical Report

This chapter provides a description of the design for the State Assessment in mathematics and gives an overview of the steps involved in implementing the program from the planning stages to the analysis and reporting of the data. The chapter summarizes the major components of the program, with references to later chapters for more details. The organization of this chapter, and of the report, is as follows:

- Section 1.2 provides an overview of the design of the 1996 State Assessment program in mathematics.

---

[2] Scales were created for five content strands: *number sense, properties, and operations, measurement; geometry and spatial sense; data analysis, statistics, and probability;* and *algebra and functions.*

- Section 1.3 summarizes the development of the mathematics objectives and the development and review of the items written to measure those objectives. Details are provided in Chapter 2.

- Section 1.4 discusses the assignment of the cognitive items to assessment booklets. An initial discussion is provided of the balanced incomplete block (BIB) spiral design that was used to assign cognitive items to assessment booklets and assessment booklets to individuals. A more complete description is provided in Chapter 2.

- Section 1.5 outlines the sampling design used for the 1996 State Assessment program in mathematics. A fuller description is provided in Chapter 3.

- Section 1.6 summarizes the field administration procedures, including securing school cooperation, training administrators, administering the assessment, and conducting quality control. Further details appear in Chapter 4.

- Section 1.7 describes the flow of the data from their receipt at NCS through data entry, professional scoring, and entry into the ETS/NAEP database for analysis, and the creation of data products for secondary users. Chapters 5 and 6 provide a detailed description of the process.

- Section 1.8 provides an overview of the data obtained from the 1996 State Assessment program in mathematics.

- Section 1.9 summarizes the procedures used to weight the assessment data and to obtain estimates of the sampling variability of subpopulation estimates. Chapter 7 provides a full description of the weighting and variance estimation procedures.

- Section 1.10 describes the initial analyses performed to verify the quality of the data in preparation for more refined analyses, with details given in Chapter 9.

- Section 1.11 describes the item response theory (IRT) scales and the overall mathematics composite that were created for the primary analysis of the State Assessment data. Further discussion of the theory and philosophy of the scaling technology appears in Chapter 8, with details of the scaling process in Chapter 9.

- Section 1.12 provides an overview of the linking of the scaled results from the State Assessment to those from the national mathematics assessment. Details of the linking process appear in Chapter 9.

- Section 1.13 describes the reporting of the assessment results, with further details supplied in Chapter 10.

- Appendices A through H include a list of the participants in the objectives and item development process, a summary of the participation rates, a list of the conditioning variables, the IRT parameters for the mathematics items, the reporting subgroups, composite and derived common background and reporting variables, a description of the process used to define achievement levels, an explanation and correction of the NAEP program documentation error in the NAEP 1992 results, and a summary explaining the information weighting error in setting the mathematics achievement levels.

1.2 DESIGN OF THE STATE ASSESSMENT IN MATHEMATICS

The major aspects of the design for the State Assessment in mathematics included the following:

- Participation at the jurisdiction level was voluntary.

- Fourth- and eighth-grade students from public and nonpublic schools were assessed. Nonpublic schools included Catholic schools, other religious schools, private schools, Department of Defense Education Activity (DoDEA) schools,[3] and BIA schools. Separate representative samples of public and nonpublic schools were selected in each participating jurisdiction and students were randomly sampled within schools. The sizes of a jurisdiction's nonpublic-school samples were proportional to the percentage of grade-level students in that jurisdiction attending such schools.

- The fourth- and eighth-grade mathematics student booklets used for the 1996 NAEP State Assessment, and included as part of the 1996 national NAEP instrument for grades 4 and 8, contained multiple-choice, short-constructed response, and extended-constructed response cognitive items. Some items required the use of calculators (four-function calculators at grade 4 and scientific calculators at grade 8), geometric shapes, and protractors/rulers. The total pool of mathematics items was divided into 13 blocks of items, each 15 minutes long, at each grade level.

- A complex form of matrix sampling called a balanced incomplete block (BIB) spiraling design was used. With BIB spiraling, students in an assessment session received different booklets, which provides for greater mathematics content coverage than would have been possible had every student been administered the identical set of items, without imposing an undue testing burden on the student.

- Background questionnaires given to the students, the students' mathematics teachers, and the principals or other administrators provided a variety of contextual information. The background questionnaires for the State

---

[3]Students from seven of the DDESS schools (five fourth-grade DDESS schools and two eighth-grade DDESS schools) were included as part of the State Assessment and in the special assessment of DoDEA schools. In these cases, the DDESS school ID was replaced with the state ID.

Assessment program were identical to those used in the fourth- and eighth-grade national assessments.

- The assessment time for each student was approximately one hour. Each assessed student was assigned a mathematics booklet that contained two 5-minute background questionnaires, one 3-minute motivation questionnaire, and three of the 13 blocks containing mathematics items requiring 15 minutes each. Twenty-six different booklets were assembled.

- The assessments took place in the five-week period between January 29 and March 4, 1996. One-fourth of the schools in each jurisdiction were to be assessed each week throughout the first four weeks; however, due to severe weather throughout much of the country, the fifth week was used for regular testing as well as for makeup sessions.

- Data collection was, by law, the responsibility of each participating jurisdiction. Security and uniform assessment administration were high priorities. Extensive training of State Assessment personnel was conducted to assure that the assessment would be administered under standard, uniform procedures. For jurisdictions that had participated in previous NAEP state assessments, 25 percent of both public- and nonpublic-school assessment sessions were monitored by Westat staff. For the jurisdictions new to NAEP, 50 percent of both public- and nonpublic-school sessions were monitored.

1.3 DEVELOPMENT OF MATHEMATICS OBJECTIVES, ITEMS, AND BACKGROUND QUESTIONS

The same framework was used for the 1990, 1992, and 1996 NAEP State Assessments in mathematics. The 1996 assessment specifications represented an enhancement of the specifications used for the 1992 and 1990 that was influenced by the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics*. Similar to all previous NAEP assessments, the mathematics framework and specifications were developed through a broad-based consensus process. In developing the new portion of the 1996 NAEP mathematics assessment, the same procedures used in 1992 were followed, but with the newly-enhanced specifications. After careful reviews of the framework and specifications, questions were developed that were aligned with the refined specifications.

The framework for the 1990, 1992, and 1996 assessments was organized according to three mathematical abilities and five content strands. The mathematical abilities assessed were *conceptual understanding*, *procedural knowledge*, and *problem solving*. Content was drawn primarily from elementary and secondary school mathematics up to, but not including, calculus. The content strands assessed were *number sense, properties, and operations*; *measurement*; *geometry and spatial sense*; *data analysis, statistics, and probability*; and *algebra and functions*.[4]

---

[4] The content strand *number sense, properties, and operations* was called *numbers and operations* in the 1990 and 1992 assessments. The content strand *geometry and spatial sense* was called *geometry* in the 1990 and 1992 assessments.

The instrument used in the 1996 mathematics assessment was composed of a combination of new items developed for administration in 1996 and items from the 1992 and 1990 assessments. Those items that were carried over from the 1992 and 1990 instruments comprised approximately 60 percent of the 1996 instrument. The remainder was made up of new items developed according to the recommendations included in the enhanced framework for 1996. Based on field test results, items that had not been used previously in a NAEP assessment were revised or modified as necessary and then again reviewed for sensitivity, content, and editorial concerns. With the assistance of ETS/NAEP staff and outside reviewers, the Mathematics Instrument Development Committee selected the items to include in the 1996 assessment. All questions underwent extensive reviews by specialists in mathematics, measurement, and bias/sensitivity, as well as reviews by state representatives.

Maintaining approximately 70 percent of the instrument across the two assessment years allowed for the reporting of trends in mathematics performance. At the same time, developing a new set of items made it possible to release approximately 30 percent of the 1992 assessment for public use. Copies of the released items are available from ETS after permission for access has been received from NCES.

Chapter 2 includes specific details about developing the objectives and items for the State Assessment.

1.4 ASSESSMENT INSTRUMENTS

The assembly of cognitive items into booklets and their subsequent assignment to assessed students was determined by a BIB design with spiraled administration. Details of this design, almost identical to the design used in 1990 and 1992, are provided in Chapter 2. The single difference in these designs is that the 1996 State Assessment does not include blocks of estimation items. In earlier assessments, the results of these blocks of items were summarized separately from the mathematics composite scale. In addition to the student assessment booklets, three other instruments provided data relating to the assessment—a mathematics teacher questionnaire, a school characteristics and policies questionnaire, and an SD/LEP student questionnaire.

The *student assessment booklets* contained five sections and included both cognitive and noncognitive questions. In addition to three 15-minute sections of cognitive questions, each booklet included two 5-minute sets of general and mathematics background items designed to gather contextual information about students, their experiences in mathematics, and their attitudes toward the subject, and one 3-minute section of motivation questions designed to gather information about the student's level of motivation while taking the assessment.

The *teacher questionnaire* was administered to the fourth- and eighth-grade mathematics teachers of the students participating in the assessment. The questionnaire consisted of three sections and took approximately 20 minutes to complete. The first section focused on the teacher's general background and experience; the second, on the teacher's background related to mathematics; and the third, on classroom information about mathematics instruction.

The *school characteristics and policies questionnaire* was given to the principal or other administrator in each participating school and took about 20 minutes to complete. The questions asked about the principal's background and experience; school policies, programs, and facilities; and the demographic composition and background of the students and teachers.

The *SD/LEP student questionnaire* was completed by the teachers of those students who were selected to participate in the State Assessment sample but who were classified as students with disabilities (SD) or were categorized as having limited English proficiency (LEP). Some of these students did not participate in the assessment because they were determined by the school personnel to be unable to participate, using inclusion rules provided by NAEP; others did participate in the assessment because they were determined to be able to participate by not meeting the specifications in the inclusion rules. Each questionnaire took approximately three minutes to complete and asked about the student and the special programs in which the student participated.

Further information on the assessment instruments can be found in Chapter 2.

1.5 THE SAMPLING DESIGN

The target populations for the State Assessment program in mathematics consisted of fourth- and eighth-grade students enrolled in public and nonpublic schools. The public- and nonpublic-school samples in each jurisdiction were designed to produce aggregate estimates for the jurisdiction and for selected subpopulations (depending upon the size and distribution of the various subpopulations within the jurisdiction), and also to enable comparisons to be made, at the jurisdiction level, between administration of assessment tasks with monitoring and without monitoring.

The representative sample of public-school fourth- and eighth-grade students assessed in the State Assessment came from about 100 schools (per grade) in most jurisdictions. However, if a jurisdiction had fewer than 100 schools with a fourth or eighth grade, all or almost all schools were asked to participate. If a jurisdiction had smaller numbers of students in each school than expected, more than 100 schools were selected for participation. The public schools were stratified by urbanization, percentage of Black and Hispanic students enrolled, and median household income within the ZIP code area of the school.

The nonpublic-school samples differed in size across the jurisdictions, with the number of schools selected proportional to the nonpublic-school enrollment within each jurisdiction. Typically, about 20 to 25 nonpublic schools (per grade) were included for each jurisdiction. The nonpublic schools were stratified by type of control (Catholic, private/other religious, other nonpublic), metro status, and enrollment size per grade.

In most jurisdictions, up to 30 students were selected from each school, with the aim of providing an initial target sample size of approximately 3,000 public-school students per jurisdiction. The student sample size of 30 for each school was chosen to ensure that at least 2,000 public-school students participated from each jurisdiction allowing for school nonresponse, exclusion of students, inaccuracies in the measures of enrollment, and student absenteeism from the assessment. In jurisdictions with fewer schools, larger numbers of students per school were often required to ensure target samples of roughly 3,000 students. In certain jurisdictions, all eligible fourth- and eighth-grade students were targeted for assessment. The overall student sample size for nonpublic schools was much smaller than the approximate 2,000 students from public schools that were assessed.

Students within a school were sampled from lists of fourth- or eighth-grade students. The decisions to exclude students from the assessment were made by school personnel, in one of two ways, also used in differing groups of schools in the national assessment. The students in one group of schools were excluded using the inclusion rules used in previous assessments, in particular, the 1990 and 1992 Trial State Assessments in mathematics; students in a second group of schools were excluded on the basis of inclusion rules that were new for the 1996 assessment. The new inclusion rules are meant to be clearer, more easily followed, and closer to inclusion rules used in testing programs administered by school districts or state departments of education. In the 1996 national assessments, students in a third group of schools were excluded using the new inclusion rules, but SD and LEP students in these schools were offered special accommodations to the standard NAEP administration procedures. In the State Assessment, no special accommodations were offered. Each excluded student in the State Assessment was carefully accounted for to estimate the percentage of the state population deemed unassessable and the reasons for exclusion, no matter which school the student attended.

Chapter 3 describes the various aspects of selecting the sample for the 1996 State Assessment—selection of schools for use of the differing inclusion criteria, the construction of the public- and nonpublic-school frames, the stratification processes, the updating of the school frames with new schools, the actual sample selection, and the sample selection for the field test.

1.6 FIELD ADMINISTRATION

The administration of the 1996 program and the 1995 field test required collaboration between staff in the participating jurisdictions and schools and the NAEP contractors, especially Westat, the field administration contractor. The purpose of the field test conducted in 1995 was to try out new blocks of items designed as replacements for the 1992 assessment blocks released to the public.

Each jurisdiction volunteering to participate in the 1995 field test or in the 1996 State Assessment program was asked to appoint a state coordinator as liaison between NAEP staff and the participating schools. In addition, Westat hired and trained a supervisor for each jurisdiction and six field managers, each of whom was assigned to work with groups of jurisdictions. The state supervisors were responsible for working with the state coordinators, overseeing assessment activities, training school district personnel to administer the assessment, and coordinating the quality-control monitoring efforts. Each field manager was responsible for working with the state coordinators of seven to eight jurisdictions and supervising the state supervisors assigned to those jurisdictions. An assessment administrator was responsible for preparing for and conducting the assessment session in one or more schools. These individuals were usually school or district staff and were trained by Westat. Westat also hired and trained three to five quality control monitors in each jurisdiction. For jurisdictions that had previously participated in the State Assessment program, 25 percent of the public- and nonpublic-school sessions were monitored. For jurisdictions new to the program, 50 percent of all sessions were monitored. During the field test, the state supervisors monitored all sessions.

Chapter 4 describes the procedures for obtaining jurisdiction cooperation and provides details about the field activities for both the field test and 1996 State Assessment program. Chapter 4 also describes the planning and preparations for the actual administration of the assessment, the training and monitoring of the assessment sessions, and the responsibilities of the state coordinators, state supervisors, assessment administrators, and quality control monitors.

1.7 MATERIALS PROCESSING, PROFESSIONAL SCORING, AND DATABASE CREATION

Upon completion of each assessment session, school personnel shipped the assessment booklets and forms to NAEP contractor NCS for professional scoring, entry into computer files, and checking. The files were then sent to ETS for creation of the database. Chapter 5 describes the printing, distribution, receipt, processing, and final disposition of the 1996 State Assessment materials.

The volume of collected data and the complexity of the State Assessment processing design, with its spiraled distribution of booklets, as well as the concurrent administration of this assessment and the national assessments, required the development and implementation of flexible, innovative processing programs, and a sophisticated Process Control System. This system, described in Chapter 5, allowed an integration of data entry and workflow management systems that included carefully planned and delineated editing, quality control, and auditing procedures.

Chapter 5 also describes the data transcription and editing procedures used to generate the electronic files containing various assessment information, including the sampling weights required to make valid statistical inferences about the population from which the State Assessment sample was drawn. Before any analysis could begin, the data from these files underwent a quality control check at ETS. The files were then merged into a comprehensive, integrated database. Chapter 6 describes the transcribed data files, the procedure of merging them to create the State Assessment database, the results of the quality control process, and the procedures used to create data products for use in secondary research.

1.8 THE 1996 STATE ASSESSMENT DATA

The basic information collected from the State Assessment in mathematics consisted of the responses of the assessed students to the 144 mathematics exercises at grade 4 and 164 exercises at grade 8. To limit the assessment time for each student to about one hour, a variant of matrix sampling called BIB spiraling was used to assign a subset of the full exercise pool to each student. At each grade level, the set of items was divided into 13 unique blocks, each requiring 15 minutes for completion. Each assessed student received a booklet containing three of the 13 blocks according to a design that ensured that each block was administered to a representative sample of students within each jurisdiction. The data also included responses to the background questionnaires (described in Section 1.4 of this chapter and in Chapter 2).

The national data to which the State Assessment results were compared came from nationally representative samples of public- and nonpublic-school students in the fourth and eighth grade. These samples were part of the full 1996 national mathematics assessment in which nationally representative samples of students in public and nonpublic schools were assessed from three age cohorts: fourth-, eighth-, and twelfth-grade students.

The assessment instruments used in the State Assessment were also used in the fourth- and eighth-grade national assessments and were administered using almost identical procedures in both assessments. The time of testing for the state assessments (January 29-March 4, 1996) occurred within the time of testing of the national assessment (January 3-April 5, 1996). However, the state assessments differed from the national assessment in one important regard: Westat staff collected the data for the national assessment while, in accordance with the NAEP legislation, data collection activities for the State Assessment were the responsibility of each participating jurisdiction. These activities included ensuring the participation of selected schools and students, assessing students according to standardized procedures, and observing procedures for test security. To provide quality control of the State Assessment, a random half of the administrations in jurisdictions participating in a State Assessment for the first time was monitored; 25 percent of the administrations in other jurisdictions was monitored.

1.9 WEIGHTING AND VARIANCE ESTIMATION

A complex sample design was used to select the students to be assessed in each of the participating jurisdictions. The properties of a sample from a complex design are very different from those of a simple random sample in which every student in the target population has an equal chance of selection and every combination of students of the size of the sample has an equal chance of selection. The properties of the sample from the complex State Assessment design were taken into account in the analysis of the assessment data.

One way that the properties of the sample design were addressed was by using sampling weights to account for the fact that the probabilities of selection were not identical for all students. These weights also included adjustments for school and student nonresponse. All population and subpopulation characteristics based on the State Assessment data used sampling weights in their estimation. Chapter 7 provides details on the computation of these weights.

In addition to deriving appropriate estimates of population characteristics, it is essential to obtain appropriate measures of the degree of uncertainty of those statistics. One component of uncertainty is a result of sampling variability, which measures the dependence of the results on the particular sample of students actually assessed. Because of the effects of cluster selection (schools are selected first, then students are selected within those schools), observations made on different students cannot be assumed to be independent of each other (and, in fact, are generally positively correlated). As a result, classical variance estimation formulas will produce incorrect results. Instead, a variance estimation procedure that takes the characteristics of the sample into account was used for all analyses. This procedure, called *jackknife variance estimation*, is discussed in Chapter 7 and described more fully in *The NAEP 1994 Technical Report* (Allen, Kline, & Zelenak, 1996).

Jackknife variance estimation provides a reasonable measure of uncertainty for any statistic based on values observed without error. Statistics such as the average proportion of students correctly answering a given question meet this requirement, but other statistics based on estimates of student mathematics performance, such as the average mathematics scale score of a subpopulation, do not. Because each student typically responds to relatively few items within a particular mathematics content strand, there exists a nontrivial amount of imprecision in the measurement of the proficiency of a given student. This imprecision adds an additional component of variability to statistics based on estimates of individual scale scores. The estimation of this component of variability is discussed in Chapter 8.

1.10 PRELIMINARY DATA ANALYSIS

After the computer files of student responses were received from NCS, all cognitive and noncognitive items were subjected to an extensive item analysis. Each block of cognitive items was subjected to item analysis routines, which yielded for each item the number of respondents, the percentage of responses in each response category for an item, the percentage who omitted the item, the percentage who did not reach the item, and the correlation between the item score and the item block score. In addition, the item analysis program provided summary statistics for each block, including a reliability (internal consistency) coefficient. These analyses were used to check on the scoring of the items, to verify the appropriateness of the difficulty level of the items, and to check for speededness. The results also were reviewed by knowledgeable project staff in search of aberrations that might signal unusual results or errors in the database.

Tables of the weighted percentages of students with responses in each category of each cognitive and background item were created and distributed to each jurisdiction. Additional analyses comparing the data from the monitored sessions with those from the unmonitored sessions were conducted to determine the comparability of the assessment data from the two types of administrations. Differential item functioning (DIF) analyses were carried out to identify items new to the assessment that were differentially difficult for various subgroups and to reexamine such items with respect to their fairness and their appropriateness for inclusion in the scaling process. Further details of the preliminary analyses conducted on the data appear in Chapter 9.

1.11 SCALING THE ASSESSMENT ITEMS

The primary analysis and reporting of the results from the State Assessment program used item response theory (IRT) scale-score models. Scaling models quantify a respondent's tendency to provide correct answers to the domain of items contributing to a scale as a function of a parameter called proficiency, estimated by a scale score. The scale scores can be viewed as a summary measure of performance across the domain of items that make up the scale. Three distinct IRT models were used for scaling: 1) three-parameter logistic models for multiple-choice items; 2) two-parameter logistic models for short constructed-response items that were scored correct or incorrect, and 3) generalized partial-credit models for short and extended constructed-response items that were scored on a multipoint scale. Chapter 8 provides an overview of the scaling models used. Further details on the application of these models are provided in Chapter 9.

A series of scales were created for the State Assessment to summarize students' mathematics performance. These scales were defined identically to those used for the scaling of the national NAEP fourth- and eighth-grade mathematics data. Five content strand scales, based on the paradigm described in Chapter 2, were created to correspond to the following areas: *number sense, properties, and operations*, *measurement*; *geometry and spatial sense*; *data analysis, statistics, and probability*, and *algebra and functions*. Although the items comprising each scale were identical to those used for the national program, the item parameters for the State Assessment scales were estimated from the combined data from all jurisdictions participating in the State Assessment. Item parameter estimation was based on an item calibration sample consisting of an approximately 25 percent sample of all the available data. To ensure equal representation in the scaling process, each jurisdiction was equally represented in the item calibration sample, as were the monitored and unmonitored administrations from each jurisdiction. Chapter 9 provides further details about the item parameter estimation.

The fit of the IRT model to the observed data was examined within each scale by comparing the estimates of the empirical item characteristic functions with the theoretic curves. For multiple-choice and dichotomously-scored constructed response items, nonmodel-based estimates of the expected proportions of correct responses to each item for students with various levels of scale scores were compared with the fitted item response curve; for partial-credit polytomously-scored constructed-response items, the comparisons were based on the expected proportions of students with various levels of scale scores who achieved each item score level. In general, the item-level results were well fit by the scaling models.

Using the item parameter estimates, estimates of various population statistics were obtained for each jurisdiction. The NAEP methods use random draws ("plausible values") from scale score distributions for each student to compute population statistics. Plausible values are not optimal individual student scale scores; instead, they serve as intermediate values to be used in estimating population characteristics. Under the assumptions of the scaling models, these population estimates will be consistent, in the sense that the estimates approach the model-based population values as the sample size increases. This would not be the case for population estimates obtained by aggregating optimal individual scale scores. Chapter 8 provides further details on the computation and use of plausible values.

In addition to the plausible values for each scale, a composite score scale of the five mathematics content strand scales was created as a measure of overall mathematics proficiency. This composite was a weighted average of the five mathematics content strand scales in which the weights were proportional to the relative importance assigned to each content strand as specified in the mathematics objectives. Consistent with the mathematics framework, the weights used to define the composite were somewhat different at grades 4 and 8. The definitions of the composites for the State Assessment program at grades 4 and 8 were identical to those used for the national fourth- and eighth-grade mathematics assessments.

1.12 LINKING THE STATE RESULTS TO THE NATIONAL RESULTS

A major purpose of the State Assessment program was to allow each participating jurisdiction to compare its 1996 results with the nation as a whole and with the region of the country in which that jurisdiction is located. For meaningful comparisons to be made between each of the State Assessment jurisdictions and the relevant national sample, results from these two assessments had to be expressed in terms of a similar system of scale units.

The results from the State Assessment program were linked to those from the national assessment through linking functions determined by comparing the results for the aggregate of all fourth- and eighth-grade public-school students assessed in the State Assessment with the results for public-school students of the matching grade within a subsample (the National Linking sample) of the national NAEP sample. The National Linking sample for a given grade is a representative sample of the population of all grade-eligible public-school students within the aggregate of the 45 participating states and the District of Columbia (excluding Guam and the two DoDEA jurisdictions). Specifically, the grade 4 National Linking sample consists of all fourth-grade students in public schools in the states and the District of Columbia who were assessed in the national mathematics assessment. The grade 8 National Linking sample is equivalently defined for eighth-grade students who participated in the national assessment.

For each grade, a linear equating within each scale was used to link the results of the State Assessment to the national assessment. For each scale, the adequacy of linear equating was evaluated by comparing the distribution of mathematics scale scores based on the aggregation of all assessed students at each grade from the participating states and the District of Columbia with the equivalent distribution based on the students in the National Linking sample for the matching grade. In the estimation of these distributions, the students were weighted to represent the target population of public-school students in the specified grade in the aggregation of the states and the District of Columbia. If a linear equating was adequate, the distribution for the aggregate of states and the District of Columbia and that for the National Linking sample would have, to a close approximation, the same shape, in terms of the skewness, kurtosis, and higher moments of the distributions. The only differences in the distributions allowed by linear equating are in the means and variances. This has been found to be the case for the 1996 State Assessment program.

Each mathematics content strand scale was linked by matching the mean and standard deviation of the scale score averages across all fourth- or eighth-grade students in the State Assessment to the corresponding scale mean and standard deviation across all students in the matching grade National Linking sample. The results for nonpublic-school students were transformed to the national scale using the same transformation as was used for the public-school student results. Further details of the linking are given in Chapter 9.

1.13 REPORTING THE STATE ASSESSMENT RESULTS

Each jurisdiction in the State Assessment received a summary report providing its results with accompanying text and tables, national and regional comparisons, and (for jurisdictions that had participated in the 1990 and 1992 state programs) trend comparisons to the previous assessments. These reports were generated by a computerized report-generation system for which graphic designers, statisticians, data analysts, and report writers collaborated to develop shells of the reports in advance of the analysis. These prototype reports were provided to State Education Agency personnel for their reviews and comments. The results of the data analysis were then automatically incorporated into the reports, which display tables and graphs of the results and interpretations of those results, including indications of subpopulation comparisons of statistical and substantive significance.

Each report contains state-level estimates of average scale score, both for the state as a whole and for categories of the key reporting variables: gender, race/ethnicity, level of parental education, and type of location. Results are presented for each mathematics scale score, for the overall mathematics composite scale score, and by achievement levels. Results are also reported for a variety of other subpopulations based on variables derived from the student, teacher, and school questionnaires. Standard errors are included for all statistics.

A second report, the *NAEP 1996 Mathematics Report Card for the Nation and the States*, highlights key assessment results for the nation and summarizes results across the jurisdictions participating in the assessment. This report contains composite scale-score results (scale-score means, proportions at or above achievement levels, etc.) for the nation, each of the four regions of the country, and each jurisdiction participating in the State Assessment, both overall and by the primary reporting variables. In addition, overall results are reported for each of the content strand scales.

The third type of summary report is entitled *Cross-State Data Compendium from the NAEP 1996 Mathematics Assessment*. Like the *Report Card*, the *Compendium* reports results for the nation and for all of the jurisdictions participating in the State Assessment. The *Compendium* contains most of the tables included in the *Report Card* plus additional tables that provide composite scale-score results for a large number of secondary reporting variables.

The fourth type of summary report is a six-section almanac. One section of the almanac includes information about the percentages of students at or above the three composite scale achievement levels (and below basic). Three of the sections of the almanac present analyses based on responses to each of the questionnaires (student, mathematics teacher, and school) administered as part of the State Assessment. Another section of the almanac, the scale section, reports scale score means and associated standard errors for the five mathematics content strand scales. Results in this section are also reported for the total group in each jurisdiction, as well as for select subgroups of interest. The final section of the almanac, the "p-value" section, provides the total-group proportion of correct responses to each cognitive item included in the assessment.

The production of the state reports, *Mathematics Report Card, Data Compendium*, and the almanacs required a large number of decisions about a variety of data analysis and statistical issues. For example, because the demographic characteristics of the fourth- and eighth-grade public-school students vary widely by jurisdiction, the proportions of students in the various categories of the race/ethnicity, parental education, and type of location variables also varied by jurisdiction. Chapter 10 documents the major conventions and statistical procedures used in generating the state reports, *Mathematics Report Card, Data Compendium*, and the almanacs. The chapter describes the rules, based on effect size and sample size considerations, that were used to establish whether a particular category contained sufficient data for reliable reporting of results for a particular jurisdiction. Chapter 10 also describes the multiple comparison and effect size-based inferential rules that were used for evaluating the statistical and substantive significance of subpopulation comparisons.

To provide information about the generalizability of the results, a variety of information about participation rates was reported for each state and jurisdiction. This included the school participation rates, both in terms of the initially selected samples of schools and in terms of the finally achieved samples, including replacement schools. The student participation rates, the rates of students excluded due to being identified as SD or LEP, and the estimated proportions of assessed students who are classified as SD or LEP were also reported by jurisdiction. These rates are described and reported in Appendix B.

Chapter 2

DEVELOPING THE MATHEMATICS OBJECTIVES, COGNITIVE ITEMS, BACKGROUND QUESTIONS, AND ASSESSMENT INSTRUMENTS[1]

Jeff Haberstroh and Chancey Jones
Educational Testing Service

2.1 OVERVIEW

A new framework was developed for the 1996 NAEP State Assessment in mathematics. This framework represents an enhancement of the framework used for the 1992 and 1990 assessments. Similar to all previous NAEP assessments, the mathematics framework was developed through a broad-based consensus process. The National Assessment Governing Board (NAGB) contracted with The College Board to prepare the framework for the 1996 mathematics assessment. The development process involved a committee of mathematicians and mathematics educators. Educators, scholars, and citizens, representative of many diverse constituencies and points of view, participated in the national consensus process to design objectives for the assessment.

The instrument used in the 1996 mathematics assessment was composed of a combination of new items developed for administration in 1996 and items from the 1992 and 1990 assessments. Those items that were carried over from the 1992 and 1990 instruments comprised approximately 60 percent of the 1996 instrument. The remaining portion was made up of new items developed according to the recommendations included in the enhanced specifications for the 1996 framework. Maintaining approximately 60 percent of the instrument across the two assessment years (1992 and 1996) allowed for the reporting of trends in mathematics performance. At the same time, developing a new set of items made it possible to release approximately 40 percent of the 1992 assessment for public use.

In developing the new portion of the 1996 NAEP mathematics assessment, the same procedures used in 1992 were followed, but using the newly enhanced specifications from the framework. After careful reviews of the framework, items were developed that were aligned with the specifications described in the framework. All items underwent extensive reviews by specialists in mathematics, measurement, and bias/sensitivity, as well as reviews by state representatives.

The framework and item development efforts were governed by four major considerations:

- The framework for the mathematics assessment had to be developed through a consensus process.

[1] Jeff Haberstroh and Chancey Jones coordinated the development of the mathematics assessment instruments.

- As outlined in the ETS proposal for the administration of the NAEP cooperative agreement (ETS, 1992), the development of the items had to be guided by a Mathematics Instrument Development Panel and receive further review by state representatives and classroom teachers from across the country. In addition, the items had to be carefully reviewed for potential bias.

- As described in the ETS Standards of Quality and Fairness (ETS, 1987), all materials developed at ETS had to be in compliance with specified procedures.

- As per federal regulations, all NAEP cognitive and background items had to be submitted to a federal clearance process.

This chapter includes details about developing the specifications and items for the State Assessment in mathematics. The chapter also describes the instruments, the student assessment booklets, mathematics teacher questionnaire, school characteristics and policies questionnaire, and SD/LEP student questionnaire. Various committees worked on the development of the framework, objectives, and items for the mathematics assessment. The list of committee members and consultants who participated in the 1996 development process is provided in Appendix A.

2.2 FRAMEWORK AND ASSESSMENT DESIGN PRINCIPLES

The guidelines for the development of the new mathematics framework specified that the design of the framework contain some performance-oriented exercises in mathematics with a focus on problem-solving and providing students with opportunities to communicate their understanding in mathematics. The framework would embody a broad view of mathematics that addressed the high levels of mathematical literacy needed for employability, personal development, and citizenship. Also, the framework would take into account findings of contemporary research on mathematics and mathematics education, and would expand the range of assessment tools to include formats that more closely resembled desired classroom activities.

The development was further guided by the consideration that the assessment should reflect many of the states' curricular emphases and objectives in addition to what various scholars, practitioners, and interested citizens believed should be included in the curriculum. Accordingly, the committee focused on several frames of reference:

- The purpose of the NAEP mathematics assessment is to provide information about the progress and achievement of students in general rather than to test individual students' ability. NAEP is designed to inform policymakers and the public about mathematics ability in the United States. Furthermore, NAEP state data can be used to inform states of their students' relative strengths and weaknesses.

- The term "mathematical literacy" encompasses such broad skills and abilities as being able to reason numerically, algebraically, geometrically, spatially, and with data; identify and apply problem-solving strategies appropriately in situations; and use the language of mathematics to construct clear and coherent responses to problems or tasks.

- The mathematics assessment should use authentic problems and tasks that address important mathematics concepts and skills so that the assessment tool will demonstrate a close link to desired classroom instruction and students' mathematics experiences.

- Every effort should be made to make the best use of available methodology and resources in driving assessment capabilities forward.

- Every effort must be made in developing the assessment to represent a variety of opinions, perspectives, and emphases among professionals in universities, as well as in state and local school districts.

2.3 FRAMEWORK DEVELOPMENT PROCESS

NAGB is responsible for guiding NAEP, including the development of the mathematics assessment objectives and test specifications. Appointed by the Secretary of Education from lists of nominees proposed by the board itself in various statutory categories, the 24-member board is composed of state, local, and federal officials, as well as educators and members of the public.

Under contract with NAGB, The College Board convened a committee during 1991 and 1992 to develop an enhanced version of the framework that had been used for the 1990 and 1992 assessments. (Note that the 1992 mathematics assessment had already been developed at the time the development of this enhanced framework was just beginning.) The enhanced version was needed to better reflect the rapid evolution of mathematics instruction that was underway in the early 1990s as a result of the emergence of the National Council of Teachers of Mathematics *Curriculum and Evaluation Standards for School Mathematics* (NCTM *Standards*). The *Standards* were rapidly becoming one of the acknowledged barometers for measuring achievement in mathematics education. The development process for the enhanced framework was based on consensus building, and included the committee listed in Appendix A.

During this development process, input and reactions were continually sought from a wide range of members of the mathematics field, experts in assessment, school administrators, and state staff in mathematics assessment. In particular, the process was informed by recommendations of leading professional organizations in mathematics.

2.4 FRAMEWORK FOR THE ASSESSMENT

The framework for the 1996 mathematics assessment is organized according to a five-by-three matrix of content strands by mathematical abilities. The content strands are:

- Number Sense, Properties, and Operations;
- Measurement;
- Geometry and Spatial Sense;

- Data Analysis, Statistics, and Probability; and
- Algebra and Functions.

These content strands were assessed across the three mathematical abilities of:

- Conceptual Understanding,
- Procedural Knowledge, and
- Problem Solving.

While most questions in the assessment assessed understanding of a single subtopic in a content strand and a single mathematical ability, some questions assessed multiple content subtopics, strands, and/or multiple mathematical abilities. Figures 2-1 and 2-2 describe the five content strands and three mathematical abilities that guided the development of the 1996 State Assessment program in mathematics.

Figure 2-1

Descriptions of Content Strands in Mathematics

Number Sense, Properties, and Operations

This strand focuses on students' understanding of numbers (whole numbers, fractions, decimals, integers, real numbers, and complex numbers), operations, and estimation, and their application to real-world situations. Students will be expected to demonstrate an understanding of numerical relationships as expressed in ratios, proportions, and percents. Students also will be expected to understand properties of numbers and operations, generalize from number patterns, and verify results.

Measurement

The measurement strand focuses on understanding of the process of measurement and on the use of numbers and measures to describe and compare mathematical and real-world objects. Students will be asked to identify attributes, select appropriate units and tools, apply measurement concepts, and communicate measurement-related ideas.

Geometry and Spatial Sense

As described in the NCTM *Standards*, spatial sense must be an integral component of the study and assessment of geometry. Understanding spatial relationships allows students to use the dynamic nature of geometry to connect mathematics to their world.

This content strand is designed to extend well beyond low-level identification of geometric shapes into transformations and combinations of those shapes. Informal constructions and demonstrations (including drawing representations), along with their justifications, take precedence over more traditional types of compass-and-straightedge constructions and proofs. While reasoning is addressed throughout all of the content strands, this strand continues to lend itself to the demonstration of reasoning within both formal and informal settings. The extension of proportional thinking to similar figures and indirect measurement is an important connection here.

Data Analysis, Statistics, and Probability

The important skills of collecting, organizing, reading, representing, and interpreting data will be assessed in a variety of contexts to reflect the pervasive use of these skills in dealing with information. Statistics and statistical concepts extend these basic skills to include analyzing and communicating increasingly sophisticated interpretations of data. Dealing with uncertainty and making predictions about outcomes require an understanding not only of the meaning of basic probability concepts but also the application of those concepts in problem-solving and decision-making situations.

Figure 2-1 (continued)
Descriptions of Content Strands in Mathematics

Questions will emphasize appropriate methods for gathering data, the visual exploration of data, a variety of ways of representing data, and the development and evaluation of arguments based on data analysis. Students will be expected to apply these ideas in increasingly sophisticated situations that require increasingly comprehensive analysis and decision making.

Algebra and Functions

This strand extends from work with simple patterns at grade 4, to basic algebra concepts at grade 8, to sophisticated analysis at grade 12, and involves not only algebra but also precalculus and some topics from discrete mathematics. As described in the NCTM *Standards*, these algebraic concepts are developed throughout the grades with informal modeling done at the elementary level and with increased emphasis on functions at the secondary level. The nature of the algebraic concepts and procedures included in the assessment at all levels reflects the NCTM *Standards*. Students will be expected to use algebraic notation and thinking in meaningful contexts to solve mathematical and real-world problems, specifically addressing an increasing understanding of the use of functions (including algebraic and geometric) as a representational tool.

Figure 2-2
Descriptions of Mathematical Abilities

Conceptual Understanding

Students demonstrate conceptual understanding in mathematics when they provide evidence that they can recognize, label, and generate examples and nonexamples of concepts; use and interrelate models, diagrams, manipulatives, and varied representations of concepts; identify and apply principles (i.e., valid statements generalizing relationships among concepts in conditional form); know and apply facts and definitions; compare, contrast, and integrate related concepts and principles to extend the nature of concepts and principles; recognize, interpret, and apply the signs, symbols, and terms used to represent concepts; or interpret the assumptions and relations involving concepts in mathematical settings.

Conceptual understanding reflects a student's ability to reason in settings involving the careful application of concept definitions, relations, or representations of either. Such an ability is reflected by student performance that indicates the production of examples, common or unique representations, or communications indicating the ability to manipulate central ideas about the understanding of a concept in a variety of ways.

Procedural Knowledge

Students demonstrate procedural knowledge in mathematics when they select and apply appropriate procedures correctly; verify or justify the correctness of a procedure using concrete models or symbolic methods; or extend or modify procedures to deal with factors inherent in problem settings.

Procedural knowledge includes the various numerical algorithms in mathematics that have been created as tools to meet specific needs efficiently. Procedural knowledge also encompasses the abilities to read and produce graphs and tables, execute geometric constructions, and perform noncomputational skills such as rounding and ordering. These latter activities can be differentiated from conceptual understanding by the task context or presumed student background—that is, an assumption that the student has the conceptual understanding of a representation and can apply it as a tool to create a product or to achieve a numerical result. In these settings, the assessment question is how well the student executed a procedure or how well the student selected the appropriate procedure to effect a given task.

Procedural knowledge is often reflected in a student's ability to connect an algorithmic process with a given problem situation, to employ that algorithm correctly, and to communicate the results of the algorithm in the context of the problem setting. Procedural understanding also encompasses a student's ability to reason through a situation, describing why a particular procedure will give the correct answer for a problem in the context described.

Figure 2-2 (continued)
Descriptions of Mathematical Abilities

Problem Solving

In problem solving, students are required to use their accumulated knowledge of mathematics in new situations. Problem solving requires students to recognize and formulate problems; determine the sufficiency and consistency of data; use strategies, data, models, and relevant mathematics; generate, extend, and modify procedures; use reasoning (i.e., spatial, inductive, deductive, statistical, or proportional) in new settings; and judge the reasonableness and correctness of solutions. Problem solving situations require students to connect all of their mathematical knowledge of concepts, procedures, reasoning, and communication/representational skills in confronting new situations. As such, these situations are, perhaps, the most accurate measures of students' proficiency in mathematics.

2.5 DISTRIBUTION OF ASSESSMENT ITEMS

In the 1996 mathematics assessment, a portion of the items at one grade also appeared at the other grades. Specifically, for the grades included in the State Assessment, 104 items appeared at grade 4 only, 54 items appeared at grades 4 and 8 only, and 129 items appeared at grade 8 only.

Tables 2-1 and 2-2 show the percentages of each content strand and mathematical ability in the assessment as specified in the mathematics framework.

Table 2-1
Minimum Distribution of Items by Grade and Content Strand

Content Strand	Grade 4 Target	Grade 4 Actual[1]	Grade 8 Target	Grade 8 Actual[1]
Number Sense, Properties, and Operations	40%-70%[2]	42%	25%-60%[2]	26%
Measurement	20%	18%	15%	16%
Geometry and Spatial Sense	15%	16%	20%	20%
Data Analysis, Statistics, and Probability	10%	12%	15%	19%
Algebra and Functions	15%	12%	25%	19%

[1]Actual percentages are based on the classifications agreed upon by NAEP's Instrument Development Panel.
[2]For this category, these percentages are the minimum and maximum that are acceptable, respectively.

Table 2-2
Minimum Distribution of Items by Grade and Mathematical Ability

Mathematical Ability	Grade 4 Target	Grade 4 Actual[1]	Grade 8 Target	Grade 8 Actual[1]
Conceptual Understanding	33%	37%	33%	38%
Procedural Knowledge	33%	22%	33%	25%
Problem Solving	33%	41%	33%	37%

Note: Some items carry multiple classifications.
[1]Actual percentages are based on the classifications agreed upon by NAEP's Instrument Development Panel.

2.6 DEVELOPING THE COGNITIVE ITEMS

The development of cognitive items began with careful field testing, both locally and nationally, of grade-appropriate questions and tasks for the assessment. Items were selected from a pool of questions that were written by teachers from across the country as well as by mathematics assessment specialists on staff at ETS. The framework stated that the assessment should include some performance-based questions and tasks that require students to reason and make connections within and across different content strands of mathematics. Final selections of questions used in the 1996 assessment were approved by the Mathematics Instrument Development Panel.

The State Assessment included constructed-response (short and extended) and multiple-choice items. The decision to use a specific item type was based on a consideration of the most appropriate format for assessing the particular objective. Both types of constructed-response items were designed to provide an in-depth view of students' ability to communicate their understanding of important concepts in mathematics. Short constructed-response questions (scored with either a 2- or 3-level scoring rubric) were used when students needed to respond briefly in order to demonstrate full comprehension. Extended constructed-response questions (scored with a 4- or 5-level scoring rubric) were used when the task required more thoughtful consideration of the problem and engagement in more complex reasoning processes. Multiple-choice items were used when a straightforward, single correct answer was required. Guided by the NAEP mathematics framework, the Instrument Development Panel monitored the development of all three types of items to assess objectives in the framework. For more information about item scoring, see Chapter 5.

The State Assessment at each grade consisted of 13 blocks of items, each 15 minutes in length. As with the 1992 instrument development effort, a detailed series of steps was used to create the new assessment items for 1996 that reflected the objectives.

1. Item specifications and prototype items were provided in the *1996 Mathematics Framework*.

2. The Mathematics Instrument Development Panel provided guidance to NAEP staff about how the objectives could be measured given the realistic constraints of resources and the feasibility of measurement technology. The Panel made recommendations about priorities for the assessment and types of items to be developed.

3. Items were chosen for the assessment through an extensive selection process that involved the input of teachers from across the country as well as the Mathematics Instrument Development Panel.

4. Item writers from both inside and outside ETS were selected based on their knowledge about mathematics education and experience in creating items according to specifications.

5. The items were reviewed and revised by NAEP/ETS staff and external test specialists.

6. Items were reviewed by grade-appropriate teachers across the country for developmental appropriateness.

7. Representatives from the State Education Agencies met and reviewed all items and background questionnaires (see Section 2.8 for a discussion of the background questionnaires).

8. Language editing and sensitivity reviews were conducted according to ETS quality control procedures.

9. Field test materials were prepared, including the materials necessary to secure clearance by the Office of Management and Budget.

10. The field test was conducted in many states, the District of Columbia, and three territories.

11. Representatives from State Education Agencies met and reviewed the field test results.

12. Based on the field test analyses, new items for the 1996 assessment were revised, modified, and re-edited, where necessary. The items once again underwent ETS sensitivity review.

13. The Mathematics Instrument Development Panel approved the selection of items to include in the 1996 assessment.

14. After a final review and check to ensure that each assessment booklet and each block met the overall guidelines for the assessment, the booklets were typeset and printed. In total, the items that appeared in the State Assessment underwent 86 separate reviews, including reviews by NAEP/ETS staff, external reviewers, State Education Agency representatives, and federal officials.

2.7 STUDENT ASSESSMENT BOOKLETS

Each student assessment booklet included one section of general background questions, one section of mathematics background questions, a section of motivation questions, and three sections of mathematics cognitive questions. The assembly of mathematics blocks into booklets and their subsequent assignment to sampled students was determined by a *balanced incomplete block* (BIB) design with *spiraled* administration. The overall assessment time for each student was approximately one hour.

The mathematics cognitive blocks were assigned to booklets in such a way that each block appeared in the same number of booklets and every pair of blocks appeared together in exactly one booklet. This is the *balanced* part of the balanced incomplete block design. It is an *incomplete* block design because no booklet contained all items and hence there is incomplete data for each assessed student.

The assessment booklets were then *spiraled* and bundled. Spiraling involves interweaving the booklets in a systematic sequence so that each booklet appears an appropriate number of times in the sample. The bundles were designed so that each booklet would appear equally often in each position in a bundle.

The final step in the BIB-spiraling procedure was the assigning of the booklets to the assessed students. The students within an assessment session were assigned booklets in the order in which the booklets were bundled. Thus, students in an assessment session received different booklets, and only a few students in a session received the same booklet. In most jurisdictions in the State Assessment, up to 30 students were selected from each school, with the aim of providing an initial sample size of approximately 3,000 public-school students per jurisdiction per grade, who responded to each item. The nonpublic-school samples differed in size across the jurisdictions, with the number of schools selected proportional to the nonpublic-school enrollment within each jurisdiction. Typically, about 20 to 25 nonpublic schools (per grade) were included for each jurisdiction.

Table 2-3 provides the composition of each block of items administered in the State Assessment program in mathematics. Table 2-4 shows the order of the blocks in each booklet and how the 13 cognitive blocks were arranged across the 26 booklets to achieve the BIB-spiral design. The 1996 design was identical to that used in 1992. The new blocks that were developed for the 1996 State Assessment (M5, M7, M12, M14, and M15) were arranged within the booklet design in the same manner as were the 1992 blocks that they replaced.

Table 2-3
Cognitive and Noncognitive Block Information
Grade 4/Grade 8

Block	Type	Total Number of Items	Number of Multiple-Choice Items	Number of Constructed-Response Items	Numbers of Booklets Containing Block[2]
BM1	Common Background	24/26	24/26	00/00	26
MB1	Mathematics Background	25/31	25/31	00/00	26
MB	Mathematics Motivation	05/05	05/05	00/00	26
M3	Mathematics Cognitive (Trend)	13/13	09/09	04/04	6-7
M4	Mathematics Cognitive[1] (Trend)	14/21	14/21	00/00	6-7
M5	Mathematics Cognitive[1]	10/11	04/06	06/05	6-7
M6	Mathematics Cognitive[1] (Trend)	11/16	00/00	11/16	6-7
M7	Mathematics Cognitive[1] (Manipulatives)	08/10	03/05	05/05	6-7
M8	Mathematics Cognitive (Calculator)	15/18	14/16	01/02	6-7
M9	Mathematics Cognitive	12/09	09/05	03/04	6-7
M10	Mathematics Cognitive[1] (Manipulatives)	06/07	00/00	06/07	6-7
M11	Mathematics Cognitive[1]	16/19	11/13	05/06	6-7
M12	Mathematics Cognitive (Calculator)	09/09	05/04	04/05	6-7
M13	Mathematics Cognitive	12/11	06/06	06/05	6-7
M14	Mathematics Cognitive (Calculator)	10/09	04/05	06/04	6-7
M15	Mathematics Cognitive (Ruler/Protractor)	10/09	03/04	07/05	6-7

[1]These blocks contained some items that appeared at both grades 4 and 8.
[2]Booklets that contained a 30-minute theme block had six sections; booklets that did not contain a 30-minute theme block had seven sections. There were no theme block booklets in the 1996 State Assessment.

Table 2-4
Booklet Contents for Both Grades

Booklet Number	Common Background Block	Mathematics Background Block	Cognitive Blocks 1st	2nd	3rd	Mathematics Motivation Block
M101	BM1	MB1	M3	M4	M7	MB
M102	BM1	MB1	M4	M5	M8	MB
M103	BM1	MB1	M5	M6	M9	MB
M104	BM1	MB1	M6	M7	M10	MB
M105	BM1	MB1	M7	M8	M11	MB
M106	BM1	MB1	M8	M9	M12	MB
M107	BM1	MB1	M9	M10	M13	MB
M108	BM1	MB1	M10	M11	M14	MB
M109	BM1	MB1	M11	M12	M15	MB
M110	BM1	MB1	M12	M13	M3	MB
M111	BM1	MB1	M13	M14	M4	MB
M112	BM1	MB1	M14	M15	M5	MB
M113	BM1	MB1	M15	M3	M6	MB
M114	BM1	MB1	M3	M5	M10	MB
M115	BM1	MB1	M4	M6	M11	MB
M116	BM1	MB1	M5	M7	M12	MB
M117	BM1	MB1	M6	M8	M13	MB
M118	BM1	MB1	M7	M9	M14	MB
M119	BM1	MB1	M8	M10	M15	MB
M120	BM1	MB1	M9	M11	M3	MB
M121	BM1	MB1	M10	M12	M4	MB
M122	BM1	MB1	M11	M13	M5	MB
M123	BM1	MB1	M12	M14	M6	MB
M124	BM1	MB1	M13	M15	M7	MB
M125	BM1	MB1	M14	M3	M8	MB
M126	BM1	MB1	M15	M4	M9	MB

2.8 QUESTIONNAIRES

As part of the State Assessment (as well as the national assessment), a series of questionnaires was administered to students, teachers, and school administrators. Similar to the development of the cognitive items, the development of the policy issues and questionnaire items was a consensual process that involved staff work, field testing, and review by external advisory groups. A Background Questionnaire Panel drafted a set of policy issues and made recommendations regarding the design of the questions. They were particularly interested in capitalizing on the unique properties of NAEP and not duplicating other surveys (e.g., the National Survey of Public and Private School Teachers and Administrators, the School and Staffing Survey, and the National Educational Longitudinal Study).

The Panel recommended a focused study that addressed the relationship between student achievement and instructional practices. The policy issues, items, and field test results were reviewed by the group of external consultants who identified specific items to be included in the final questionnaires. In addition, the Mathematics Instrument Development Panel and state representatives were consulted on the appropriateness of issues addressed in the questionnaires as they relate to mathematics instruction and achievement. The items underwent internal ETS review procedures to ensure fairness and quality and were then assembled into questionnaires.

2.8.1 Student Questionnaires

In addition to the cognitive items, the 1996 State Assessment included three student questionnaires; two sets of general and mathematics background questions designed to gather contextual information about students, their instructional experiences in mathematics, and their attitudes toward mathematics, and one set of background questions, given to students at the end of each booklet to determine their motivation in completing the assessment and their familiarity with assessment tasks. In order to ensure that all fourth-grade students understood the questions and had every opportunity to respond to them, the three questionnaires were read aloud by administrators as fourth-grade students read along and responded in their booklets. Background questionnaires were not read aloud to eighth-grade students.

The **student demographics (common background) questionnaire** included questions about race/ethnicity, language spoken in the home, mother's and father's level of education, reading materials in the home, homework, attendance, which parents live at home, and which parents work. This questionnaire was the first section in every booklet. In many cases the questions used were continued from prior assessments, so as to document changes in contextual factors that occur over time.

The second section of background questions was the **mathematics background questionnaire**. Categories of information represented in this section include:

> *Time Spent Studying Mathematics*: Students were asked to describe both the amount of instruction they received in mathematics and the time spent on mathematics homework.
>
> *Instructional Practices*: Students were asked to report their instructional experiences related to mathematics in the classroom, including group work, special projects, and writing in response to mathematics. In addition, they were asked about the instructional practices of their mathematics teachers and the extent to which the students themselves discussed what they did in class and demonstrated use of skills and strategies.
>
> *Attitudes Towards Mathematics*: Students were asked a series of questions about their attitudes and perceptions about mathematics.

The **student motivation questionnaire** asked students to describe how hard they tried on the NAEP mathematics assessment, how difficult they found the assessment, how many questions they thought they got right, how important it was for them to do well, and how familiar they were with the assessment format.

2.8.2 Teacher, School, and SD/LEP Student Questionnaires

To supplement the information on instruction reported by students, the mathematics teachers of the students participating in the State Assessment were asked to complete a questionnaire about their instructional practices, teaching backgrounds, and characteristics. The teacher questionnaire contained two parts. The first part pertained to the teachers' background and general training. The second part pertained to specific training in teaching mathematics and the procedures the teacher uses for *each class* containing an assessed student, as well as collecting information on teachers' awareness and knowledge of the NCTM *Standards*.

The **Teacher Questionnaire, Part I: Background and General Training** included questions pertaining to gender, race/ethnicity, years of teaching experience, certification, degrees, major and minor fields of study, course work in education, course work in specific subject areas, amount of in-service training, extent of control over instructional issues, and availability of resources for their classroom.

The **Teacher Questionnaire, Part II: Training in Mathematics and Classroom Instructional Information** included questions on the teacher's exposure to various issues related to mathematics and teaching mathematics through pre- and in-service training, ability level of students in the class, whether students were assigned to the class by ability level, time on task, homework assignments, frequency of instructional activities used in class, methods of assessing student progress in mathematics, instructional emphasis given to the mathematics abilities covered in the assessment, and use of particular resources.

A **School Characteristics and Policies Questionnaire** was given to the principal or other administrator of each school that participated in the State Assessment program. This information provided an even broader picture of the instructional context for students' mathematics achievement. This questionnaire included questions about background and characteristics of school principals, length of school day and year, school enrollment, absenteeism, drop-out rates, size and composition of teaching staff, policies about grouping students, curriculum, testing practices and uses, special priorities and school-wide programs, availability of resources, special services, community services, policies for parental involvement, and school-wide problems.

The **SD/LEP Student Questionnaire** was completed by the teachers of students who were selected to participate in the State Assessment sample who were also identified as students with a disability (SD) or categorized as being of limited English proficiency (LEP). Some of these students were determined by the school to be ineligible to be assessed. In order to be excluded from the assessment, a student must have been identified as SD and must not have been mainstreamed at least 50 percent of the time, or was categorized as LEP. In addition, the school staff would have needed to determine that it was inappropriate to include the student in the assessment. This questionnaire asked about the nature of the student's disability or about the student's native language, and the special programs in which the student participated.

2.9 DEVELOPMENT OF FINAL FORMS

The field tests of new items for the 1996 assessment were conducted in February and March 1993 and involved students in many states, the District of Columbia, and three U. S.

territories. The intent of the field test was to try out the items and procedures and to give the states and the contractors practice and experience with the proposed materials and procedures. About 500 responses were obtained to each item in the field test.

The field test data were collected, scored, and analyzed in preparation for meetings with the Mathematics Instrument Development Panel. The objectives that guided the review of these items were:

- to determine which items were most suitable for assessing understanding in mathematics in accordance with the framework;

- to determine the need for revisions of items that lacked clarity, or had ineffective item formats;

- to prioritize items to be included in the State Assessment; and,

- to determine appropriate timing for assessment items.

Committee members, ETS assessment staff, and NAEP/ETS staff reviewed the materials. Item analyses (which provided the mean percentage of correct responses, the r-biserial correlations, and the difficulty level for each item) were used as a guide in identifying and flagging for further review those test items that were not measuring the intended objective well. In addition, another meeting of representatives from state education agencies was convened to review the field test results.

Once the committees had selected the items, all items were rechecked for content, measurement, and sensitivity concerns. The federal clearance process was initiated in June 1993 with the submission of draft materials to NCES. The final package containing the final set of cognitive items assembled into blocks and questionnaires was submitted in August 1993. Throughout the clearance process, revisions were made in accordance with changes required by the government. After approval, the blocks (assembled into booklets) and questionnaires were readied for printing in preparation for the assessment.

Chapter 3

SAMPLE DESIGN AND SELECTION[1]

John Burke and James L. Green
Westat, Inc.

3.1 OVERVIEW

The 1996 State Assessment program in mathematics included assessments of fourth- and eighth-grade students in public- and nonpublic-schools. The 1996 State Assessment program in science was conducted at grade 8 only, except for Department of Defense Education Activity (DoDEA) schools that were assessed at both grades 4 and 8. For the eighth-grade, the samples selected for both the mathematics and science assessment were selected as part of the same process. Some schools that were selected for participation in the eighth-grade sample provided both students that were assessed in mathematics and students that were assessed in science. (This was also true for the DDESS and DoDDS sample.) A representative sample of public- and nonpublic-school students was drawn in each participating jurisdiction. Each sample was designed to produce aggregate estimates as well as estimates for various subpopulations of interest with approximately equal precision for the participating jurisdictions. The sample for the fourth- and eighth-grade public-school assessments in each jurisdiction consisted of about 3,150 students (before attrition) in each subject from about 100 public schools in each case. The target for nonpublic-school students varied by jurisdiction and was proportional to their representation in the jurisdiction.

The target population for the 1996 State Assessment program included students in public and nonpublic schools who were enrolled in the fourth and eighth grade at the time of assessment. The sampling frame included public and nonpublic schools having the relevant grade in each jurisdiction. The samples were selected based on a two-stage sample design; selection of schools within participating jurisdictions, and selection of students within schools. The first-stage samples of schools were selected with probability proportional to a measure of size based on the estimated grade-specific enrollment in the schools. Special procedures were used for jurisdictions with many small schools, and for jurisdictions having small numbers of grade-eligible schools.

Stratification variables were added to the sampling frame prior to sample selection. Public schools were stratified by urbanization and minority class and nonpublic schools were stratified by metro area status and school type. The urbanization strata were defined in terms of large or mid-size central city, urban fringe of large or mid-size city, large town, small town, and rural areas. Within urbanization strata, public schools were further stratified explicitly on the basis of minority enrollment in those jurisdictions with substantial Black or Hispanic student population. Minority enrollment was defined as the total percent of Black and Hispanic students enrolled in a school. Within minority strata, public schools were sorted by median household income of the ZIP code area where the school was located. Metro area status was determined by U.S. Bureau of Census definitions as of June 30, 1993. Other stratification variables were obtained from Quality Education Data, Inc. (QED) and the National Center for Education

---

[1] John Burke was responsible for overseeing all sampling activities; James Green carried out most of these activities.

Statistics' Common Core of Data (CCD). School type was a dichotomous variable (Catholic or other nonpublic). Within school type, nonpublic schools were sorted by estimated grade enrollment.

From the stratified frame of public and nonpublic schools within each jurisdiction, a systematic random sample of about 100 grade-eligible schools was drawn with probability proportional to a measure of size based on the estimated grade-specific enrollment of the school. One or more sessions were sampled within each school. The number of sessions selected depended on the school's estimated grade-specific enrollment, though the overwhelming majority of schools at grade 4 were allocated a single session.

For jurisdictions that participated in the 1994 Trial State Assessment, 25 percent of the selected public and nonpublic schools were designated at random to be monitored during the assessment field period so that reliable comparisons could be made between sessions administered with and without monitoring. For jurisdictions that did not participate in the previous assessment, 50 percent of the selected public and nonpublic schools were designated to be monitored.

Approximately 3,150 public-school students were targeted for selection for a given grade and subject in a given jurisdiction. For nonpublic schools, the target for each grade and subject varied by jurisdiction. On average, 109 public schools and 20 nonpublic schools were selected for fourth grade in each jurisdiction and 105 public schools and 31 nonpublic schools were selected for eighth grade in each jurisdiction. The maximum number of public and nonpublic schools sampled in a jurisdiction were 139 and 44, respectively, for fourth grade. The minimum number of public and nonpublic schools sampled in a jurisdiction were 22 and 10, respectively, for fourth grade. The maximum number of public and nonpublic schools sampled for eighth grade were 159 and 68, respectively. The minimum number of public and nonpublic schools sampled in a jurisdiction were 6 and 10, respectively, for eighth grade.

Each selected school provided a list of eligible enrolled students, from which a systematic sample of students was drawn. Thirty students were selected for each session.

The 1996 State Assessment was preceded in 1995 by a field test. The principal goals of the field test were: (1) to test new items contemplated for 1996, and (2) to test procedures contemplated for 1996. Some schools that participated in the field test were also given a chance of selection in the 1996 assessment. Section 3.2 documents the procedures used to select the schools for the field test.

The rest of this chapter documents the procedures used to select schools for the 1996 State Assessment. Section 3.3 describes the construction of the sampling frames, including the sources of school data, missing data problems, and definition of in-scope schools. Section 3.4 includes a description of the various steps in stratification of schools within participating jurisdictions. School sample selection procedures (including new and substitute schools) are described in Section 3.5. Section 3.5.5 includes information about the selection of schools for application of the two sets of inclusion rules (S1 and S2 subsamples) used in the State Assessment. Section 3.6 includes the steps involved in selection of students within participating schools.

3.2 SAMPLE SELECTION FOR THE 1995 FIELD TEST

The 1995 field test for the State Assessment program was conducted together with the field test for the national portion of the assessment. In these field tests, assessments were piloted in: mathematics, science, and the arts (dance, music, theater, and visual arts). All jurisdictions were included in the field test except Alaska, Delaware, the District of Columbia, Hawaii, Rhode Island and Wyoming, which were excluded due to the heavy burden placed on these small population jurisdictions by the main assessment. The field test was conducted for grades 4, 8, and 12. Pairs of schools were identified, with one of each pair to be included in the test. This allowed state participation in the selection of the test schools and also facilitated replacement of schools that declined to participate in the assessment. Sampling weights were not computed for the field test samples.

3.2.1 Primary Sampling Units

The field test primary sampling unit (PSU) sampling frame was derived from the national list of U.S. counties. The frame was stratified by state and metro area status. Two hundred and fifteen PSUs were selected from the resulting field test frame. Twenty PSUs were selected with certainty and 195 noncertainty PSUs were selected—one per noncertainty stratum. The PSUs were selected systematically and with probability proportional to the 1990 PSU population. Counties that were noncertainty selections for the Third International Mathematics and Science Study (TIMSS), the 1996 NAEP national assessment, and the 1996 NAEP trend samples were excluded from the sampling frame. The number of counties, and so, PSU's, selected per jurisdiction ranged from 2 to 10.

3.2.2 Selection of Schools and Students

Public and nonpublic schools with fourth-, eighth-, or twelfth-grade students were in-scope for the field test assessment. Schools with fewer than 40 students were eliminated from the sampling frame to avoid the relatively high per student cost of conducting assessments in small schools. Schools selected as originals or substitutes for TIMSS were also eliminated from the frame.

Across all three grades from the resulting sampling frame, 1,285 pairs of schools were selected. The first member of each pair was selected systematically and with probability proportional to grade enrollment. The twelfth-grade sample was drawn first followed by the eighth- and fourth- grade samples. The selected twelfth-grade schools were removed from the frame before drawing the eighth-grade sample. The selected twelfth- and eighth-grade schools were removed from the frame before drawing the fourth-grade sample. In this way, no school was selected for more than one grade.

The second member of each pair was selected in such a way that the "distance" from the primary selection, based on percent of Black students, percent of Hispanic students, grade enrollment, and percent of students living below poverty was the smallest across all schools remaining after the fourth-, eighth-, and twelfth-grade sampling.

3.2.3 Assignment to Sessions for Different Subjects

Up to six different session types were assigned in a given jurisdiction. The particular number of session types varied by grade. Table 3-1 gives the overall number of schools selected for each grade and session type. The number of sessions assigned to an individual school depended on the size of the school and the subject(s) that school was assigned.

Table 3-1
Number of Schools Selected for Each Grade and Session Type

Session Type[1]	Grade 4	Grade 8	Grade 12
Mathematics/Science	75	80	90
Mathematics Trend	75	75	75
Visual Arts/Music	75	70	100
Theater and Dance	85	85	120
Spanish/Bilingual	120	120	0
SD Accommodations	20	20	0
Total	**450**	**450**	**385**

[1]The mathematics and science sessions were sessions where items selected for the 1996 State Assessment program were administered. The mathematics trend sessions were sessions where booklets from the 1996 Trial State Assessment program in mathematics were administered. The results from students included in these sessions were used to verify that the 1996 and 1992 assessments could be placed on the same scale. The two types of arts sessions were selected for every grade. They were administered at grades 4 and 8, although the grade 12 sessions were administered the arts field test in 1997. The Spanish/bilingual and SD accommodations sessions were administered using special booklets to determine whether SD/LEP students could participate in the 1996 assessment with special accommodations.

3.3 TARGET POPULATION AND SAMPLING FRAME FOR THE 1996 ASSESSMENT

3.3.1 Target Population

The target population for the 1996 State Assessment included students in public and nonpublic schools who were enrolled in the fourth or eighth grade. Nonpublic schools included Catholic schools, other religious schools, private schools, DDESS, and Bureau of Indian Affairs (BIA) schools. Special education schools were not included. Both S1, based on the old inclusion rules, and S2, based on the new inclusion rules, shared this target population.

3.3.2 Sampling Frame

In order to draw the school samples for the 1996 State Assessment, it was necessary to obtain a comprehensive list of public and nonpublic schools in each jurisdiction. For each school, useful information for stratification purposes, reliable information about grade span and enrollment, and accurate information for identifying the school to the state coordinator (district membership, name, address) were required.

Based on the experience with the 1992 and 1994 Trial State Assessments, and national assessments from 1984 to 1994, the file made available by QED was elected as the sampling frame. The CCD school file was used to check the completeness of the QED file.

The QED list covers all U.S. states and jurisdictions except Puerto Rico. The version of the QED file used was released in late 1994, in time for selection of the school sample in early 1995. The file was missing racial/ethnic minority enrollment and urbanization data for a sizable minority of schools (due to the inability of QED to match these schools with the corresponding CCD file). Considerable efforts were undertaken to obtain these variables for all schools in jurisdictions where these variables were to be used for stratification. These efforts are described in the next section.

A new addition for 1996 was the joint use of QED and National Center for Education Statistics' Private School Universe Survey (PSS) lists of nonpublic schools. These two sources were combined, eliminating duplicates as necessary and increasing coverage throughout the combined frame. When a given school was found on both lists, the PSS data were given priority.

Tables 3-2 and 3-3 show the distribution of fourth- and eighth-grade schools and enrollment within schools as reported in the combined frame. Grade-specific enrollment was estimated for each school as the quotient of total school enrollment and the number of grades in the school.

Table 3-2
Distribution of Fourth-Grade Schools and Enrollment in Combined Frame

Jurisdiction	Public Schools Total Schools	Public Schools Total Enrollment	Nonpublic Schools Total Schools	Nonpublic Schools Total Enrollment
Alabama	760	58,446	271	6,319
Alaska	344	9,838	70	650
Arizona	685	59,386	265	4,772
Arkansas	535	35,580	152	2,566
California	4,823	436,578	2,521	57,037
Colorado	764	51,068	251	4,517
Connecticut	565	40,703	248	5,497
Delaware	52	7,573	108	2,200
District of Columbia	107	6,156	53	1,602
DoDEA/DDESS	39	3,118	N/A	N/A
DoDEA/DoDDS	113	7,291	N/A	N/A
Florida	1,444	167,900	1,019	23,748
Georgia	1,034	104,129	455	10,162
Guam	21	2,356	14	566
Hawaii	176	14,848	100	2,857
Indiana	1,130	74,784	640	10,537
Iowa	758	38,645	236	5,278
Kentucky	796	50,603	272	6,851
Louisiana	793	63,887	369	12,201
Maine	394	17,589	109	1,254
Maryland	792	60,409	426	10,638
Massachusetts	1,030	72,171	421	10,191
Michigan	1,871	129,209	943	18,573
Minnesota	827	63,255	481	9,013
Mississippi	458	41,251	171	4,580
Missouri	1,093	67,929	492	11,110
Montana	458	13,482	88	1,076
Nebraska	882	22,310	202	3,786
Nevada	244	18,780	52	974
New Jersey	1,315	91,263	698	18,578
New Mexico	384	26,072	187	2,668
New York	2,255	204,385	1,526	43,627
North Carolina	1,116	91,917	441	8,536

Table 3-2 (continued)

Distribution of Fourth-Grade Schools and Enrollment in Combined Frame

Jurisdiction	Public Schools Total Schools	Public Schools Total Enrollment	Nonpublic Schools Total Schools	Nonpublic Schools Total Enrollment
North Dakota	325	9,704	77	1,002
Oregon	752	41,320	234	3,602
Pennsylvania	1,831	136,418	1,558	31,902
Rhode Island	178	11,688	78	1,926
South Carolina	552	51,328	251	5,062
Tennessee	929	70,073	342	6,825
Texas	3,181	285,699	931	21,560
Utah	434	37,425	55	959
Vermont	247	8,051	58	676
Virginia	1,042	84,306	409	7,788
Washington	1,051	74,964	406	7,275
West Virginia	553	23,628	137	1,322
Wisconsin	1,137	65,421	873	14,968
Wyoming	226	8,032	35	281
Total	**40,323**	**3,048,203**	**18,711**	**406,546**

Table 3-3

Distribution of Eighth-Grade Schools and Enrollment In Combined Frame

Jurisdiction	Public Schools Total Schools	Public Schools Total Enrollment	Nonpublic Schools Total Schools	Nonpublic Schools Total Enrollment
Alabama	484	56,995	245	5,363
Alaska	256	9,240	59	481
Arizona	328	54,351	227	4,210
Arkansas	344	35,074	110	1,846
California	1,642	379,030	2,023	47,939
Colorado	325	46,695	224	3,795
Connecticut	207	34,383	248	5,828
Delaware	29	7,751	101	2,097
District of Columbia	32	4,808	46	1,435
DoDEA/DDESS	12	1,517	N/A	N/A
DoDEA/DoDDS	66	5,353	N/A	N/A
Florida	466	152,838	839	19,767
Georgia	398	97,029	385	8,297
Guam	6	2,199	12	498
Hawaii	52	12,845	84	3,341
Indiana	437	76,101	558	9,073
Iowa	409	38,331	194	4,461
Kentucky	357	51,275	238	6,293
Louisiana	431	59,102	352	13,767
Maine	235	16,134	98	1,077
Maryland	229	57,586	383	9,942

Table 3-3 (continued)
Distribution of Eighth-Grade Schools and Enrollment In Combined Frame

	Public Schools		Nonpublic Schools	
Jurisdiction	**Total Schools**	**Total Enrollment**	**Total Schools**	**Total Enrollment**
Massachusetts	383	61,789	407	10,656
Michigan	737	120,422	819	16,577
Minnesota	424	59,224	361	7,447
Mississippi	301	39,570	143	4,076
Missouri	633	63,768	441	10,375
Montana	321	12,800	81	834
Nebraska	577	22,137	173	3,502
Nevada	95	18,626	44	840
New Hampshire	132	14,600	78	1,228
New Jersey	664	84,346	660	18,516
New Mexico	152	24,249	148	2,387
New York	1,013	187,305	1,368	42,412
North Carolina	526	89,074	377	6,856
North Dakota	237	9,065	54	743
Oregon	343	39,630	195	2,808
Rhode Island	52	10,286	77	2,163
South Carolina	252	51,010	206	3,679
Tennessee	533	66,684	325	7,044
Texas	1,488	271,798	680	16,095
Utah	142	36,877	54	913
Vermont	126	7,413	52	575
Virginia	336	79,009	362	7,124
Washington	425	70,998	345	6,430
West Virginia	206	24,448	126	1,214
Wisconsin	513	61,628	778	13,729
Wyoming	96	7,971	31	195
Total	**21,740**	**3,243,013**	**18,452**	**423,591**

3.4 STRATIFICATION

3.4.1 Stratification Variables

The stratification used for sample selection varied by school type (public or nonpublic). Stratification of public schools involved four primary dimensions whereas the stratification of nonpublic schools involved three primary dimensions. Public schools were stratified hierarchically by small or large district status, school size class, urbanization classification and minority classification. Nonpublic schools were stratified by size class, metro area status and school type (Catholic or other nonpublic). Public schools were further stratified implicitly by median household income (i.e., sorted in ascending or descending order) of the ZIP code area where the school was located, and nonpublic schools were further stratified implicitly by estimated grade enrollment in order to provide some control of these variables. Tables 3-4 through 3-7 provide counts of sampled schools by the primary stratification variables. The

DDESS schools, the DoDDS schools (except fourth grade), and Guam samples are not included in these tables as all schools in these jurisdictions were sampled with certainty, thereby requiring no stratification. The DoDDS fourth-grade sample was sorted by Department of Defense Education Activity (DoDEA) area (Europe, Pacific, etc.), DoDEA district (Brussels, Heidelberg, Italy, etc.), and estimated fourth-grade enrollment prior to sample selection.

3.4.2 Missing Stratification Variables

As stated earlier, the sampling frame for the 1996 State Assessment was the most recent version of the QED file available combined with the 1993 PSS list of nonpublic schools. The CCD file was used to extract information on urbanization ("type of location") for public schools where this information was missing on the QED file. Any public schools with missing values remaining in urbanization or minority enrollment data were imputed.

Schools with missing values in urbanization data were assigned the urbanization of other school records within the same state, county, and city when urbanization did not vary within the given city. Any schools still missing urbanization were assigned the modal value of urbanization within their city. Any remaining missing values were assigned individually based on city using U.S. Bureau of Census publications.

Schools with missing values in minority enrollment data were assigned the average minority enrollment within their school district. Any schools still missing minority enrollment data were assigned values individually using ZIP code and U.S. Bureau of Census data. The minority data were extracted only for those schools in jurisdictions in which minority stratification was performed.

Metro area status was assigned to each nonpublic school based on U.S. Bureau of Census definitions as of June 30, 1993, based on Federal Information Processing Standard (FIPS) county code, and was found for all schools in the sampling frame. The Catholic school flag was assigned to each nonpublic school based on the QED or PSS school type and was found for all schools in the sampling frame.

Median household income was assigned to every school in the sampling frame by merging on ZIP code with a file from Donnelly Marketing Information Services. Any schools still missing median household income were assigned the mean value of median household income for the three-digit ZIP code prefix or county within which they were located.

3.4.3 Urbanization Classification

Urbanization classification was created based on the NCES type of location variable. The type of location variable contains at most seven levels:

1. *Large Central City*: A central city of a Metropolitan Statistical Area (MSA) with a population greater than or equal to 400,000, or a population density greater than or equal to 6,000 persons per square mile;

2. *Mid-size Central City*: A central city of an MSA but not designated as a large central city;

3. *Urban Fringe of Large City*: A place within an MSA of a large central city and defined as urban by the U.S. Bureau of Census;

4. *Urban Fringe of Mid-Size City*: A place within an MSA of a mid-size central city and defined as urban by the U.S. Bureau of Census;

5. *Large Town*: A place not within an MSA, but with a population greater than or equal to 25,000 and defined as urban by the U.S. Bureau of Census;

6. *Small Town*: A place not within an MSA, with a population less than 25,000, but greater than 2,499 and defined as urban by U.S. Bureau of Census; and

7. *Rural*: A place with a population of less than 2,500 and defined as rural by the U.S. Bureau of Census.

Urbanization classification was created by collapsing type of location categories as necessary and according to specific rules until each urbanization stratum included a minimum of 10 percent of eligible students in the participating jurisdiction. Tables I-1 and I-2 in Appendix I provide the urbanization classifications used within each jurisdiction and grade.

3.4.4 Minority Classification

Minority classification was created within urbanization strata and was based on a school's percentages of Black and Hispanic students. Three different minority classification schemes were used and are described as follows:

- *Case 1:* Urbanization strata with less than 10 percent Black students and 7 percent Hispanic students were not stratified by minority enrollment (Level 0);

- *Case 2:* Urbanization strata with greater than or equal to 10 percent Black students or 7 percent Hispanic students, but not more than 20 percent of each, were stratified by ordering percent minority enrollment (Black plus Hispanic) within the urbanization classes and dividing the schools into three groups with about equal numbers of students per minority classification (Levels 1, 2, and 3); and

- *Case 3:* In urbanization strata with greater than 20 percent of both Black and Hispanic students, minority strata were formed with the objective of providing equal strata with emphasis on the minority group (Black or Hispanic) with the higher concentration. The stratification was performed as follows. The minority group with the higher percentage gave the primary stratification variable; the remaining group gave the secondary stratification variable. Within urbanization class, the schools were sorted based on the primary stratification variable and divided into two groups of schools containing approximately equal numbers of students based on estimated grade enrollment. Within each of these two groups, the schools were sorted by the secondary stratification variable and subdivided into two subgroups of schools containing approximately equal numbers of students. As a result, within urbanization strata there were four minority classifications (e.g., low Black/low Hispanic, low Black/high Hispanic, high Black/low Hispanic, and high Black/high Hispanic (Levels 4, 5, 6, and 7).

The minority groups and classifications were formed solely for the purpose of creating efficient stratification design at this stage of sampling. These classifications are not directly used in analysis and reporting of the data, but will act to reduce sampling errors for achievement-level estimates. Tables I-1 and I-2 in Appendix I provide information on minority stratification for the participating jurisdictions.

3.4.5 Median Household Income

Prior to the selection of the school samples, the public schools were sorted by their four stratification variables (small or large district status, school class size, urbanization classification, and minority classification) in an order such that changes occur on only one variable at a time (also known as a serpentine order.) This is accomplished by alternating between ascending and descending sort order on each variable successively through the sort hierarchy. Within this sorted list, the schools were sorted, in serpentine order, by the median household income. This final stage of sorting resulted in implicit stratification of median household income. The data on median household income was related to the ZIP code area in which the school is located. The data were derived from the 1990 Census and are obtained from Donnelly Marketing Information Services.

3.4.6 Metro Area Status

All schools in the sampling frame were assigned a metro area status based on their FIPS county code and Office of Management and Budget (OMB) Metropolitan Area Definitions as of June 30, 1993. This field indicated if a school was located within a metropolitan area or not. Tables I-3 and I-4 in Appendix I provide information on metro area status stratification for the participating jurisdictions.

3.4.7 School Type

All nonpublic schools were assigned a school type (Catholic or other nonpublic) based on their QED or PSS school-type variable. Tables I-3 and I-4 in Appendix I provide information on school-type stratification for the participating jurisdictions.

3.5 SCHOOL SAMPLE SELECTION

3.5.1 Measure of Size and Sample Selection

Each grade-eligible school was assigned an estimated grade enrollment by dividing its total student enrollment by its number of grades. Each school was then assigned a measure of size based on the following function of estimated grade enrollment (EGE). Tables 3-4 and 3-5 provide the estimated grade enrollment and measure of size for grades 4 and 8.

Table 3-4
Estimated Grade Enrollment and Measure of Size, Grade 4

Estimated Grade Enrollment	Measure of Size
EGE < 10	15
10 ≤ EGE < 20	1.5 * EGE
20 ≤ EGE < 33	30
33 ≤ EGE	EGE

Table 3-5
Estimated Grade Enrollment and Measure of Size, Grade 8

Estimated Grade Enrollment	Measure of Size
EGE < 10	30
10 ≤ EGE < 20	3 * EGE
20 ≤ EGE < 65	60
65 ≤ EGE	EGE

Schools were designated as being in "small" or "large" districts and were assigned to one of two size classes as shown in Tables 3-4 and 3-5. A large district was defined as a district containing 20 percent or more of a jurisdiction's student population. All other districts were considered small. Schools were assigned to the large size class if their estimated grade enrollment was greater than 19. Otherwise schools were assigned to the small size class.

A sample of schools was then selected for each jurisdiction with probability proportional to each school's measure of size. The sampling frame of schools was sorted in systematic order prior to sample selection, as follows:

- Public schools
  ⇒ Small or large district status,
  ⇒ Size class,
  ⇒ Urbanicity stratum,
  ⇒ Minority stratum, and
  ⇒ Median household income.

- Nonpublic schools
  - ⇒ Size class,
  - ⇒ Metro area status,
  - ⇒ Catholic/non Catholic, and
  - ⇒ Estimated grade enrollment.

Sorting the sampling frame in a specific order prior to systematic sample selection ensures that the sampled units represent a variety of population subgroups.

3.5.2 Control of Overlap of School Samples for National Educational Studies

The issue of school sample overlap has been relevant in all rounds of NAEP in recent years. To avoid undue burden on individual schools, NAEP developed a policy for 1996 of avoiding overlap between national and state samples. This was to be achieved without unduly distorting the resulting samples by introducing bias or substantial variance. The procedure used was an extension of the method proposed by Keyfitz (1951). The general approach is given in *The NAEP 1994 Technical Report* (Allen, Kline, & Zelenak, 1996). Counts of school selection for both state and national NAEP are found in Table 3-6.

Table 3-6
Number of Schools Selected for Both State and National NAEP, by Grade and School Type

State NAEP		National NAEP Grade					
Grade	School Type	4 Main	4 Trend	8 Main	8 Trend	12 Main	12 Trend
4	Public	10	29	9	4	4	0
4	Nonpublic	0	2	17	1	11	5
8	Public	8	4	53	101	26	4
8	Nonpublic	23	5	5	5	22	4

3.5.3 Selection of Schools in Small Jurisdictions

All schools in jurisdictions with small numbers of public schools were selected. The jurisdictions and grades are shown in Table 3-7.

Table 3-7
Jurisdictions Where All Public Schools were Selected, by Grade and School Type

Jurisdiction	Public Grade 4	Public Grade 8	Nonpublic Grade 4	Nonpublic Grade 8
Delaware	*	*		
District of Columbia	*	*		*
DoDEA/DDESS	*	*		
DoDEA/DoDDS		*		
Guam	*	*	*	*
Hawaii		*		
Rhode Island		*		

3.5.4 New School Selection

A sample of new schools was drawn to properly reflect additions to the target population occurring after the sampling frame building information was created. A district-level file was constructed from the combined QED and PSS school-level files. The district-level file was divided into a "small" districts file that was not used in the selection of new schools, and a "medium and large" districts files that was used for this purpose. Small districts consisted of those districts in which there were at most three schools on the aggregate frame and no more than one fourth-, one eighth-, and one twelfth-grade school. The remainder of districts were denoted as "medium and large" districts.

A sample of medium and large districts was drawn in each jurisdiction. All districts were selected in Delaware, the District of Columbia, Hawaii, and Rhode Island. The remaining jurisdictions in the file of medium and large districts (eligible for sampling) were divided into two files within each district. Two districts were selected per jurisdiction with equal probability among the smaller districts with combined enrollment of less than or equal to 20 percent of the state enrollment in the medium and large districts file. From the rest of the file, eight districts were selected per jurisdiction with probability proportional to enrollment. The breakdown given above applied to all jurisdictions except Alaska and Nevada, where four and seven districts were selected with equal probability and six and three districts were selected with probability proportional to enrollment, respectively. The 10 selected districts in each jurisdiction were then sent a listing of all their schools that appeared on the file, and were asked to provide information about the new schools not included in the file. These listings, provided by selected districts, were used as sampling frames for selection of new schools.

The eligibility of a school was determined based on the grade span. A school was also classified as "new" if a change of grade span was such that the school status changed from ineligible to eligible. The average grade enrollment for these schools was set to the average grade enrollment before the grade-span change. The schools found eligible for sampling due to the grade-span change were added to the new school selection frame.

The probability of selecting a school was minimum $\left[\dfrac{\text{sampling rate} \;*\; \text{measure of size}}{P(\text{district})},\ 1\right]$,

where P(district) was the probability of selection of a district and the sampling rate was the rate used for the particular jurisdiction in the selection of the original sample of schools.

In each jurisdiction, the sampling rate used for the main sample of grade-eligible schools was used to select the new schools. Additionally, all new eligible schools coming from small districts (those with at most one grade 4 and one grade 8 school and at most three schools on the aggregate frame) that had a school selected in the regular sample for the fourth grade were included in the sample with certainty. In the 1996 State Assessment, there were no such schools.

Tables 3-8 and 3-9 shows the number of new schools coming from the medium and large and small districts for the fourth- and eighth-grade samples.

Table 3-8

Distribution of New Schools Coming from "Medium" or "Large" and "Small" Districts in the Fourth-Grade Sample

Jurisdiction	Number of New Schools "Medium" or "Large" Districts	"Small" Districts
Alabama	1	0
Alaska	0	0
Arizona	0	0
Arkansas	0	0
California	0	0
Colorado	0	0
Connecticut	0	0
Delaware	1	0
DoDEA/DDESS	0	0
DoDEA/DoDDS	0	0
District of Columbia	2	0
Florida	1	0
Georgia	1	0
Guam	0	0
Hawaii	0	0
Indiana	0	0
Iowa	0	0
Kentucky	1	0
Louisiana	3	0
Maine	2	0
Maryland	2	0
Massachusetts	2	0
Michigan	2	0
Minnesota	0	0
Mississippi	3	0
Missouri	0	0
Montana	0	0
Nebraska	1	0
Nevada	3	0
New Jersey	1	0

Table 3-8 (continued)

Distribution of New Schools Coming from "Medium" or "Large" and "Small" Districts in the Fourth-Grade Sample

Jurisdiction	Number of New Schools: "Medium" or "Large" Districts	"Small" Districts
New Mexico	0	0
New York	1	0
North Carolina	3	0
North Dakota	1	0
Oregon	1	0
Pennsylvania	1	0
Rhode Island	3	0
South Carolina	1	0
Tennessee	2	0
Texas	1	0
Utah	1	0
Vermont	3	0
Virginia	0	0
Washington	0	0
West Virginia	0	0
Wisconsin	0	0
Wyoming	1	0
Total	**45**	**0**

Table 3-9

Distribution of New Schools Coming from "Medium" or "Large" and "Small" Districts in the Eighth-Grade Sample

Jurisdiction	Number of New Schools: "Medium" or "Large" Districts	"Small" Districts
Alabama	0	0
Alaska	0	0
Arizona	1	0
Arkansas	1	0
California	0	0
Colorado	1	0
Connecticut	0	0
Delaware	2	0
DoDEA/DDESS	0	0
DoDEA/DoDDS	0	0
District of Columbia	2	0
Florida	4	0
Georgia	2	0
Guam	0	0
Hawaii	1	0
Indiana	1	0
Iowa	0	0

Table 3-9 (continued)
Distribution of New Schools Coming from "Medium" or "Large" and "Small" Districts in the Eighth-Grade Sample

Jurisdiction	Number of New Schools "Medium" or "Large" Districts	"Small" Districts
Kentucky	0	0
Louisiana	3	0
Maine	0	0
Maryland	1	0
Massachusetts	1	0
Michigan	0	0
Minnesota	0	0
Mississippi	2	0
Missouri	1	0
Montana	1	0
Nebraska	3	0
Nevada	2	0
New Hampshire	0	0
New Jersey	0	0
New Mexico	0	0
New York	0	0
North Carolina	1	0
North Dakota	0	0
Oregon	2	0
Rhode Island	0	0
South Carolina	1	0
Tennessee	2	0
Texas	1	0
Utah	3	0
Vermont	2	0
Virginia	0	0
Washington	1	0
West Virginia	0	0
Wisconsin	3	0
Wyoming	4	0
Total	**55**	**0**

3.5.5 Assigning Subject, Sample Type, and Monitor Status

Subject assignment rules varied by grade. All fourth grade schools were assigned to participate in mathematics assessments except for the DDESS and DoDDS samples where the rules for subject assignment at eighth grade were followed. All eighth-grade schools with 20 or more students were assigned to participate in both mathematics and science assessments. Schools with less than 20 students were assigned one subject selected at random.

The 1996 State Assessment used two different sets of inclusion rules (see Chapter 4) for different sets of schools (S1 and S2 subsamples). A sample type variable was created to reflect which set of rules to use within a given school. The sampled schools were sorted by stratum (public and nonpublic) and subject (both mathematics and science, mathematics only, and science only) and then randomly assigned sample type within the sorted list. The sets of inclusion rules are described in Chapter 4.

Jurisdictions received 25 or 50 percent monitoring of sessions depending on previous participation in the state assessments. All jurisdictions received 25 percent monitoring except Alaska, Nevada, Vermont, and Washington, where 50 percent monitoring was used. The sampled schools were sorted by stratum, subject, and sample type, and then assigned the two levels of monitoring at random.

3.5.6 School Substitution and Retrofitting

A substitute school was assigned to each sampled school (to the extent possible) prior to the field period through an automated substitute selection mechanism that used distance measures as the matching criterion. Schools were also required to be of the same type (i.e., public, nonpublic, BIA, and DoDEA schools were only allowed to substitute for each other), and substitutes for nonpublic, BIA, and DoDEA schools were required to come from within the same district. Public-school substitutes were required to come from different districts. Two passes were made at the substitution, with the second pass raising the maximum distance measure allowed and removing the different district assignment for public schools. This strategy was motivated from the fact that most public-school nonresponse is really at the district level.

A distance measure was used in each pass and was calculated between each sampled school and each potential substitute. The distance measure was equal to the sum of four squared standardized differences. The differences were calculated between the sampled and potential substitute school's estimated grade enrollment, median household income, percent Black enrollment and percent Hispanic enrollment. Each difference was squared and standardized to the population standard deviation of the component variable (e.g., estimated grade enrollment) across all grade-eligible schools and jurisdictions. The potential substitutes were then assigned to sampled schools by order of increasing distance measure. An acceptance limit was put on the distance measure of .60 for the first pass. A given potential substitute was assigned to one and only one sampled school. Some sampled schools did not receive assigned substitutes (at least in the first pass) because the number of potential substitutes was less than the number of sampled schools or the distance measure for all remaining potential substitutes from different districts was greater than .60.

In the second pass, th different district constraint for public schools was lifted and the maximum distance allowed was raised to .75. This generally brought in a small number of additional assigned substitutes. Although the selected cut-off points of .60 and .75 on the distance measure were somewhat arbitrary, they had been decided upon for the 1994 Trial State Assessment by a group of statisticians reviewing a large number of listings beforehand and finding a consensus on the distance measures at which substitutes began to appear unacceptable.

Jurisdictions that did not receive substitutes for all selected schools were allowed to retrofit unused substitutes after part of the field period elapsed. Substitutes that were assigned to cooperating or ineligible original selections were free to be assigned to other original selections that did not receive substitutes. These free substitutes were put back into the substitute selection mechanism described above and allowed to pair up with other original selections.

Cooperating original selections were also allowed to serve as "double session" substitutes for other pending or refusing schools and were put through the substitute selection mechanism after retrofitting unused regular substitutes. Double session substitutes are particularly helpful to small jurisdictions where all or most schools are taken as original selections, thereby leaving no or few schools available as substitutes.

Tables I-5 and I-6 in Appendix I include information about the number of substitutes provided in each jurisdiction. Of the 47 participating jurisdictions, 42 were provided with at least one substitute at grade 4, and 41 were provided with at least one substitute at grade 8. Among jurisdictions receiving no substitutes, the majority had 100 percent participation from the original sample. The number of substitutes provided to a jurisdiction ranged from 0 to 24 in the fourth-grade sample. A total of 243 substitutes were selected.

Tables I-7 through I-10 in Appendix I show the number of schools in the fourth- and eighth-grade mathematics samples, together with school response rates observed within participating jurisdictions. The tables also show the number of substitutes in each jurisdiction that were associated with a nonparticipating original school selection, and the number of those that participated.

3.6 STUDENT SAMPLE SELECTION

3.6.1 Student Sampling and Participation

Schools initially sent a complete list of students to a central location in November 1995. They were not asked to list students in any particular order, but were asked to implement checks to ensure that all grade-eligible students were listed. Based on the total number of students on this list, the "Student Listing Form," sample line numbers were generated for student sample selection. To generate these line numbers, the sampler entered the number of students on the form and the number of sessions into a calculator or personal computer that had been programmed with the sampling algorithm. The program generated a random start that was used to systematically select the student line numbers (30 per session). To compensate for new enrollees not on the Student Listing Form, extra line numbers were generated for a supplemental sample of new students.

After the student sample was selected, the administrator at each school identified students who were incapable of taking the assessment either because they were identified as students with disabilities (SD) or because they were classified as being of limited English proficiency (LEP). Two different sets of inclusion rules were used: a set used in previous assessments and a new set that was meant to clarify the inclusion rules used in NAEP and to provide wider inclusion of SD and LEP students. More details on the procedures for student exclusion are presented in the report on field procedures for the 1996 State Assessment program (Westat, Inc., 1996).

When the assessment was conducted in a given school, a count was made of the number of nonexcluded students who did not attend the session. If this number exceeded three students, the school was instructed to conduct a makeup session, to which all students who were absent from the initial session were invited.

Tables I-11 through I-14 in Appendix I provide the distribution of the student samples and response rates by grade, school type, and jurisdiction.

3.6.2 The Reduced Sample Option

All jurisdictions were given the option to reduce the expected student sample size in order to reduce testing burden and the number of multiple-testing sessions for participating schools. If jurisdictions chose to exercise this option, the estimates obtained from the assessment were more variable than they otherwise would have been. In general, jurisdictions could reduce student sample sizes by adjusting the number of sessions with participating schools subject to the following constraints:

- The minimum number of sessions per school had to be equal to 1;
- The maximum number of sessions per school had to be equal to 2 at fourth grade and 3 at eighth grade;
- The expected student size from the reduced sample was greater than or equal to half of the original student sample size.

Table 3-10 shows the jurisdictions that exercised the reduced sample option at each grade.

Table 3-10
Jurisdictions Exercising the Reduced Sample Option, By Grade

Jurisdiction	Grade 4	Grade 8
Alaska		*
Delaware	*	*
Guam	*	
Hawaii		*
Rhode Island		*

Chapter 4

STATE AND SCHOOL COOPERATION AND FIELD ADMINISTRATION[1]

Lucy M. Gray
Westat, Inc.

4.1 OVERVIEW

By volunteering to participate in the State Assessment and in the field test that preceded it, each jurisdiction assumed responsibility for securing the cooperation of the schools sampled by NAEP. The participating jurisdictions were responsible for the actual administration of the 1996 State Assessment at the school level. The 1995 field test, however, operated within the framework of the national (rather than state) model. Therefore, for the field test, NAEP field staff were responsible for securing cooperation for, scheduling, and conducting the assessments. This chapter describes state and school cooperation and field administration procedures for both the 1995 field test and the 1996 assessment program. Section 4.2 presents information on the field test, while Section 4.3 focuses on the 1996 State Assessment.

4.2 THE FIELD TEST

4.2.1 Conduct of the Field Test

In preparation for the 1996 state and national assessment programs, a field test of the forms, procedures, and booklet items was held in late January through early March 1995. In this field test, assessments were piloted in: mathematics, science, and the arts (dance, music, theater, and visual arts). In an effort to increase the participation of limited English proficient (LEP) students and students with disabilities (SD), the mathematics field test included bilingual and Spanish-language versions of three test booklets, newly developed Braille and large-print booklets, and the provision of additional testing accommodations for students with disabilities and students with limited English proficiency. Results for the field testing of the Spanish-language mathematics assessment, Braille and large-print booklets, and special testing accommodations are contained in a separate report prepared by Educational Testing Service (ETS) (Anderson, Jenkins, & Miller, 1996).

A number of new complexities were planned for the 1996 assessment, such as increased use of manipulatives in mathematics, theme blocks in mathematics, hands-on tasks in science, and performance items in dance, music, theater, and visual arts. The complexities of mathematics and science substantially increased the scope of the 1996 assessment, as originally defined, and were rehearsed as part of the field test.

[1] Lucy Gray was responsible for various aspects of the field activities for the NAEP national and State Assessments in mathematics.

In September 1994, letters were sent from the U.S. Department of Education to all Chief State School Officers inviting them to participate in the 1995 field test of materials and procedures. In an effort to secure the participation of more schools and to lessen the burden of participation on jurisdictions, ETS and Westat offered to perform all of the work involved, including sampling, communicating with school staff, and administering the assessment.

The school sample for the field test included both public and nonpublic schools and was designed to involve as many states as possible, thus limiting the burden on each state. However, states with small numbers of schools in which all schools were already involved in the 1994 National Assessment program were excluded from the field test sample. As a result, the original field test sample consisted of 1,129 public and nonpublic schools spread roughly in proportion to the population across 38 states. Because the states' responsibilities were very limited in the field test, they were asked only to notify districts of their inclusion, and to indicate their support for participation in the field test. Schools selected for the 1995 field test were designated to have either arts sessions or mathematics and science sessions, but not both.

Because the focus of the field test was to have as many schools participate as possible, flexibility was allowed in substituting for the original selections. Three forms of substitution were available to replace sampled schools that did not participate in the field test. The first type were schools identified by Westat and located within the same district as the originally sampled schools. These substitute schools were demographically comparable to those in the original sample. A second school substitution option allowed district superintendents to choose their own alternate school. In the event that a district refused to participate, the third option was an "out of district" substitute, identified by Westat. The type and number of sessions scheduled for an originally selected school were carried over to the substitute school.

During the period from October to December 1994, all districts and schools in the field test sample were contacted, cooperation secured, and assessment schedules set. To accomplish these initial tasks, 21 of the most experienced NAEP supervisors were trained during a three-day session (in early October 1994) conducted by Westat project staff. Following training, each of the supervisors was responsible for scheduling activities in several states. In December 1994, the NAEP field staff was expanded to 72 supervisors. All supervisors, including those in the original group, attended the second training session. After opening plenary sessions, the trainees were divided into two groups: arts and mathematics/science. Because of the complicated nature of the arts field test, it was decided to have supervisors specialize in the administration of either arts or mathematics/science sessions. Training focused on a review of the scheduling activities during the fall (e.g., results of initial contacts with districts and schools); sampling procedures; preparation and distribution of school, teacher, and student questionnaires; administration of the performance-based arts tasks; classroom management techniques; exercise administrator training; and completion of administrative forms and procedures.

The period from January 2-20, 1995, was set aside for supervisors to call and visit the schools in their assignments, draw student samples, prepare Administration Schedules, and prepare and distribute teacher, school, and SD/LEP student questionnaires. Assessments were conducted during the period from January 23 through March 10, 1995. Mathematics and science sessions were scheduled to be completed by February 24, and arts sessions continued through the end of the data collection period. Throughout the field testing period, supervisors reported directly to Westat's field director through six field managers.

4.2.2 Results of the Field Test

A total of 963 originally selected schools and alternates actually participated in the field test. The final assessed sample of schools included 434 schools at grade 4, 395 schools at grade 8, and 134 schools at grade 12.

A total of 46,514 students participated in the field test. Of this number, 17,212 students participated in the 1995 arts field test; these students will be discussed in a later report on the arts assessment. Student participation in mathematics and science included 11,014 students at grade 4, 11,641 students at grade 8, and 6,647 students at grade 12.

4.3 THE 1996 STATE ASSESSMENT

Forty-four states, the District of Columbia, and Guam volunteered for the 1996 State Assessment, as did the Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS) and the Department of Defense Dependents Schools (DoDDS). Table 4-1 identifies the jurisdictions participating in the State Assessment.

Table 4-1
Jurisdictions Participating in the 1996 State Assessment Program in Mathematics

Jurisdictions			
Alabama	Georgia	Mississippi[2]	Pennsylvania[4]
Alaska[1]	Guam	Missouri[2]	Rhode Island
Arizona	Hawaii	Montana[3]	South Carolina[2]
Arkansas	Indiana	Nebraska	Tennessee[2]
California	Iowa	Nevada[1]	Texas
Colorado	Kentucky	New Hampshire[5]	Utah[2]
Connecticut	Louisiana	New Jersey	Vermont[1]
Delaware	Maine[2]	New Mexico	Virginia
DoDEA/DDESS[1/6]	Maryland	New York	Washington[1]
DoDEA/DoDDS[1/6]	Massachusetts[2]	North Carolina	West Virginia
District of Columbia	Michigan	North Dakota	Wisconsin
Florida	Minnesota	Oregon[3]	Wyoming

[1]Participated in the 1996 mathematics assessment program only.
[2]Participated in the 1992 and 1996 mathematics assessment programs but not in the 1990 program.
[3]Participated in the 1990 and 1996 mathematics assessment programs but not in the 1992 program.
[4]Grade 4 only.
[5]Grade 8 only.
[6]DoDEA is the Department of Defense Education Activity schools, DDESS is the Department of Defense Domestic Dependent Elementary and Secondary Schools, and DoDDS is the Department of Defense Dependents Schools.

4.3.1 Overview of Responsibilities

Data collection for the 1996 State Assessment involved a collaborative effort between the participating jurisdictions and the NAEP contractors, especially Westat, the field administration contractor. Westat's responsibilities included:

- selecting the sample of schools and students for each participating jurisdiction;
- developing the administration procedures and manuals;
- training state personnel to conduct the assessments; and
- conducting an extensive quality assurance program.

Each jurisdiction volunteering to participate in the 1996 program was asked to appoint a state coordinator. In general, the coordinator was the liaison between NAEP/Westat staff and the participating schools. In particular, the state coordinator was asked to:

- gain the cooperation of the selected schools;
- assist in the development of the assessment schedule;
- receive the lists of all grade-eligible students from the schools;
- coordinate the flow of information between the schools and NAEP;
- provide space for the Westat state supervisor to use when selecting the sample of students;
- notify assessment administrators about training and send them their manuals; and
- send the lists of sampled students to the schools.

At the school level, an assessment administrator was responsible for preparing for and conducting the assessment session(s) in one or more schools. These individuals were usually school or district staff and were trained by Westat staff. The assessment administrator's responsibilities included:

- receiving the list of sampled students from the state coordinator;
- identifying sampled students who should be excluded;
- distributing assessment questionnaires to appropriate school staff and collecting them upon their completion;
- notifying sampled students and their teachers;
- administering the assessment sessions(s);
- completing assessment forms; and
- preparing the assessment materials for shipment.

Decisions on exclusion were made in consultation with school staff and were guided by the SD/LEP questionnaires completed by the school staff.

Westat also hired and trained a state supervisor for each jurisdiction. The 1996 State Assessment involved about the same number of state supervisors (Westat staff) as both the 1992 and 1994 assessments, since approximately the same number of jurisdictions were involved each year. In addition, three troubleshooters were trained in case any state supervisor was unable to complete their assignment. The primary tasks of the state supervisor were to:

- select the samples of students to be assessed;
- recruit and hire the quality control monitors throughout their jurisdiction;
- conduct in-person assessment administration training sessions; and
- coordinate the monitoring of the assessment sessions and makeup sessions.

Westat hired and trained six field managers for the State Assessment. Each field manager was responsible for working with the state coordinators of seven to eight jurisdictions and for overseeing assessment activities. The primary tasks of the field managers were to:

- obtain information about cooperation and scheduling;
- make sure the arrangements for the assessments were set and assessment administrators identified; and
- schedule the assessment administrators training sessions.

In addition, Westat hired between four and six quality control monitors in each jurisdiction to monitor assessment sessions.

4.3.2 Schedule of Data Collection Activities

Mid-September 1995	Westat sent lists of sampled schools for the national and state assessments and informational materials to the state coordinators.
October 1995	Westat field managers visited individual jurisdictions to explain the computerized state coordinator system, which was used to keep track of assessment-related activities.
September - December 1995	State coordinators obtained cooperation from districts and schools. State coordinators reported participation status to Westat field managers via computer files or printed lists. State coordinators sent student listing forms and supplemental student listing forms to participating schools.
November 9 - 12, 1995	State supervisor training.
November 17, 1995	Suggested cutoff for decisions on school participation and submission of lists of grade-eligible students to state coordinators for sampling purposes.

December 4 - 15, 1995	NAEP supervisor visited state coordinators' offices to select student samples and prepare Administration Schedules listing the students selected for each sample.
December 15, 1995	Westat delivered training session schedule and copies of assessment administrator manuals to state coordinators for distribution.
December 15, 1995 - January 15, 1996	State coordinators notified assessment administrators of the date, time, and location of training and sent each a copy of the manual for assessment administrators.
January 4 - 6, 1996	Training session for quality control monitors.
January 9 - 26, 1996	Supervisors conducted assessment administrator training sessions throughout respective jurisdictions.
January 29 - March 1, 1996	Assessments conducted and monitored.
March 4 - 8, 1996	Makeup week for rescheduled assessments or completed assessments requiring makeup.

4.3.3 Preparations for the State Assessment

The focal point of the schedule for the State Assessment was the period between January 29 and March 4, 1996, when the assessments were conducted in the schools. However, as with any undertaking of this magnitude, the project required many months of planning and preparation.

Westat selected the samples of schools according to the procedures described in Chapter 3. In mid-September 1995, lists of the selected schools and other materials describing the State Assessment program were sent to state coordinators. Most state coordinators preferred that NAEP provide a suggested assessment date for each school. School listings were updated with this information and were sent to the state coordinators, along with other descriptive materials and forms, by December.

State coordinators were also given the option of receiving the school information in the form of a computer database with accompanying management information software. This system enabled state coordinators to keep track of the cooperating schools, the assessment schedule, the training schedule, and the assessment administrators. Coordinators could choose to receive a laptop computer and printer or to have the system installed on their own computer. Westat field managers traveled to the state offices to explain the computer system to the state coordinators and their staff. Only one jurisdiction chose not to use the computerized system. In this case, the state coordinator kept track of information on logs and lists provided by Westat. This printed information was mailed to the field manager and dictated during a regularly scheduled telephone conversation. The field manager then entered the data into the computer database, the data were transmitted to Westat, and reports were produced.

Six of the most experienced NAEP supervisors served as field managers, the primary link between NAEP and the state coordinators. During late summer and early fall 1995, the field managers received copies of all materials sent to state coordinators, developed a preliminary Assessment Schedule for all schools in their jurisdictions, and became thoroughly familiar with the computer system. As liaisons with the state coordinators, they visited each jurisdiction to train staff in the use of the computer system. Later in the project schedule, they attended training sessions for the supervisors and quality control monitors and also presented some of the training material at each of these sessions.

The field managers used the same computer system as the state coordinators to keep track of the schools and the schedule. The state coordinators sent updates via computer disks, telephone, or print to their field manager, who then entered the information into the system. Weekly transmissions were made from the field manager to Westat.

By November, Westat had hired one state supervisor for each participating jurisdiction. The state supervisors attended a training session held November 9-12, 1995. This training session focused on the state supervisors' immediate tasks—selecting the student samples and hiring quality control monitors. Supervisors were given the training script and materials for the assessment administrators' training sessions they would conduct in January so they could become familiar with these materials.

The state supervisors' first task after training was to complete the selection of the sample of students who were to be assessed in each school. All participating schools were asked to send a list of their grade-eligible students to the state coordinator by November 17. Sample selection activities were conducted in the state coordinator's office unless the state coordinator preferred that the lists be taken to another location.

Using a preprogrammed calculator, the supervisors generally selected a sample of 30 students per session type per school with three exceptions: in schools with fewer than 30 students in the grade to be assessed, all of the students were selected; in schools in which more than one session was scheduled, 60 students (or some multiple of 30 students) were selected; and in schools with no more than 33 students in the grade, all students were selected for the assessment.

After the sample was selected, the supervisor completed an Administration Schedule for each session, listing the students to be assessed. The Administration Schedules for each school were put into an envelope and given to the state coordinator to send to the school two weeks before the scheduled assessment date. Included in the envelope were instructions for sampling students who had enrolled at the schools since the creation of the original list.

During the months of November and December 1995, the state supervisors also recruited and hired quality control monitors to work in their jurisdictions. It was the quality control monitor's job to observe the sessions designated to be monitored, to complete an observation form on each session, and to intervene when the correct procedures were not followed. Because earlier results indicated little difference in performance between monitored and unmonitored schools, and in an effort to reduce costs, the percentage of public schools to be monitored was maintained at 25 percent (i.e., the reduced monitoring rate initiated in 1994). The monitoring rate for nonpublic schools was also reduced to 25 percent (from 50% in 1994, which was the first year that nonpublic schools were assessed by NAEP). As has been customary in the past, monitoring was conducted at 50 percent for jurisdictions that were new to the State Assessment in 1996. The schools to be monitored were known only to contractor staff; it was not indicated on any of the listings provided to state staff.

Approximately 400 quality control monitors were trained in a session held in early January 1996. The first day of the training session was devoted to a presentation of the assessment administrators' training program by the state supervisors, which not only gave the monitors an understanding of what assessment administrators were expected to do, but gave state supervisors an opportunity to practice presenting the training program. The remaining days of the training session were spent reviewing the quality control monitor observation form and the role and responsibilities of the quality control monitors.

Almost immediately following the quality control monitor training, supervisors began conducting training for assessment administrators. Each quality control monitor attended at least two training sessions, to assist the state supervisor and to become thoroughly familiar with the assessment administrator's responsibilities. Most jurisdictions had approximately 14 training sessions in which approximately 217 assessment administrators were trained. Almost 10,400 assessment administrators were trained by the time assessments began on January 29, 1996.

To ensure uniformity in the training sessions, Westat developed a highly structured program involving a script for trainers, a videotape, and an example to be completed by the trainees. The training package, developed for previous state assessments, was revised to reflect the subjects and grades assessed in 1996. The supervisors were instructed to read the script verbatim as they proceeded through the training, ensuring that each trainee received the same information. The script was supplemented by the use of overhead transparencies, displaying the various forms that were to be used and enabling the trainer to demonstrate how they were to be filled out.

The videotape was also revised from previous versions to include information about assessing both fourth- and eighth-grade students. The 1996 version of the video ran just over one hour.

All of the information presented in the training session was included in Westat's *Manual for Assessment Administrators*. Copies of the manual were sent by Westat to the state coordinators by December 15, 1995, so that they could be distributed to the assessment administrators before the training sessions. The method of distribution and the amount of time that the assessment administrators had to study the manual probably varied from jurisdiction to jurisdiction. The majority of the assessment administrators appeared to have become at least somewhat familiar with the manual prior to their training. The training stressed that answers to all questions about procedures or forms could be found in the manual. In addition, assessment administrators were provided with a toll-free number that could be used to contact Westat if they had any procedural questions or were in need of additional materials. During the assessment period, this telephone number was used extensively.

The entire training session generally ran for about one-half day until 2 p.m. including lunch.

4.3.4 Monitoring of Assessment Activities

Two weeks prior to the scheduled assessment date, the assessment administrator received the Administration Schedule and assessment questionnaires and materials. Five days before the assessment, the quality control monitor made a call to the administrator and recorded the results of the call on the Quality Control Form for Monitored Schools because the assessment administrators were not supposed to know in advance which sessions were designated to be monitored. The pre-assessment call was conducted in exactly the same way regardless of whether the school was to be monitored or not. For example, directions to the school were obtained even if the school was in the unmonitored sample. Most of the questions asked in the pre-assessment call were designed to gauge whether the assessment administrator had received all materials needed and had completed the preparations for the assessment.

If the sessions in a school were designated to be monitored, the quality control monitor was to arrive at the school one hour before the scheduled beginning of the assessment to observe preparations for the assessment. To ensure the confidentiality of the assessment items, the booklets were packaged in shrink-wrapped bundles and were not to be opened until the quality control monitor arrived or 45 minutes before the session began, whichever occurred first.

In addition to observing the opening of the bundles, the quality control monitor used the Quality Control Form to check that the following had been done correctly: sampling newly enrolled students, reading the script, distributing and collecting assessment materials, timing the booklet sections, answering questions from students, and preparing assessment materials for shipment. After the assessment was over, the quality control monitor obtained the assessment administrator's opinions of how the session went and how well the materials and forms worked. The 14-section booklet, Quality Control Form for Monitored Schools, is included in the *Report on Data Collection Activities for the 1996 National Assessment of Educational Progress* (Westat, Inc., 1996).

If four or more students were absent from the session, a makeup session was to be held. If the original session had been monitored, the makeup session was also monitored. This required coordination of scheduling between the quality control monitor and assessment administrator.

4.3.5 Participation of Department of Defense Education Activity Schools (DoDEA)

The schools run by the Department of Defense at military bases and other installations around the world participated in the NAEP State Assessment for the second time in 1996. The participation of the selected schools was mandated by DoDEA. To accommodate the geographic diversity of DoDEA schools, some minor adaptations were made in the preparatory activities used for the other jurisdictions.

The data collection in DoDEA schools was expanded in 1996 so that both DDESS and DoDDS DoDEA schools were surveyed. In 1994, only the schools at overseas installations were sampled as part of the State Assessment. Also, DoDEA chose to conduct science assessments at grade 4 (in other State NAEP schools, science was conducted only at grade 8) so that both mathematics and science data were collected at both grades 4 and 8 in DoDEA schools.

Many of the quality control monitors hired for the DoDEA schools were based overseas, and many had previous experience working within the DoDEA system. They were referred to Westat by DoDEA. All quality control monitors for the DoDEA schools attended the quality control training in Los Angeles and several assessment administrator training sessions in the geographic areas in which they worked.

The samples of students to be assessed in the DoDEA schools were selected in the Westat home office, using standard NAEP procedures, from lists of students produced in the DoDEA offices in Northern Virginia. Due to privacy concerns, only student ID numbers and not student names appeared on the DoDEA lists. Thus, after sampling, the Administration Schedules contained only the ID numbers, and the assessment administrators consulted school records and added the names of the students to the Administration Schedules prior to the assessments.

Two field supervisors were hired specifically to conduct assessment administrator trainings and monitor quality control monitors in the DoDDS schools. The DoDEA liaison in Northern Virginia, who essentially functioned as the state coordinator, arranged the assessment administrator training sessions, all of which were held in schools or other facilities on the bases. In many cases, the quality control monitors were required to obtain special clearances through DoDEA to visit the bases for training and the assessments.

The assessments in DoDEA schools were conducted using the same procedures as in all State Assessment schools with the one exception that DoDEA included science assessments at both grades 4 and 8.

4.3.6 Exclusion of Students from the Assessment

Due to recent interest in including as many students as possible in NAEP and other educational assessments, efforts were initiated in the 1995 field test to explore the impact of redefining the NAEP inclusion criteria for students with disabilities and/or limited English proficiency (SD/LEP). This investigation was continued in 1996 in both the national and State Assessments.

The approach taken in the 1996 State Assessment was to divide the school sample into two, equal-size subsamples, referred to as S1 and S2. The schools in the S1 subsample were asked to apply the "old" (used in previous years) inclusion criteria; the S2 schools received a "new," revised criteria. The assessment administration for a school assured that the appropriate set of inclusion criteria were used in each school. Training of each member of the field staff included information about the two sets of inclusion criteria. Figures 4-1 and 4-2 describe the criteria for S1 and S2.

Figure 4-1
S1 Criteria

A student identified on the Administration Schedule as LEP may be excluded from the assessment if he or she:

1. is a native speaker of a language other than English,
2. has been enrolled in an English-speaking school (not including a bilingual education program) for less than two years, and
3. is judged to be incapable of taking part in the assessment.

A student identified on the Administration Schedule as SD or an equivalent classification may be excluded from the assessment if:

1. the student is mainstreamed less than 50 percent of the time in academic subjects and is judged incapable of participating meaningfully in the assessment, or
2. the Individualized Education Plan (IEP) team or equivalent group has determined that the student is incapable of participating meaningfully in the assessment.

SD/LEP students meeting the above criteria should be assessed if, in the judgment of school staff, they are capable of taking the assessment.

Figure 4-2
S2 Criteria

A student who is identified on the Administration Schedule as LEP and who is a native speaker of a language other than English should be included in the NAEP assessment unless:

1. the student has received mathematics, science, and language arts instruction primarily in English for less than three school years, including the current year, or
2. the student cannot demonstrate his or her knowledge of mathematics or science in English without an accommodation or adaptation.

A student identified on the Administration Schedule as SD or an equivalent classification should be included in the NAEP assessment unless:

1. the IEP team or equivalent group has determined that the student cannot participate in assessments such as NAEP,
2. the student's cognitive functioning is so severely impaired that she or he cannot participate, or
3. the student's IEP requires that the student be tested with an accommodation or adaptation and the student cannot demonstrate his/her knowledge of mathematics or science without that accommodation or adaptation.

The school person most knowledgeable about each student classified as IEP or LEP should complete an SD/LEP Questionnaire about the student.

The preliminary, unweighted proportion of students in the S1/S2 subsampling suggest that applying the new (S2) or old (S1) criteria result in virtually no change in the proportions of students excluded from the NAEP assessments as SD or LEP. For example, in grade 4 public schools, in both subsamples, about 5.6-5.7 percent of the students were excluded as SD and about 1.6-1.7 percent were consistently excluded as LEP students. The rates are slightly lower for grade 8 public-school students—just below five percent for SD exclusions, and about one percent for LEP—and again consistent across the two subsamples. The rates for nonpublic schools were lower still, that is, consistently less than half the size of the public-school rates and very similar across the S1 and S2 subsamples.

4.3.7 School and Student Participation

Table 4-2 shows the results of the state coordinators' efforts to gain the cooperation of the selected schools. Overall, for the 1996 State Assessment in mathematics, 4,573 public schools and 470 nonpublic schools for grade 4 participated. For grade 8, 3,913 public schools and 455 nonpublic schools participated.

Participation results for students in the 1996 State Assessment in mathematics are given in Table 4-3. Over 148,000 fourth-grade students and over 136,500 eighth-grade students were sampled. As can be seen from the table the original sample, which was selected by the NAEP state supervisors, comprised approximately 144,500 (or 98%) of the total number of students sampled for grade 4, and approximately 134,000 (or 98%) of the total number of students sampled for grade 8. The original sample size was increased somewhat after the supplemental samples had been drawn (from students newly enrolled since the creation of the original lists).

Table 4-2
School Participation, 1996 State Assessment in Mathematics

	Grade 4		Grade 8	
	Public	**Nonpublic**	**Public**	**Nonpublic**
Number of schools in original sample	4,980	869	4,482	1,068
Number of schools not eligible (closed, no 4th grade)	88	126	128	220
Number of eligible schools in original sample	4,892	743	4,354	848
Non-cooperating (e.g., school, district, or state refusal)	492	224	552	299
Cooperating	4,400	519	3,802	549
Number of substitutes provided for non-cooperating schools	450	144	403	154
Number of participating substitutes for non-cooperating schools	173	17	111	12
Total number of schools participating (after substitution)	4,573	470	3,913	455

Table 4-3
Student Participation, 1996 State Assessment in Mathematics

	Grade 4		Grade 8	
	Public	Nonpublic	Public	Nonpublic
Number sampled	137,892	10,370	128,608	8,291
Original sample	134,525	10,249	125,688	8,230
Supplemental sample	3,367	121	2,920	61
Percent increase in original sample by adding supplemental sample	2.5%	1.2%	2.3%	0.7%
Number (%) of originally sampled students withdrawn	5,432 (4.0%)	148 (1.4%)	5,669 (4.5%)	104 (1.3%)
Number of students excluded[1]	9,649	117	7,488	44
Number (%) of sampled students identified as SD	15,573 (11.3%)	291 (2.8%)	13,489 (10.5%)	155 (1.9%)
Number (%) of sampled students excluded as SD	7,678 (5.6%)	104 (1.0%)	6,223 (4.8%)	33 (0.4%)
Number (%) of sampled students identified as LEP	4,917 (3.6%)	186 (1.8%)	2,866 (2.2%)	43 (0.5%)
Number (%) of sampled students excluded as LEP	2,215 (1.6%)	18 (0.2%)	1,388 (1.1%)	11 (0.1%)
Number of students to be assessed	122,811	10,105	115,451	8,143
Number of students assessed	116,583	9,704	105,073	7,764
Original sessions	115,744	9,661	103,571	7,749
Makeup sessions	839	43	1,502	15
Student participation rates				
Before makeups	94.2%	95.6%	89.7%	95.2%
After makeups	94.9%	96.0%	91.0%	95.3%

[1] To be excluded, a student had to be designated as SD or LEP and judged incapable of participating in the assessment. A student could be identified as both SD and LEP, resulting in this number being less than the sum of the students excluded as SD or LEP.

4.3.8 Results of the Observations

During the assessment sessions, the quality control monitors observed whether the assessment environment was adequate or inadequate based on factors such as room size, seating arrangements, noise from hallways or adjacent rooms, and lighting. (If the room was unsuitable, however, the quality control monitors did not routinely ask the assessment administrator to make other arrangements.) Of the 3,776 monitored assessment sessions where quality control monitors recorded an observation, the quality control monitors felt that 96 percent of the sessions were held in suitable surroundings

The *Manual for Assessment Administrators* encouraged assessment administrators to use an assistant during the assessment session, a suggestion that came from the earliest state assessment in 1990. To measure how frequently that advice was heeded, quality control monitors noted whether an assistant was used in the monitored sessions. The results indicate that assistants were used for 60 to 70 percent of the public-school sessions, with the largest percentage (66-70%) noted for grade 8 sessions. In nonpublic schools, however, an assistant was employed less often (29-40% of the time), which is possibly a reflection of fewer staff resources and generally smaller session sizes in nonpublic schools. Assessment administrators used assistants in varying capacities. The *Manual for Assessment Administrators* was very emphatic that only a NAEP-trained person could actually administer the assessment session. Almost always, assistants helped to supervise the session and to prepare, distribute, and collect assessment materials and/or booklets.

The assessment administrators were asked to estimate the total time that they spent on the preparations for and the conduct of the assessment, including their attendance at the training session. Estimates for 1996 were similar to those for 1992 because two subjects were assessed in each of these years (compared to 1994 when only one subject was assessed). In 1996, a majority of the assessment administrators with grade 4 sessions (63% in public and 82% in nonpublic schools) stated that they spent less than 20 hours on the assessment. For grade 8, however, only 30 percent of the assessment administrators in public schools, compared to 73 percent of those in nonpublic schools, spent fewer than 20 hours. The variation in time distribution for grade 8 public schools, particularly compared to public schools at grade 4, is most likely due to the fact that two session types (mathematics and science) were usually conducted by each grade 8 assessment administrator, but only one session type (mathematics) was held at grade 4. This does not appear to hold true for nonpublic schools, however, where the distribution of time spent is more similar for grades 4 and 8. It is evident that assessment administrators in nonpublic schools spent fewer hours overall on the assessment than did assessment administrators in public schools. Potential explanations might be the generally smaller sessions sizes in nonpublic schools (i.e., fewer materials to prepare and ship) and the possibility that some grade 8 schools may have used more than one assessment administrator with each assessment administrator conducting one session (but compiling a larger total time for all sessions combined).

Quality control monitors reported that they observed the opening of assessment booklet bundles for 3,539 (or 89%) of the monitored sessions, and it is assumed that these bundles were opened at the proper time. In two percent of the sessions, however, the bundle opening was not observed due to quality control monitor error, (e.g., the quality control monitor was late, in the wrong place, or miscommunicated with the assessment administrator); presumably, some (or probably most) of these bundles were opened at the correct time. For another two percent of sessions, the quality control monitors were unable to observe the bundle opening that occurred early due to assessment administrator error (e.g., the assessment administrator misunderstood the procedures, felt more time was needed, had scheduling conflicts, or needed to prepare for multiple sessions starting at the same time). Information on the opening of the assessment booklet bundles was not reported for the remaining seven percent of the monitored sessions.

When queried, the quality control monitors felt most positive about the attitudes of the assessment administrators and somewhat less positive about the attitudes of other school staff and the students towards the assessment.

Quality control monitors concluded the summary section by assigning a final rating of the assessment administrator's performance. With this rating, the quality control monitor reconsidered the session from the vantage point of how well it would have gone without the quality control monitor's presence. Eighty-four percent of the assessment administrators in monitored sessions were self-reliant or needed to consult the quality control monitors for only one or two minor items. Only about four or five percent had serious difficulty conducting the session (that is, relied on the quality control monitor to initiate procedures or conduct the session).

After the conclusion of the assessment sessions, Westat mailed state coordinators a short survey to obtain their reactions to the operations associated with the 1996 State Assessment and any suggestions they had for improving the program. Thirty-seven state coordinators responded by returning the survey or by providing their responses over the telephone. A detailed summary of the state coordinators' responses is contained in the *Report on Data Collection Activities for All States* (Westat, Inc., 1996), which was distributed to state coordinators in October 1996. Some of the responses from the state coordinators included:

- Fifteen of the 37 reporting jurisdictions mandated participation in the 1996 State Assessment;

- Seven jurisdictions reported that they helped gain the cooperation of nonpublic schools. Most of these provided a letter from the state superintendent of schools, and others answered questions.

- Twenty-nine jurisdictions used the computer system throughout the field testing period. Seven jurisdictions used the system initially but not necessarily during the assessment period, and one jurisdiction did not use the system at all. The jurisdictions seemed to be comfortable with the computer system and were able to use it effectively. A fairly common suggestion was to expand the documentation and capabilities regarding label production.

- Of the jurisdictions reporting on staff time devoted to NAEP, state coordinators spent an average of 34 days (ranging from 2 to 100 days) on NAEP activities, and other staff spent an average of 28 days (ranging from 2 to 85 days).

- Reactions to the 1996 State Assessment were quite positive. Twenty-five of the 28 state coordinators who expressed an opinion said that the assessments went "very well" or "well"—even though this was a challenging year in terms of bad weather, missed instruction time, and school staff burden.

Chapter 5

PROCESSING AND SCORING ASSESSMENT MATERIALS[1]

Patrick B. Bourgeacq, Charles L. Brungardt, Luann Forinash, Mary Lynn Helscher, Tillie Kennel, Linda L. Reynolds, Tim Robinson, Mary Schulte, Connie Smith, Patricia M. Stearns, and Bradley J. Thayer
National Computer Systems

5.1 OVERVIEW

This chapter reviews the processing and scoring activities conducted by National Computer Systems (NCS) for the 1996 NAEP State Assessment. The 1996 assessment presented the greatest challenge in processing and scoring NAEP data to date. For this assessment, NCS was charged with processing and scoring the largest assessment in the history of NAEP in the shortest amount of time. Further, image scanning processes, eliminating almost all paper handling during scoring and improving monitoring and reliability scoring, increased to nearly twice that of the 1994 assessment. In the early 1990s, NCS developed and implemented flexible, innovatively designed processing programs and a sophisticated Process Control System that allows the integration of data entry and workflow management systems to accomplish this work.

This chapter begins with a description of the various tasks performed by NCS, detailing printing, distribution, receipt control, scoring, and processing activities. It also discusses specific activities involved in processing the assessment materials, and presents an analysis of several of those activities. The chapter provides documentation for the professional scoring effort—scoring guides, training papers, papers illustrating sample score points, calibration papers, calibration bridges, and interreader reliability reports. The detailed processing specifications and documentation of the NAEP Process Control System are presented in the final sections of the chapter.

5.1.1 Innovations for 1996

Much of the information necessary for documentation of accurate sampling and for calculating sampling weights is collected on the Administration Schedules that, until 1993, were painstakingly filled out by hand by Westat administrative personnel. In 1994, for the first time, much of the work was computerized—booklets were preassigned and booklet ID numbers were preprinted on the Administration Schedule. When Westat personnel received the documents, they filled in only the "exception" information. This new method also permitted computerized updating of information when the Administration Schedules were received at NCS, eliminating the need to sort and track thousands of pieces of paper through the processing stream.

The introduction of image processing and image scoring further enhanced the work of NAEP. Image processing and scoring were successfully piloted in a side-by-side study conducted during the 1993 NAEP field test, and so became the primary processing and scoring methods for the 1994 and 1996

[1] Patrick Bourgeacq is the project director for scoring. All of the authors were involved in the processing and scoring procedures for the NAEP State Assessments. Jeff Haberstroh and Chancey Jones of Educational Testing Service contributed to the professional scoring section of this chapter.

State Assessments. Image processing allowed the automatic collection of handwritten demographic data from the administrative schedules and the student test booklet covers through intelligent character recognition (ICR). This service was a benefit to the jurisdictions participating in NAEP because they were able to write rather than grid certain information—a reduction of burden on the schools. Image processing also made image scoring possible, eliminating much of the time spent moving paper as part of the scoring process. The images of student responses to be scored were transmitted electronically to the scoring center, located at a separate facility from where the materials were processed. This process enhanced the reliability and monitoring of scoring and allowed both NCS and ETS to focus attention on the intellectual process of scoring student responses.

Tables 5-1 and 5-2 give an overview of the processing volume and the schedule for the 1996 NAEP State Assessment.

Table 5-1
1996 NAEP State Assessment Processing Totals

Document/Category	Totals
Number of sessions	15,487
Assessed student booklets	356,447
Absent student booklets	27,743
Excluded student booklets	25,713
SD/LEP questionnaires	47,708
School questionnaires	9,470
Teacher questionnaires	39,311
Scanned documents	356,447
Scanned sheets	9,829,970
Key-entered documents[1]	0

[1]No Braille booklets and only one large-print booklet were received from the 1995 field test. Rather than key enter only one booklet, the decision was made to bypass the key-entry stage and let the scoring center score it directly from the booklet. Thus, there were zero key-entered documents.

Table 5-2
1996 NAEP State Assessment, NCS Schedule

Activity	Planned Start Date	Planned Finish Date	Actual Start Date	Actual Finish Date
Printing	9/2/95	12/11/95	9/2/95	12/11/95
Grade 4 Mathematics Teacher Questionnaire Roster delivered to NCS	10/12/95	10/12/95	10/16/95	10/16/95
Grade 8 Teacher Questionnaires delivered to NCS	10/12/95	10/12/95	10/16/95	10/16/95
Administration Schedule delivered to NCS	10/18/95	10/18/95	10/23/95	10/23/95
Grade 8 School Characteristics and Policies Questionnaires at NCS	10/20/95	10/20/95	10/23/95	10/23/95
SD/LEP Roster delivered to NCS	10/20/95	10/20/95	10/24/95	10/24/95
Grade 4 School Characteristics and Policies Questionnaires at NCS	10/20/95	10/20/95	10/25/95	10/25/95
Grade 8 Mathematics spiral material at NCS	10/23/95	11/2/95	10/18/95	11/3/95
Pre-packaging begins	10/23/95	12/20/95	10/16/95	12/1/95
Grade 4 mathematics Teacher Questionnaires	10/26/95	10/26/95	11/1/95	11/1/95
Grade 4 mathematics spiral material at NCS	10/26/95	11/1/95	11/1/95	11/1/95
Grade 8 mathematics Teacher Questionnaires at NCS	10/30/95	10/30/95	10/25/95	10/25/95
NCS/ETS meet to review items and scoring schedule	11/2/95	11/3/95	11/2/95	11/3/95
State supervisor training	11/9/95	11/12/95	11/9/95	11/11/95
Administration Schedule address file from Westat	11/20/95	11/20/95	11/22/95	11/22/95
95% session data file of schools from Westat	11/22/95	11/22/95	11/22/95	1/5/96
SD/LEP Questionnaire delivered to NCS	11/22/95	11/22/95	12/5/95	12/11/95
Print Administration Schedules	11/27/95	11/27/95	11/28/95	10/23/95
Ship Administration Schedules to Westat state supervisors	11/29/95	11/29/95	10/23/95	10/23/95
All materials at NCS for packaging	11/29/95	12/1/95	12/1/95	12/15/95
State supervisor training materials shipped	12/15/95	12/15/95	12/13/95	12/13/95
School address file from Westat	12/18/95	12/18/95	11/29/95	11/29/95
Final packaging	12/26/95	2/3/96	12/26/95	2/7/96
Receiving	1/30/96	3/5/96	2/6/96	3/12/96
Processing	2/2/96	3/22/96	2/6/96	4/5/96
PSC selects mathematics table leaders	3/1/96	3/1/96	2/1/96	2/28/96
Scoring training preparation	3/4/96	3/22/96	3/4/96	3/22/96
Scorers assigned to teams	3/11/96	3/11/96	3/11/96	3/11/96
Training and scoring	3/13/96	5/3/96	3/13/96	5/6/96

Table 5-2 (continued)
1996 NAEP State Assessment, NCS Schedule

Activity	Planned Start Date	Planned Finish Date	Actual Start Date	Actual Finish Date
Weights data shipped - grade 4	3/15/96	3/18/96	3/28/96	4/22/96
Weights data shipped - grade 8	3/30/96	4/1/96	4/8/96	4/22/96
Grade 8 mathematics weights	5/4/96	5/6/96	5/3/96	5/3/96
Grade 4 mathematics weights	5/4/96	5/6/96	5/9/96	5/9/96
School Characteristics and Policies Questionnaires data tape shipped to ETS	7/11/96	7/12/96	7/11/96	7/11/96
Teacher Questionnaires data tape shipped	7/18/96	7/19/96	7/24/96	7/24/96
SD/LEP Questionnaires data shipped to ETS	7/26/96	7/29/96	8/7/96	8/7/96

5.2 PRINTING

5.2.1 Overview

For the 1996 NAEP assessments, 255 unique documents were designed. NCS printed more than 1,900,000 booklets and forms, totaling over 58 million pages.

Printing preparations began with the design of the booklet covers in June 1995. This was a collaborative effort involving staff from ETS, Westat, and NCS. Because the goal was to design one format for use with all of the booklets, necessary data elements to be collected for the different assessment types had to be agreed upon. In a similar collaboration with ETS and Westat, NCS prepared Administration Schedules and questionnaire rosters, and the camera-ready copies for the documents were created and edited. The printing of assessment booklets, questionnaires, and tracking forms for the main and state assessments was complete by December 11, 1995.

5.2.2 State Assessment Printing

The printing effort for the State Assessment materials began with the receipt of camera-ready copy of short-term trend cognitive mathematics blocks. Camera-ready data for the new mathematics blocks were created by ETS, as were some of the directions and all of the background blocks.

Because large numbers of documents were to be printed in a relatively short period of time, preliminary composition work was begun by the NCS printer in Columbia, Pennsylvania, and the required numbers of negatives for each booklet component were made. Performing these preliminary tasks was crucial to meeting the delivery schedule.

The actual assembly of booklets began after all parts needed for a particular booklet were received and the Office of Management and Budget (OMB) had given its approval to print. ETS supplied booklet maps that specified the order of blocks in each booklet (see Chapter 2, Table 2-4, for the contents of each booklet). Using these booklet maps and mock-ups of booklets as guides, the NCS printer assembled prepared negatives into complete booklets. Generally, five weeks elapsed between receipt of final copy and delivery of printed booklets.

The printer forwarded proofs of the booklets and questionnaires to ETS and to NCS for review and approval to print. Clean-up work and changes, where necessary, were indicated on the proofs, which were returned to the printer. Once approved, the booklets were printed.

As the booklets and forms were printed, pallets of documents were received and entered into NCS's Inventory Control system. Sample booklets were selected and quality-checked for printing and collating errors. All printing for the 1996 NAEP State Assessment in mathematics was completed by December 11, 1995.

Table 5-3
Documents Printed for the 1996 NAEP State Assessment

Sample	Grade	Document (Booklet)[1]	Subject	Type	Number of Pages	Final Copy from ETS	Approval to Print	Printed Documents Received	Quantity Printed
Main/State	4	M101X	Mathematics	Image scan	40	9/18/95	10/13/95	11/7/95	10,140
Main/State	4	M102C	Mathematics	Image scan	40	9/18/95	10/13/95	11/2/95	10,200
Main/State	4	M103	Mathematics	Image scan	36	9/18/95	10/13/95	11/7/95	10,200
Main/State	4	M104GX	Mathematics	Image scan	36	9/18/95	10/12/95	11/7/95	10,200
Main/State	4	M105CX	Mathematics	Image scan	44	9/18/95	10/12/95	11/2/95	10,200
Main/State	4	M106C	Mathematics	Image scan	44	9/18/95	10/13/95	11/2/95	10,200
Main/State	4	M107G	Mathematics	Image scan	40	9/18/95	10/13/95	11/6/95	10,200
Main/State	4	M108CG	Mathematics	Image scan	44	9/18/95	10/13/95	11/6/95	10,200
Main/State	4	M109CR	Mathematics	Image scan	44	9/18/95	10/11/95	11/7/95	10,200
Main/State	4	M110C	Mathematics	Image scan	44	9/18/95	10/11/95	11/6/95	10,200
Main/State	4	M111C	Mathematics	Image scan	44	9/18/95	10/12/95	11/7/95	10,000
Main/State	4	M112CR	Mathematics	Image scan	48	9/18/95	10/12/95	11/6/95	10,200
Main/State	4	M113R	Mathematics	Image scan	40	9/18/95	10/12/95	11/7/95	10,060
Main/State	4	M114G	Mathematics	Image scan	40	9/18/95	10/13/95	11/9/95	10,440
Main/State	4	M115	Mathematics	Image scan	32	9/18/95	10/12/95	11/7/95	10,200
Main/State	4	M116CX	Mathematics	Image scan	44	9/18/95	10/12/95	11/9/95	10,040
Main/State	4	M117C	Mathematics	Image scan	40	9/18/95	10/12/95	11/9/95	10,160
Main/State	4	M118CX	Mathematics	Image scan	44	9/18/95	10/12/95	11/7/95	10,080
Main/State	4	M119CGR	Mathematics	Image scan	44	9/18/95	10/12/95	11/7/95	10,168
Main/State	4	M120	Mathematics	Image scan	40	9/18/95	10/13/95	11/9/95	10,000
Main/State	4	M121CG	Mathematics	Image scan	40	9/18/95	10/13/95	11/9/95	12,220
Main/State	4	M122	Mathematics	Image scan	44	9/18/95	10/13/95	11/1/95	10,200
Main/State	4	M123C	Mathematics	Image scan	40	9/18/95	10/13/95	11/6/95	10,200
Main/State	4	M124RX	Mathematics	Image scan	48	9/18/95	10/13/95	11/7/95	10,001
Main/State	4	M125C	Mathematics	Image scan	44	9/18/95	10/13/95	11/2/95	10,200
Main/State	4	M126R	Mathematics	Image scan	40	9/18/95	10/13/95	11/6/95	10,200

[1] The letters *X, C, GX, CX, G, CR, R, CGR, CG*, and *RX* refer to the ancillary materials that accompanied the assessment booklet (i.e., calculator, protractor, ruler, etc.).

Table 5-3 (continued)
Documents Printed for the 1996 NAEP State Assessment

Sample	Grade	Document (Booklet)[1]	Subject	Type	Number of Pages	Final Copy from ETS	Approval to Print	Printed Documents Received	Quantity Printed
Main/State	8	M101Y	Mathematics	Image scan	52	9/18/95	10/3/95	10/18/95	10,200
Main/State	8	M102C	Mathematics	Image scan	48	9/18/95	10/3/95	10/18/95	10,200
Main/State	8	M103	Mathematics	Image scan	44	9/18/95	10/3/95	10/23/95	10,210
Main/State	8	M104GY	Mathematics	Image scan	48	9/18/95	10/3/95	10/18/95	10,200
Main/State	8	M105CY	Mathematics	Image scan	52	9/18/95	10/3/95	10/18/95	10,140
Main/State	8	M106C	Mathematics	Image scan	48	9/18/95	10/4/95	10/25/95	10,132
Main/State	8	M107G	Mathematics	Image scan	44	9/18/95	10/4/95	10/18/95	10,475
Main/State	8	M108CG	Mathematics	Image scan	48	9/18/95	10/4/95	10/23/95	10,315
Main/State	8	M109CP	Mathematics	Image scan	52	9/18/95	10/4/95	10/18/95	10,220
Main/State	8	M110C	Mathematics	Image scan	48	9/18/95	10/4/95	10/23/95	10,080
Main/State	8	M111C	Mathematics	Image scan	48	9/18/95	10/4/95	10/23/95	10,200
Main/State	8	M112CP	Mathematics	Image scan	52	9/18/95	10/4/95	10/23/95	10,504
Main/State	8	M113CP	Mathematics	Image scan	48	9/18/95	10/4/95	10/25/95	10,478
Main/State	8	M114G	Mathematics	Image scan	44	9/18/95	10/4/95	10/25/95	10,502
Main/State	8	M115	Mathematics	Image scan	44	9/18/95	10/4/95	10/25/95	10,260
Main/State	8	M116CY	Mathematics	Image scan	52	9/18/95	10/5/95	10/23/95	10,502
Main/State	8	M117C	Mathematics	Image scan	44	9/18/95	10/4/95	10/25/95	10,500
Main/State	8	M118CY	Mathematics	Image scan	52	9/18/95	10/5/95	10/23/95	10,500
Main/State	8	M119CGP	Mathematics	Image scan	48	9' [illegible]/95	10/5/95	10/30/95	10,502
Main/State	8	M120	Mathematics	Image scan	48	9/18/95	10/5/95	10/30/95	10,260
Main/State	8	M121CG	Mathematics	Image scan	48	9/18/95	10/10/95	10/30/95	12,200
Main/State	8	M122	Mathematics	Image scan	48	9/18/95	10/10/95	10/30/95	10,120
Main/State	8	M123C	Mathematics	Image scan	48	9/18/95	10/5/95	10/30/95	10,148
Main/State	8	M124CPY	Mathematics	Image scan	52	9/18/95	10/10/95	11/1/95	10,030
Main/State	8	M125C	Mathematics	Image scan	48	9/18/95	10/10/95	10/30/95	10,460
Main/State	8	M126CP	Mathematics	Image scan	48	9/18/95	10/11/95	11/2/95	10,220

[1] The letters *Y, C, GY, CY, G, CG, CP, CGP*, and *CPY* refer to the ancillary materials that accompanied the assessment booklet (i.e., calculator, protractor, ruler, etc.).

BEST COPY AVAILABLE

Table 5-3 (continued)

Documents Printed for the 1996 NAEP State Assessment

Sample	Grade	Document (Booklet)	Subject	Type	Number of Pages	Final Copy from ETS	Approval to Print	Printed Documents Received	Quantity Printed
Main/State	4	School Questionnaire	—	Image scan	16	9/5/95	10/3/95	10/25/95	12,241
Main/State	8	School Questionnaire	—	Image scan	16	9/5/95	10/3/95	10/23/95	20,180
State	4	Teacher Questionnaire	Mathematics	OMR	28	9/21/95	10/11/95	11/1/95	35,060
Main/State	8	Teacher Questionnaire	Mathematics	OMR	24	9/21/95	10/10/95	10/25/95	45,296
Main/State	All	SD/LEP Questionnaire	—	OMR	16	10/12/95	11/9/95	12/11/95	201,050
Main/State	All	Administration Schedule	—	ICR	2	n/a	9/29/95	10/23/95	250,500
Main/State	All	SD/LEP Questionnaire Roster	—	ICR	2	n/a	10/4/95	10/25/95	101,000
State	4	Teacher Questionnaire Roster	Mathematics	ICR	2	n/a	9/21/95	10/16/95	50,471
Main/State	8	Teacher Questionnaire Roster	Mathematics	ICR	2	n/a	9/21/95	10/16/95	50,500

94

5.3 PACKAGING AND SHIPPING

5.3.1 Distribution

The distribution effort for the 1996 NAEP State Assessment involved packaging and mailing documents and associated forms and materials to individual schools. The NAEP Materials Distribution System, initially developed by NCS in 1990 to control shipments to the schools and supervisors, was utilized again in 1996. Files in the system contained the names and addresses for shipment of materials, scheduled assessment dates, and a listing of all materials available for use by a participant. Changes to any of this information were made directly in the distribution file either manually or via file updates provided by Westat. Figure 5-1 illustrates the process flow for the accountability system and online bundle assignment and distribution system utilized for NAEP.

Bar code technology continued to be utilized in document control. To identify each document, NCS utilized a unique ten-digit numbering system. This numbering system consisted of the three-digit booklet number or form type, a six-digit sequential number, and a check digit. Each form was assigned a range of ID numbers. Bar codes reflecting this ID number were applied to the front cover of each document by NCS bar code processes and high-speed ink jet printers.

Once all booklets from a subject area were bar coded, they were spiraled and bundled into groups of eleven documents. For State Assessment samples in mathematics, NCS spiraled the booklets according to the pattern dictated by ETS in the bundle maps. Booklets were spiraled in such a manner that each booklet appeared in the first position in a bundle approximately the same number of times and that the booklets were evenly distributed across the bundles. This assured that sample sizes of individual booklet types would not be jeopardized if entire bundles were not used.

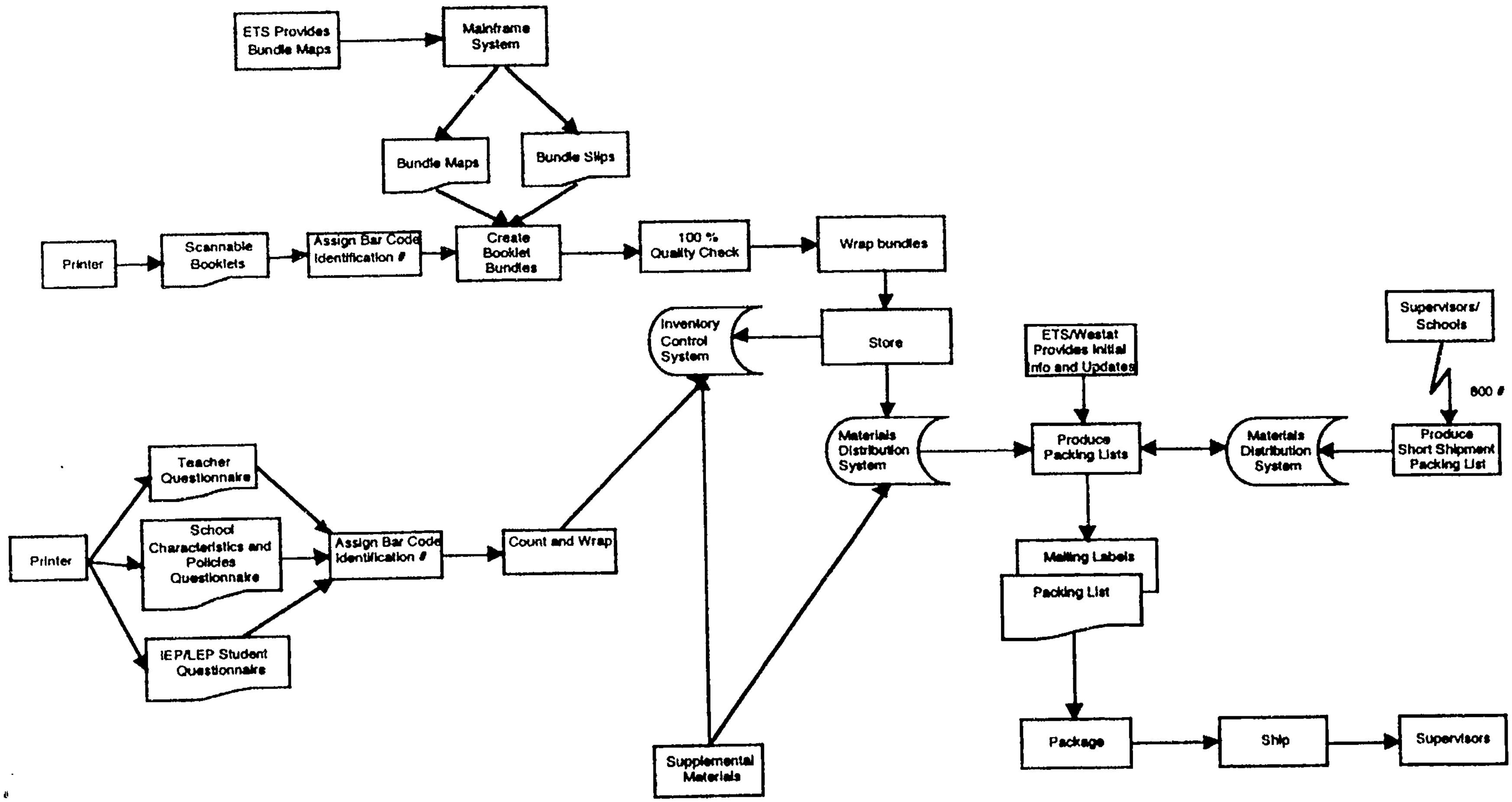
All booklets had to be arranged in the exact order listed on the bundle header sheet. To ensure the accuracy of each bundle and the security of the NAEP assessment, a quality control plan was utilized to verify the document order of each bundle and to account for all booklets. All bundles that contained a bundle slip were taken to a bar code reader/document transport machine where they were scanned to interpret each bundle's bar code. The file of scanned bar codes was then transferred from the personal computer connected to the scanner to a mainframe data set.

The unique bundle number on the header sheet informed the system program what type of bundle should follow. A computer job was run to compare the bundle type expected to the sequence of booklets that was scanned after the header. This job also verified that the appropriate number of booklets was included in each bundle. Any discrepancies were printed on an error listing. The NCS packaging department corrected the error and the bundle was again read into the system. This process was repeated until no discrepancies existed. By using this quality-control plan, NCS could verify the document order of each bundle and account for all booklets.

Once a bundle cleared the bundle quality control process, it was shrink-wrapped and flagged on the system as ready for distribution. In the State Assessment, the bundles were not to be opened until 45 minutes before the assessment. The mathematics bundles were shrink-wrapped, strapped, and a label was placed on the top of each bundle that read "Do Not Open Until 45 Minutes Before Assessment."

Figure 5-1

1996 NAEP State Assessment Materials Distribution Flow Chart



97

95

BEST COPY AVAILABLE

Once all bundles for a subject area passed the bundle quality control process, information from the bundle quality control file was uploaded to the mainframe computer system and used in the creation of Administration Schedules. All Administration Schedules for each scheduled session were pre-printed with the booklet IDs designated for that session. Three bundles of booklets were pre-assigned to each session, giving each session 33 booklets. This number most closely approximated the average projected session size plus an additional supply of booklets for any extra students.

Using sampling files provided by Westat, NCS assigned bundles to schools and customized the packing lists. File data from Westat was coupled with the file of bundle numbers and the corresponding booklet numbers. This file was then used to pre-print all booklet identification numbers, school name. school number and session type, directly onto the scannable Administration Schedule. As a result, every pre-scheduled session had specific bundles assigned to it in advance. This increased the quality level of the booklet accountability system by enabling NCS to identify where any booklet should be at any time during the assessments. It also eliminated the possibility of transcription errors by assessment administrators for booklet ID numbers. Lastly, by pre-printing booklet ID numbers, the burden on the schools for transcription of data was notably reduced. NCS distributed the pre-printed Administration Schedules to state supervisors. The supervisors subsequently forwarded them to the assessment administrators in the schools before their session materials arrived. Having the preprinted Administration Schedules early assisted with sampling in the schools.

Distribution of materials for the State Assessment was accomplished in five waves or shipment dates. Except for wave "zero," session materials were sent to a school two weeks before the assessment date. All school materials were sent directly to an assessment administrator at a school or school district. Materials for Alaska, Guam, Hawaii and Department of Defense Education Activity (DoDEA) schools were sent first in wave "zero." These shipments required using an alternate carrier to ensure timely delivery and minimize the impact of customs delays. NCS received customs forms provided by the carrier. These forms were attached to the outside of the shipment boxes. Information such as address, school number and return address were pre-printed on these forms. Extra forms were also sent for returning boxes back to NCS in Iowa City. The remaining four waves were sent out weekly based on the schools scheduled assessment date. In case any of the quantities were insufficient for the assessment, administrators were given the NAEP toll-free number to request additional materials.

Initially, a total of 9,950 sets of session materials were shipped for the 1996 State Assessments. Approximately 3,000 additional shipments of booklets and miscellaneous materials were sent. All outbound shipments were recorded in the NCS outbound mail management system. This was accomplished by having a bar code containing the school number on each address label. This bar code was read into the system, which determined the routing of the shipment and the charges. Information was recorded in a file on the system that, at the end of each day, was transferred by a PC upload to the mainframe. A computer program could then access information to produce reports on all shipments sent, regardless of the carrier used. These reports helped NCS phone staff trace shipments for state supervisors and assessment administrators.

5.3.2 Short Shipment and Phones

A toll-free telephone line was maintained for school administrators to request additional materials for the State Assessments. To process a shipment, NCS phone staff asked the caller for information such as PSU, school ID, assessment type, city, state, and zip code. This information was then entered into the online short shipment system and the school's mailing address would be displayed on the screen to verify with the caller. The system allowed NCS staff to change the shipping address for individual requests. The clerk proceeded to the next screen that displayed the materials to be selected. After the requested items, due date and method of shipment were entered, the system produced a packing list and mailing labels. Phone staff also took phone calls concerning initial shipment delivery dates, tracing a shipment, and questions concerning NAEP. Approximately 3,750 calls were received regarding the 1996 NAEP State Assessments. Table 5-4 lists the types of requests and number of calls per request.

Table 5-4
1996 NAEP State Assessment
Phone Request Summary

Number of Calls	Request
46	Additional test booklets—increase in session
977	Additional SD/LEP questionnaires
940	Additional teacher questionnaires
515	Miscellaneous materials (excluding science kits)
212	Science kits
248	Missing materials in shipments
51	Add on school
236	Tracing Shipments
400	Other (delivery dates, NAEP questions)

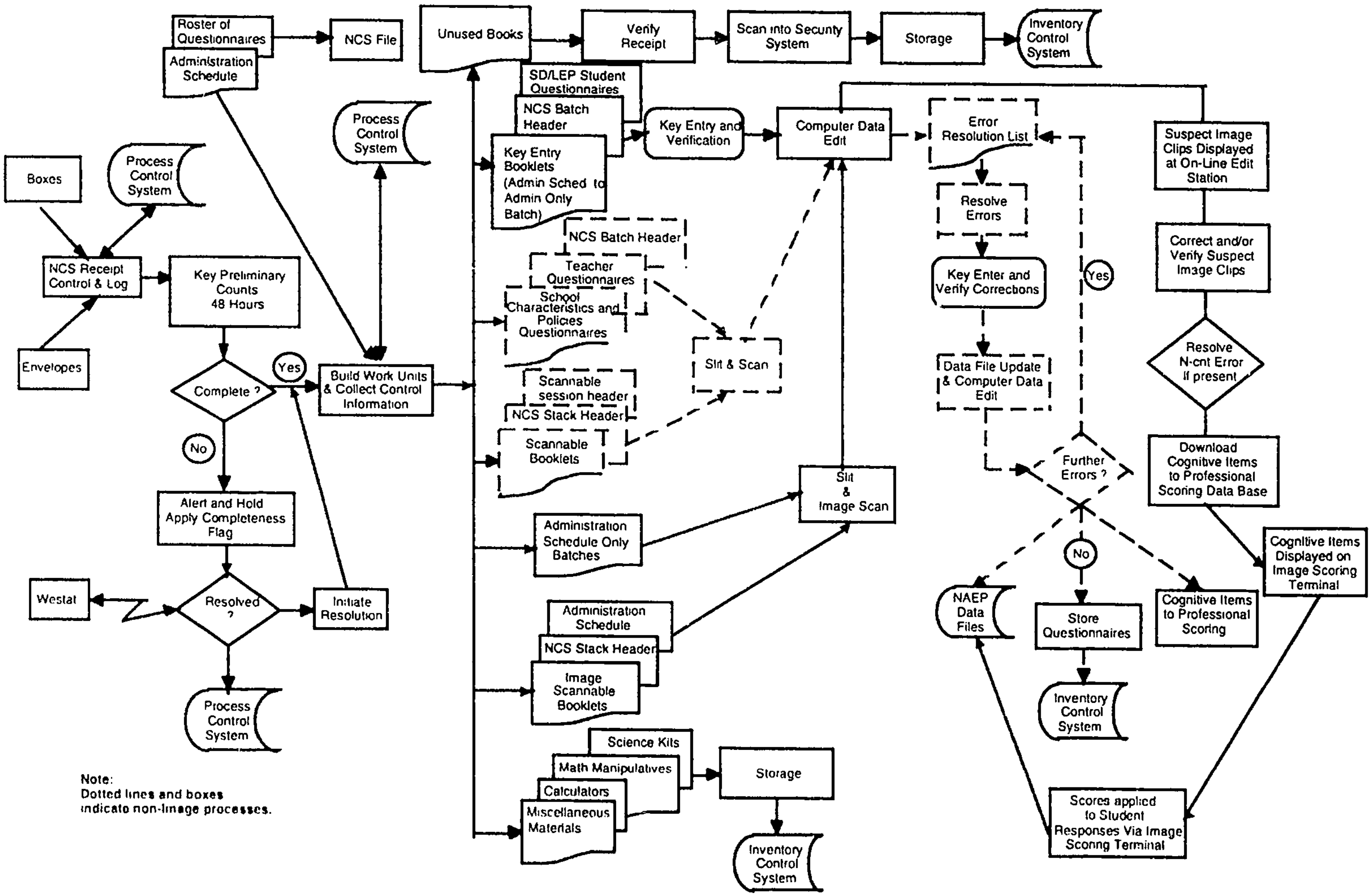
5.4 PROCESSING

5.4.1 Overview

The following describes the various stages of work involved in receiving and processing the documents used in the 1996 NAEP State Assessment. NCS staff created a set of predetermined rules and specifications for the processing departments within NCS to follow. Project staff performed a variety of procedures on materials received from the assessment administrators before releasing these materials into the NCS NAEP processing system. Control systems were used to monitor all NAEP materials returned from the field. The NAEP Process Control System contained the status of sampled schools for all sessions and their scheduled assessment dates. As materials were returned, the Process Control System was updated to indicate receipt dates, to record counts of materials returned, and to document any problems discovered in the shipments. As documents were processed, the system was updated to reflect processed counts. NCS report programs were utilized to allow ETS, Westat, and NCS staff to monitor the progress in the receipt control operations. The processing flow is illustrated in Figure 5-2.

Figure 5-2

1996 NAEP State Assessment Materials Processing Flow Chart



Note:
Dotted lines and boxes indicate non-image processes.

BEST COPY AVAILABLE

An "alert" process was used to record, monitor, and categorize all discrepant or problematic situations. Throughout the processing cycle, alert situations were either flagged by computer programs or identified during clerical check-in procedures. Certain alerts, such as missing demographic information on the Administration Schedule, were resolved by opening staff retrieving the information from booklet covers. Alert situations that could not be resolved by opening personnel were described on alert forms that were forwarded to project personnel for resolution. Once resolved, the problems and resolutions were recorded online in the Process Control System.

NCS's Workflow Management System was used to track batches of student booklets through each processing step, allowing project staff to monitor the status of all work in progress. It was also used by NCS to analyze the current work load, by project, across all work stations. By routinely monitoring these data, NCS's management staff was able to assign priorities to various components of the work and to monitor all phases of the data receipt and processing.

5.4.2 Document Receipt and Tracking

All shipments were to be returned to NCS packaged in their original boxes. As mentioned earlier, NCS packaging staff applied a bar code label to each box indicating the NAEP school ID number. When a shipment arrived at the NCS dock area, this bar code was scanned to a personal computer file, and the shipment was forwarded to the receiving area. The personal computer file was then transferred to the mainframe and the shipment receipt date was applied to the appropriate school within the Process Control System, providing the status of receipts regardless of any processing delays. Each receipt was reflected on the Process Control System status report provided to the NCS receiving department and supplied to Westat via electronic file transfer and in hard-copy format. ETS also received a hard copy. The Process Control System file could be manually updated to reflect changes, if necessary.

Receiving personnel also checked the shipment to verify that the contents of the box matched the school and session indicated on the label. Each shipment was checked for completeness and accuracy. Any shipment not received within two days of the scheduled assessment date was flagged in the Process Control System and annotated on the Process Control System report. The administration status of these delayed shipments was checked and in some cases a trace was initiated on the shipment.

A new requirement for NCS was to open all shipments within 48 hours of their receipt and to key-enter preliminary processing information into the Process Control System from the Administration Schedule. The preliminary information was written on the Administration Schedule by assessment administrators and consisted of the following:

- School number
- Session number
- Original test date
- Total number to be assessed
- Total number assessed

This preliminary information, used to provide Westat with timely student response rates, was updated with actual data when materials passed through processing error free. A completeness flag was also applied to the process control file by NCS opening staff if any part of the shipment was missing.

If multiple sessions were returned in one box, the contents of the package were separated by session. The shipment was checked to verify that all booklets preprinted or handwritten on the Administration Schedule were returned with the shipment and that all administration codes from booklet covers matched the Administration Schedule. If discrepancies were discovered at any step in this process, the receiving staff issued an alert to facilitate tracking.

If the administrator indicated that a make-up session was being held the documents were placed on holding carts until the make-up session documents arrived. If no make-up session was indicated, Westat was contacted for the status of the missing materials. If the missing materials were to be returned, the documents already received were held until that time. If the materials were not being returned, processing continued and the appropriate administration code was applied to the Administration Schedule.

Once all booklets listed on the Administration Schedule for a session were verified as present, the entire session (both the Administration Schedule and booklets) was batched by grade level and session type. Each batch was assigned a unique batch number. This number, created on the Image Capture Environment system for all image-scannable documents and on the Workflow Management System for all key-entry and OMR-scannable documents, facilitated the internal tracking of the batches and allowed departmental resource planning. All other scannable documents (School Characteristics and Policies Questionnaires, Teacher Questionnaires, SD/LEP Questionnaires, and rosters) were batched by document type in the same manner.

Because the State Assessment mathematics booklets were image-scannable, batch numbers for these documents were created on the Image Capture Environment system. Sessions were sorted by grade level and automatically uploaded to the Workflow Management System after batch creation. The Administration Schedule for these document types was used as a session header within a batch.

When batching State Assessment documents, NCS needed to allow for having both image-scannable and key-entry documents present in the same session, or having booklets listed on the Administration Schedule that would not be present in processing. This was due to the testing accommodations of large-print and Braille that were key-entry documents. Large-print booklets had to be processed separately from the Administration Schedule and scannable booklets in their session. A key-entry session header was created for these booklets. This session header contained the school ID number and session code from the Administration Schedule.

The 1996 NAEP State Assessment utilized one roster to document and track the School Characteristics and Policies Questionnaire and the Students with Disabilities/Limited English Proficiency (SD/LEP) Questionnaire. In addition, the State Assessment used the Teacher Questionnaire Roster to record the distribution and return of Teacher Questionnaires.

Some questionnaires may not have been available for return with the shipment. These were returned to NCS at a later date in an envelope provided for that purpose. The questionnaires were submitted for scanning as sufficient quantities became available for batching.

Receipt of the questionnaires was entered into the system using the same process as was used for the Administration Schedule described in previous sections. The rosters were grouped with other rosters of the same type from other sessions, and a batch was created on the Image Capture Environment system. The batch was then forwarded to scanning where all information on the rosters was scanned into the system.

In the 1996 NAEP State Assessment, NCS used a sophisticated booklet accountability system to track all distributed booklets. As stated earlier, prior to the distribution of NAEP materials, unique booklet numbers were read by bundle into a file. Specific bundles were then assigned to particular supervisors or schools. This assignment was recorded in the NAEP Materials Distribution System. When shipments arrived at NCS from the field, all used booklets were submitted for processing and a "processed documents" file was maintained. Unused booklets were submitted for security scanning where booklet ID bar codes were read and recorded into a separate file. This file and the "processed documents" file were later compared to the original bundle security file for individual booklet matching. A list of unmatched booklet IDs was printed in a report used to confirm non-receipt of individual booklets. Efforts were made to be sure unused materials from the State Assessment were returned by school personnel. The used but returned booklet IDs were also read by the bar code scanner and added to the bundle security file. All unused materials received were then inventoried and sent to the NCS warehouse for storage while awaiting authorization from ETS to salvage them.

The transcription of the student response data into machine-readable form was achieved through the use of the following three separate systems: data entry (which included optical mark recognition (OMR) and image scanning, ICR, and key entry), data validation (edit), and data resolution.

5.4.3 Data Entry

The data entry process was the first point at which booklet-level data were directly available to the computer system. Depending on the NAEP document, one of three methods was used to transcribe NAEP data to a computerized form. The data on scannable documents were collected using NCS optical-scanning equipment that also captured images of the constructed-response items and ICR fields. Nonscannable materials were keyed through an interactive online system. In both of these cases, the data were edited and suspect cases were resolved before further processing.

All student booklets, questionnaires, and control documents were scannable. Throughout all phases of processing, the student booklets were batched by grade and session type. The scannable documents were then transported to a slitting area where the folded and stapled spine was removed from the document. This process utilized an "intelligent slitter" to prevent slitting the wrong side of the document. The documents were jogged by machine so that the registration edges of the NAEP documents were smoothly aligned, and the stacks were then returned to the cart to be scanned.

During the scanning process (shown in Figure 5-3), each scannable NAEP document was uniquely identified using a print-after-scan number consisting of the scan batch number, the sequential number within the batch, and the bar code ID of the booklet. These numbers were printed on each sheet of each document as it exited the scanner. This permitted the data editors to quickly and accurately locate specific documents during the editing phase. The print-after-scan number remained with the data record, providing a method for easy identification and quick retrieval of any document.

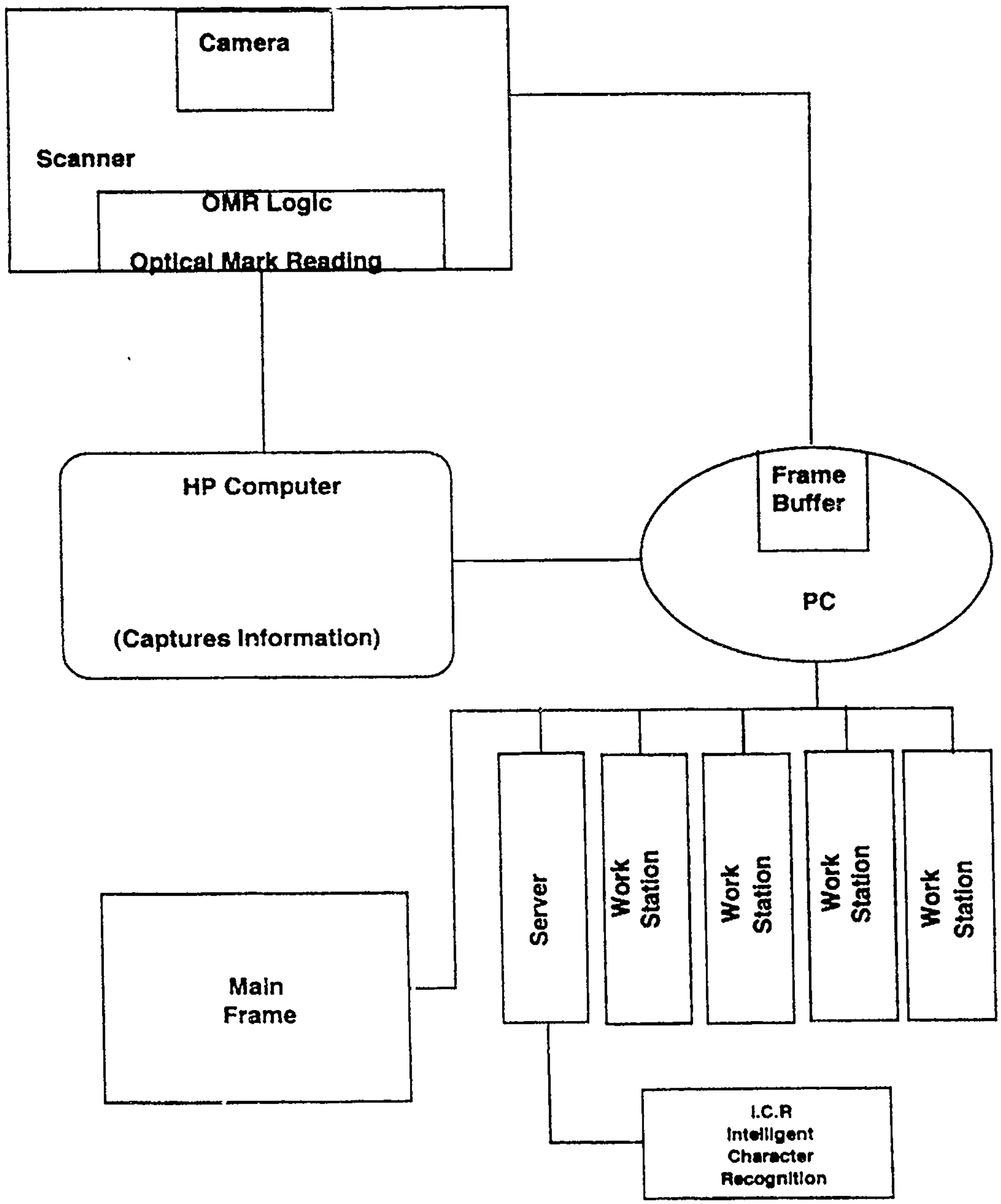
The data values were captured from the booklet covers and Administration Schedules and were coded as numeric data. Unmarked fields were coded as blanks and editing staff were alerted to missing or uncoded critical data. Fields that had multiple marks were coded as asterisks (*). The data values for the item responses and scores were returned as numeric codes. The multiple-choice single response format items were assigned codes depending on the position of the response alternative; that is, the first choice was assigned the code "1," the second "2," and so forth. The mark-all-that-apply items were given as many data fields as response alternatives; the marked choices were coded as "1" while the unmarked choices were recorded as blanks. The images of constructed-response items were saved as a digitized computer file. The area of the page that needed to be clipped was defined prior to scanning through the document definition process. The fields from unreadable pages were coded "X" as a flag for resolution staff to correct. In addition to capturing the student responses, the bar code identification numbers used to maintain process control were decoded and transcribed to the NAEP computerized data file.

As the scanning program completed scanning each stack, the stack was removed from the output hopper and placed in the same order they were scanned on the output cart. The next stack was removed from the input cart and placed into the input hopper, after which the scanning resumed. When the operator had completed processing the last stack of the batch, the program was terminated. This closed the dataset that automatically became available for the data validation (edit) process. The scanned documents were then forwarded to a holding area in case they needed to be retrieved for resolution of edit errors.

NCS again used the ICR engine to read various hand and machine printing on the front cover of the assessment and supervisor documents for the 1996 NAEP assessments. Some information from scannable student documents, such as the Administration Schedule, the Roster of Questionnaires, and some questions in the School Characteristics and Policies Questionnaires, were read by the ICR engine and verified by an online key-entry operator. In all, the ICR engine read approximately 15 million characters. The ICR engine saved NAEP field staff and school personnel a significant amount of time because they no longer had to enter this data by gridding rows and columns of data.

NCS also implemented new programs that allowed the scanners to read imprinted codes, known as 2-out-of-5 codes, that were printed via a Xerox 4280 printer on the Administration Schedule. These 2-out-of-5 codes were imprinted at the same time the booklet ID numbers were printed on the Administration Schedule and identified which booklet IDs were listed on that document. When the scanning programs were unable to translate the 2-out-of-5 codes (thereby identifying the booklet ID numbers on the document) image clips of the booklet ID numbers were displayed to online editing staff for verification. This elminated a significant amount of online editing time needed to process the NAEP assessments.

Figure 5-3
1996 NAEP State Assessment
Image Scanning Flow Chart



To provide another quality check on the image scanning and scoring system, NCS staff implemented a quality check process by creating a rubber stamp with a valid score designated on it. In this way, sample responses for each item could be scanned through the system as part of the regular scanning and scoring process. An example of the stamp used is given below.

Clerical staff stamped blank unused booklets with mock scores and sent them through the scanning process. Each unique item type scored via the image system had two quality control stamps per valid score.

The quality control booklets were batched and processed together with student documents of the same type. Because all of a specific item were batched together for transmission to the scoring facility, the quality control-stamped responses were integrated with the student responses and transmitted simultaneously to the scoring facility. During the scoring process, both student responses and the quality control items were randomly displayed so scores could be applied.

When a person who was scoring responses (reader) later saw the quality control sample on the monitor during scoring, he or she was to notify the team leader, who confirmed the score assigned by the reader was the score listed on the sample. The quality control booklets were included in the pool of all items to be drawn from for the 25 percent reliability rescore.

All image quality-assurance documents were created prior to the beginning of scoring and all pre-determined score points were used. Because during the process of scoring, valid score points can be changed or dropped completely, NCS provided ETS with documentation explaining what quality control documents were produced and which score points on these items were no longer valid. When an image quality control stamp was displayed to a reader that contained a score point that was no longer valid, the reader gave the response a score point of zero.

A key entry and verification process was used to make corrections to the teacher questionnaires and the SD/LEP student questionnaires. The Falcon system that was used to enter these data is an online data entry system designed to replace most methods of data input such as keypunch, key-to-disk, and many of the microcomputer data entry systems. The terminal screens were uniquely designed for NAEP to facilitate operator speed and convenience. The fields to be entered were titled to reflect the actual source document.

5.4.4 Data Validation

Each dataset produced by the scanning system contains data for a particular batch. These data had to be validated (or edited) for type and range of response. The data-entry and resolution system used was able to simultaneously process a variety of materials from all age groups, subject areas, control documents, and questionnaires as the materials were submitted to the system from scannable and non-scannable media.

The data records in the scan file were organized in the same order in which the paper materials were processed by the scanner. A record for each batch header preceded all data records for that batch. The document code field on each record distinguished the header record from the data records.

When a batch-header record was read, a pre-edit data file and an edit log were generated. As the program processed each record within a batch from the scan file, it wrote the edited and reformatted data records to the pre-edit file and recorded all errors on the edit log. The data fields on an edit log record identified each data problem by the batch sequence number, booklet serial number, section or block code, field name or item number, and data value. After each batch had been processed, the program generated a listing or online edit file of the data problems and resolution guidelines. An edit log listing was printed at the termination of the program for all non-image documents. Image "clips" requiring editing were routed to online editing stations for those documents that were image scanned.

As the program processed each data record, it first read the booklet number and checked it against the session code for appropriate session type. Any mismatch was recorded on the error log and processing continued. The booklet number was then compared against the first three digits of the student identification number. If they did not match, a message was written on the error log. The remaining booklet cover fields were read and validated for the correct range of values. The school codes had to be identical to those on the Process Control System record. All data values that were out of range were read "as is" but were flagged as suspect. All data fields that were read as asterisks (*) were recorded on the edit log or online edit file.

Document definition files described each document as a series of blocks that in turn were described as a series of items. The blocks in a document were transcribed in the order that they appeared in the document. Each block's fields were validated during this process. If a document contained suspect fields, the cover information was recorded on the edit log along with a description of the suspect data. The edited booklet cover was transferred to an output buffer area within the program. As the program processed each block of data from the dataset record, it appended the edited data fields to the data already in this buffer.

The program then cycled through the data area corresponding to the item blocks. The task of translating, validating, and reporting errors for each data field in each block was performed by a routine that required only the block identification code and the string of input data. This routine had access to a block definition file that had, for each block, the number of fields to be processed, and, for each field, the field type (alphabetic or numeric), the field width in the data record, and the valid range of values. The routine then processed each field in sequence order, performing the necessary translation, validation, and reporting tasks.

The first of these tasks checked for the presence of blanks or asterisks (*) in a critical field. These were recorded on the edit log or online edit file and processing continued with the next field. No action was taken on blank fields for multiple-choice items because the asterisk code indicated a non-response. The field was validated for range of response, and any values outside of the specified range were recorded on the edit log or online edit file. The program used the item-type code to make a further distinction among constructed-response item scores and other numeric data fields.

Moving the translated and edited data field into the output buffer was the last task performed in this phase of processing. When the entire document was processed, the completed string of data was written to the data file. When the program encountered the end of a file, it closed the dataset and generated an edit listing for non-image and key-entered documents. Image-scanned items that required correction were displayed at an online editing terminal.

5.4.5 Editing for Non-Image and Key-Entered Documents

Throughout the system, quality procedures and software ensured that the NAEP data were correct. All student documents on the Administration Schedule were accounted for, as receipt control personnel checked that the materials were undamaged and assembled correctly. The machine edits performed during data capture verified that each sheet of each document was present and that each field had an appropriate value. All batches entered into the system, whether key-entered or machine-scanned, were edited for errors.

Data editing took place after these checks. This consisted of a computerized edit review of each respondent's document and the clerical edits necessary to make corrections based upon the computer edit. This data-editing step was repeated until all data were correct.

The first phase of data editing was designed to validate the population and ensure that all documents were present. A computerized edit list, produced after NAEP documents were scanned or key entered, and all the supporting documentation sent from the field were used to perform the edit function. The hard-copy edit list contained all the vital statistics about the batch: number of students, school code, type of document, assessment code, suspect cases, and record serial numbers. Using these inputs, the data editor verified that the batch had been assembled correctly and that each school number was correct.

During data entry, counts of processed documents were generated by type. These counts were compared against the information captured from the Administration Schedules. The number of assessed and absent students processed had to match the numbers indicated on the Process Control System.

In the second phase of data editing, experienced editing staff used a predetermined set of specifications to review the field errors and record necessary corrections to the student data file. The same computerized edit list used in phase one was used to perform this function. The editing staff reviewed the computer-generated edit log and the area of the source document that was noted as being suspect or as containing possible errors. The composition of the field was shown in the edit box. The editing staff checked this piece of information against the NAEP source document. At that point, one of the following took place:

Correctable error. If the error was correctable by the editing staff as per the editing specifications, the correction was noted on the edit log for later correction via key-entry.

Alert. If an error was not correctable as per the specifications, an alert was issued to NAEP project staff for resolution. Once the correct information was obtained, the correction was noted on the edit log for key-entry correction.

Non-correctable error. If a suspected error was found to be correct as stated and no alteration was possible according to the source document and specifications, the programs were tailored to allow this information to be accepted into the data record. No corrective action was taken.

The corrected edit log was then forwarded to the key-entry staff for processing. When all corrections were entered and verified for a batch, an extract program pulled the corrected records into a mainframe dataset. At this point, the mainframe edit program was initiated. The edit criteria were again applied to all records. If there were further errors, a new edit listing was printed and the cycle was repeated.

When the edit process produced an error-free file, the booklet ID number was posted to the NAEP tracking file by age, assessment, and school. This permitted NCS staff to monitor the NAEP processing effort by accurately measuring the number of documents processed by form. The posting of booklet IDs also ensured that a booklet ID was not processed more than once.

5.4.6 Data Validation and Editing of Image-Processed Documents

The paper edit log for key-entered documents was replaced by online viewing of suspect data for all image-processed documents. For rapid resolution, the edit criteria for each item in question appeared on the screen along with the suspect item. Corrections were made immediately. The system employed an edit/verify system that ultimately meant that two different people viewed the same suspect data and operated on it separately. The "verifier" made sure the two responses (one from either the entry operator or the ICR engine) were the same before the system accepted that item as being correct. The verifiers could either overrule or agree with the original correction made if the two did not match. If the editor could not determine the appropriate response, he or she escalated the suspect situation to a supervisor. For errors or suspect information that could not be resolved by supervisory staff, a product-line queue was created. This allowed supervisors to escalate edits to project staff for resolution. By having this product-line queue, project staff were able to quickly locate edit clips within the image system, speeding up the resolution process.

Once an entire batch was through the edit phase, it became eligible for the count-verification phase. The Administration Schedule data were examined systematically for booklet IDs that should have been processed (assessed administration codes). All documents under that Administration Schedule were then inspected to ensure that all of the booklets were included.

With the satisfactory conclusion of the count-verification phase, the edited batch file was uploaded to the mainframe, where it went through yet another edit process. A paper edit log was produced and, if errors remained, was forwarded to another editor. When this paper edit was satisfied, the Process Control System and Workflow Management System were updated. Because there was a possible time lag between a clean edit in the image system and a clean edit in the mainframe systems, the batch was not archived until 48 hours after the image edit phase was completed.

5.4.7 Data Transmission

Due to the rapid pace of scoring on an item-by-item basis, the NCS scoring specialists found it necessary to continually monitor the status of work available to the readers and plan the scoring schedule several weeks in advance. On Wednesday of each week, the NCS performance assessment specialist in charge of each subject area planned the next two weeks' schedule. That information was then provided to the person in charge of downloading data to the scoring center. By planning the scoring schedule two weeks in advance, the scoring specialists were able to ensure that readers would have sufficient work for at least one week, after which the next download would occur to supplement the volume of any unscored items and add an additional week's work to the pool of items to score. Additionally, by scheduling two weeks' data transmission, flexibility was added to the scoring schedule, making it possible to implement last-minute changes in the schedule once the items had been delivered to the scoring center. Depending on the number of items to be transmitted, the actual downloading was conducted on Friday or was divided into two smaller sessions for Thursday and Friday download. By the first week of May 1996, there was sufficient space on the scoring servers to load all remaining unscored items to the scoring center.

Delivery of data to the scoring center was accomplished via several T1 transmission lines linking the mainframe computers and the NAEP servers at the document-scanning site in the NCS main facility with the scoring servers dedicated to distributing work to the professional readers at the scoring center. The actual task of scheduling items for downloading was accomplished using a code written by the Image Software Development team. This code enabled the person scheduling the download to choose a team of readers and select the scheduled items from a list of all items that that team would be scoring throughout the scoring project. This process was repeated for all teams of readers until all anticipated work was scheduled. Once this task was completed, the scheduled job was tested to determine if there was sufficient free disk space on the servers at the scoring center. If for any reason sufficient disk space was not available, scheduled items could be deleted from the batch individually or as a group until the scheduled batch job could accommodate all items on the available disk space at the scoring center. Once it was determined that sufficient disk space was available, transmission of student responses commenced. Data transmission was typically accomplished during off-shift hours to minimize the impact on system-load capacity.

5.5 PROFESSIONAL SCORING

5.5.1 Overview

Scoring of the 1996 NAEP State Assessment constructed-response items was conducted using NCS's imaging technology. All 1996 responses were scored online by readers working at image stations. The logistical problems associated with handling large quantities of student booklets were removed for those items scored on the image system.

One of the greatest advantages image technology presented for NAEP scoring was in the area of sorting and distributing work to scorers. All student responses for a particular item, regardless of where spiraling had placed that item in the various booklet forms, were grouped together for presentation to a team of readers. This allowed training to be conducted one item at a time, rather than in blocks of related items, thus focusing readers' attention on the complexities of a single item.

A number of tools built into the system allowed table leaders and trainers to closely and continuously monitor reader performance. A detailed discussion of these tools can be found later in this chapter.

The system automatically routed six percent of student responses to other members of the team for second scoring. Readers were given no indication of whether the response had been scored by another reader, thereby making the second scoring truly blind. On-demand, real-time reports on interreader reliability (drawn from those items that were second-scored) presented extremely valuable information on team and individual scoring. Information on adjacent and perfect agreement, score distribution, and quantity of responses scored were continuously available for consultation. Similarly, back-reading of student responses could be accomplished in an efficient and timely manner. Also, table leaders were able to read a large percentage of responses, evaluating the appropriateness and accuracy of the scores assigned by readers on their teams.

Project management tools assisted table leaders in making well-informed decisions. For example, knowledge of the precise number of responses remaining to be scored for a particular item allowed table leaders to determine the least disruptive times for lunch breaks.

Concerns about possible reader fatigue or other problems that might result from working continuously at a computer terminal proved unfounded. Both readers and table leaders responded with enthusiasm to the system, remarking on the ease with which student responses could be read and on the increased sense of professionalism they felt in working in this technological environment. Readers took periodic breaks, in addition to their lunch break, to reduce the degree of visual fatigue. Readers were grouped in teams of 9 to 14 readers per team; each team working with a specific table leader.

5.5.2 Training Paper Selection

A pool of papers to be used during training for the national main assessment was selected by NCS staff in March 1996. During the interview process, NCS performance assessment specialists identified those candidates with team leader potential. Individuals recruited to be team leaders during the actual scoring were asked to select student responses to send to ETS assessment division subject specialists, who created the master training set. Team leaders were used for this task because it gave them the advantages of working on specific items, learning the make-up of the various booklets, learning the terminology, and understanding the processing of the booklets at NCS. This was especially important in 1996, because most scoring activities occurred via the image processing system.

Generally, the training set for each short (two- or three-point) item included 40 papers:

- 10 anchor papers
- 20 practice papers
- 5 papers in Calibration Set #1
- 5 papers in Calibration Set #2

Generally, the training set for each extended (four- or five-point) item included 85 papers:

- 15 anchor papers
- 40 practice papers
- 10 papers in each of two qualification sets
- 5 papers in Calibration Set #1
- 5 papers in Calibration Set #2

Anchor papers, or sets, are those papers that represent the best examples of each score point. They are used to illustrate the scoring guide so that the reader can return to this set and compare it with student responses during scoring. Practice papers, or sets, include the remainder of the scored examples, excluding the scores, so that the reader can practice on some student responses prior to scoring. The purpose is to elicit discussion and give scorers a chance to ask questions. Qualification sets are used by the trainer to ensure that each reader has understood the scoring guide and can apply it to student documents. Similar to practice papers, the scores are masked so the reader can assign a score. A predetermined number of scores must be correct for the reader to remain on the scoring project. Calibration sets are used after a long break in scoring has occurred (e.g., after lunch in the early days of a project, or first thing in the morning) to ensure that the readers review the scoring guide and the anchor papers, and to prevent the scorers from drifting to the middle range of possible score points.

To ensure that the ETS assessment specialist would have a wide range of student responses to encompass all score points, NCS personnel copied approximately 125 papers for each five-point item, 100 papers for each four-point item, 75 papers for each three-point item, and 50 papers for each two-point item. To ensure that training papers represented the range of responses obtained from the sample population, NCS personnel selected papers randomly from across the sample. The student identifier (barcode) was written on the copy and NCS team leaders assigned tentative scores to the responses. The responses were numbered sequentially, copied, and sent via overnight delivery to ETS. When the training packet was compiled, the ETS assessment specialist faxed the composition of the packets back using the sequential numbers. ETS staff kept its copy of the training sets.

From the faxed sheets, packets were created for each item using the original copies of the student responses. These packets were then forwarded to the NCS communication center for copying, and stored for the team's use in training. ETS also sent the most up-to-date version of the training packet to the NCS scoring center for each item to be included in the scoring guide.

5.5.3 General Training Guidelines

ETS and NCS personnel conducted training for the constructed-response items on an item-by-item basis, so that each item could be scored immediately after training.

In all, 14 table leaders and 196 readers worked from March 13 to May 5, 1996, to complete scoring for the 1996 NAEP State Assessments. Each member of a team received a copy of the stimulus and training materials for the items that his or her team would be scoring. Before training, each team member became familiar with those materials under the guidance of the trainer who explained the anchor papers, exemplifying the various score-point levels. Next, ETS and NCS staff (the trainers) conducted training sessions to explain the anchor papers, exemplifying the various score point levels. The team proceeded with each member scoring the practice papers, and then discussing those papers as a group while the trainer clarified issues and answered questions. The papers selected for each training set were chosen to illustrate a range from easily classifiable responses to borderline responses for each score point.

When the trainer was confident the readers were ready to begin scoring short constructed responses, the table leader signaled the system to release the responses to the team members who had successfully completed training. For extended constructed-response items, each team member was given a qualifying set that had been prescored by the trainer in conjunction with the table leader. Readers were required to score an exact match on 80 percent of the items in order to qualify for scoring. If a reader failed on the first attempt, the trainer discussed the discrepant scores with the reader and administered a second qualifying set. Again, 80 percent exact agreement was required to score the item. During the beginning stages of scoring, the team members discussed student responses with the trainer and table leader to ensure that issues not addressed in training were handled in the same manner by all team members.

After the initial training, readers scored the items, addressing questions to the table leader and/or trainer when appropriate. Depending upon the number of responses, length of responses and complexity of the rubric, scoring of an individual item ranged anywhere from one-half hour to two weeks. Whenever a break longer than 15 minutes occurred in scoring, each team member received a set of calibration papers that had been prescored by the trainer and table leader. Each team member scored the calibration set individually, and then the team discussed the papers to ensure against scorer drift.

5.5.4 Table Leader Utilities and Reliability Reports

Among the many advantages of the image scoring system is the ease with which workflow to readers can be regulated and scoring can be monitored. One of the utilities at a table leader's disposal was a qualification algorithm used after training on extended constructed-response items. This algorithm was used to compare readers' scores with the scores agreed upon by the trainer and the table leader for the qualifying set of responses. The table leader would give identical paper-copy qualification packets to each reader. These packets contained ten student responses to be independently scored by the readers. After the readers finished, the table leader would enter each reader's scores into the computer for tabulation. The computer would calculate each reader's percent of exact, adjacent, and non-adjacent agreement with the master key. If a reader attained a percent of exact agreement above a pre-determined threshold (usually 80%), the reader would be allowed to score. Readers not attaining the pre-determined threshold were handled on a case-by-case basis—typically receiving individual training by the trainer or the NCS table leader before being allowed to score. A table leader could also cancel a reader's qualification to score an item if review of a reader's work indicated inaccurate scoring and that supplemental training was necessary after scoring had begun.

After scoring began, NCS table leaders reviewed each reader's progress using a backreading utility that allowed the table leader to review papers scored by each reader on the team. Typically, a table leader reviewed responses scored by each reader at the same rate at which second scoring occurred (i.e., six percent for items with both state and national samples and more for items with only a national sample). Table leaders made certain to note the score the reader awarded each response as well as the score a second reader gave that same paper. This was done as an interreader reliability check. Alternatively, a table leader could choose to review all responses given a particular score to determine if the team as a whole was scoring consistently. Both of these review methods used the same display screen and showed the ID number of the reader and the scores awarded. If the table leader disagreed with the score given an item, he or she discussed it with the reader for possible correction. Replacement of scores by the table leader was done only with the knowledge and approval of the reader, thereby serving as a learning experience for the reader. In the case where the response was second scored, neither score was changed.

The table leaders were able to monitor workflow using a status tool that displayed the number of items scored, the number of items first-scored that still needed to be second-scored, the number of items remaining to be second-scored, and the total number of items remaining to be scored. This allowed the team leaders and performance assessment specialists to accurately monitor the rate of scoring and to estimate the time needed for completion of the various phases of scoring.

The reliability information about the constructed-response items used in the NAEP scale will be discussed in *The NAEP 1996 Technical Report* (Allen, Carlson, & Zelenak, 1998).

5.5.5 Main and State Mathematics Assessments

It is important to note that the student responses in the fourth- and eighth-grade mathematics assessments were scored concurrently for the national and the state samples. Another advantage of image-based item-by-item scoring is that the comparability of the scoring of the two samples is ensured because all responses are scored simultaneously and in a manner that makes it impossible to know which sample any individual response belongs to. Because of this, the following discussion addresses both national (main) and state mathematics assessments. Training procedures for the scoring of mathematics items followed the steps outlined in Section 5.5.3.

5.5.6 Scoring the Main and State Mathematics Assessments

Each constructed-response item had a unique scoring standard that identified the range of possible scores for the item and defined the criteria to be used in evaluating the students' responses. Point values were assigned with the following general meanings:

Dichotomous items from the 1992 assessment[2]

- 1 = Unacceptable
- 7 = Acceptable

Three-point items developed during the 1993 field test

- 1 = Evidence of little or no understanding
- 2 = Evidence of partial understanding
- 3 = Evidence of full understanding

Four- and five-point items

- 1 = No evidence of understanding
- 2 = Evidence of minimal understanding
- 3 = Evidence of partial understanding
- 4/5 = Evidence of satisfactory/extended understanding

The scores for these items also included a 0 for no response, 8 for an erased or crossed-out response, and a 9 for any response found to be unratable (i.e., illegible, off-task, responses written in a language other than English, responses of "I don't know," or refusal to participate).

During scoring, the table leaders compiled notes on various responses for the readers' reference and guidance and for the permanent record. In addition, trainers were accessible for consultation in interpreting the guides for unusual or unanticipated responses. Each item was scored by a single team immediately after training for that item. The table leaders conducted constant online back-reading of all team members' work throughout the scoring process, bringing to the attention of each reader any problems relating to scoring. When deemed appropriate, scoring issues were discussed among the team as a whole. Table leaders also monitored the number of responses scored and individual and team reliability figures throughout the course of scoring.

Grades 4 and 8 items came from both national and state-by-state samples. Responses were delivered by image in such a way that the student demographics were unknown to the reader. Thus, readers did not know from which sample any given item came when it appeared on the screen. In the case of overlap items, all readers scored responses at both grade levels.

[2] Some dichotomous items have other unacceptable responses tracked as a 2, 3, 4, or 5, while some have other correct responses tracked as either a 6 or 7.

5.6 DATA DELIVERY

The 1996 NAEP assessment data collection resulted in several classes of data files—student background, school, teacher, weights, SD/LEP student, student/teacher match, and student-response information. Student-response information included response data from all assessed students in 1996. Data resolution activities occurred prior to the submission of data files to ETS and Westat to resolve any irregularities that existed. This section details additional steps performed before creating the final data files to ensure capture of the most complete and accurate information.

An important quality-control component of the image-scoring system was the inclusion, with a student's response to one item, of an exact copy of the student edit record, including the student booklet ID number, with every image of a student's response to a constructed-response item. This information was used to identify the file within the image-scoring system. These edit files also remained in the main data files residing on the NCS mainframe computer. By attaching this information to a student's response, exact matching of scores assigned to constructed-response items and all other data for each individual student was guaranteed, because the booklet ID for each image was part of every image file. This ensured scores were applied to the correct student's record on the mainframe.

When all the responses for an individual item had been scored, the system automatically submitted all item scores assigned during scoring, along with their student edit records, to a queue to be transmitted to the mainframe. Project staff then initiated a system job to transmit all scoring data to be matched with the original student records on the mainframe. A custom edit program matched the edit records of the scoring files to those of the original edit records on the mainframe. As matches were confirmed, the scores were applied to those individual files. After completion of this stage, all data collected for an individual student was located in one single and complete record/file identified by the student edit record.

NCS processed the SD/LEP Student Questionnaires via OMR scanning. Edits performed on the questionnaires assured that responses to questions fell within the valid range for that question. SD/LEP questionnaires were then matched to a student record. SD/LEP questionnaires that were not matched to a student document were cross-referenced with the corresponding Administration Schedule, Roster of Questionnaire, and student data files to correct, if necessary, the information needed to result in a match.

In 1996, NCS continued to use ICR technology to capture percentage figures written by school personnel directly in boxes on the School Characteristics and Policies Questionnaires rather than requiring the school official to grid ovals in a matrix. The data were then verified by an edit operator.

The same processes that were followed in previous cycles were used in 1996 to achieve the best possible student/teacher match rate. The first step was to identify Teacher Questionnaires not returned to NCS for processing so as to exclude from the matching process the students of these teachers. Student identification numbers that were not matched to a Teacher Questionnaire were cross-referenced with the corresponding Administration Schedule and Roster of Teacher Questionnaires to verify (and change, if necessary) the teacher number, teacher period, and questionnaire number recorded on these control documents. The NAEP school numbers listed on the Roster of Questionnaires and Teacher Questionnaire were verified and corrected, if necessary. Once these changes were made, any duplicate teacher numbers existing within a school were, if possible, cross-referenced for resolution with the Rosters of Questionnaires. Because this information was located together on a single, central control document, the ability to match and resolve discrepant or missing fields was simplified.

After all data processing activities were completed, data cartridges and/or diskettes were created and shipped via overnight delivery to ETS and/or Westat, as appropriate. NCS maintains a duplicate archive file for security/backup purposes.

5.7 MISCELLANEOUS

5.7.1 Storage of Documents

After the batches of image-scanned documents had successfully passed the editing process, they were sent to the warehouse for storage. Due to the large number of rescore projects done with NAEP material, the documents were unspiraled and sequenced by grade and booklet type after all of the processing/scoring was completed. Unspiraled and sequenced booklets were then assigned a new inventory number by grade and booklet type and sent back to the warehouse for storage The storage locations of all documents were recorded on the inventory control system. Unused materials were sent to temporary storage to await completion of the entire assessment. Once the assessment was complete, NCS received authorization from ETS to salvage unused materials after determining that a sufficient quantity of each form type was retained permanently.

5.7.2 Quality Control Documents

ETS requires that a random sample of booklets and the corresponding scores/scoring sheets be pulled for an additional quality-control check that verifies the accuracy and completeness of the data. For image-scanned documents, a scoring sheet is not used, so ETS uses scores sent to them on a data tape to verify the accuracy of applied scores. During the scoring of mathematics, a selected number of image-processed booklets were paper scored. If any of the random sample of mathematics booklets used for paper scoring were selected as quality control documents, the scoring sheet was also sent to ETS. All of these documents were selected prior to sending the booklets to storage. A random sample of all the questionnaires used in the 1996 NAEP assessment was also sent to ETS.

5.7.3 Alert Analysis

Table 5-5 identifies the different types of alerts to problems that were encountered in the processing of NAEP data. For the 1996 State Assessment, there was a total of 3,812 alerts.

Discrepancies were found in the receiving process that did not require an alert to be issued to Westat. They did require a great deal of effort by the opening staff to resolve in order to provide the most complete and accurate information. These are referred to as "info alerts." These were categorized and codes were assigned to them. They are listed in the left-hand column of Table 5-5.

Even though receipt-control staff were well trained in the resolution of many situations, there were some problems that required resolution by NCS NAEP product line staff. These are referred to as "problem alerts." The various types of problem alerts were also categorized and coded. They are listed in the right-hand column of Table 5-5. For any unusual situations, Westat was contacted to help with the resolution of the alert.

Table 5-5

Alerts for the 1996 National and State Assessments

Information Alerts	Problem Alerts
Code 52 not written on Administration Schedules	Change of Administration Codes-A/S or Booklets
The yes/no box not gridded on Rosters	Incorrect Rosters/Questionnaires
Session Number not on Administration Schedules	Administration Notes/Writing on Covers
Administration Codes not on A/S; but on booklets	Duplicate Student / Booklet Number/ Administration Schedule
Administration Codes not on booklets; but on A/S	All material not returned
Items returned for Westat	Affected Testing - Problem
Writing on booklet covers	Transcribed page(s) for student booklet(s)
Other	Processed as is
	Involves Inclusion Check List
	Other

A/S = Administration Schedules

Chapter 6

CREATION OF THE DATABASE, QUALITY CONTROL OF DATA ENTRY, AND CREATION OF THE DATABASE PRODUCTS[1]

John J. Ferris, Katharine E. Pashley, Patricia E. O'Reilly,
David S. Freund, and Alfred M. Rogers
Educational Testing Service

6.1 OVERVIEW

The data processing, scoring, and editing procedures described in Chapter 5 resulted in the generation of disk and tape files containing various data for students (assessed and excluded), teachers, and schools, along with SD/LEP (students with disabilities and students with limited English proficiency) information. The weighting procedures described in Chapter 7 resulted in the generation of data files that included the sampling weights required to make valid statistical inferences about the populations from which the 1996 fourth- and eighth-grade State Assessment mathematics samples were drawn. These files were merged into a comprehensive, integrated database. The creation of this database is described in Section 6.2

Section 6.3 describes a central repository or master catalog of this information. The master catalog is accessible by all analysis and reporting programs and provides correct parameters for processing the data fields and consistent labeling for identifying the results of the analyses.

To evaluate the effectiveness of the quality control of the data entry process, the corresponding portion of the final integrated database was verified in detail against a sample of the original instruments received from the field. The results of this procedure are given in Section 6.4.

The integrated database was the source for the creation of the NAEP item information database and the NAEP secondary-use data files. These are described in Section 6.5.

6.2 MERGING FILES INTO THE STATE ASSESSMENT DATABASE

The data processing conducted by National Computer Systems (NCS) resulted in the transmittal to ETS of four data files for both fourth and eighth grade: one for the student background and item response data and one file for each of the three questionnaires (Mathematics Teacher Questionnaire, School Characteristics and Policies Questionnaire, and SD/LEP Questionnaire). The sampling weights, derived by Westat, Inc., comprised an additional seven files for each grade—three sets for assessed students, three sets for excluded students and one for schools. (See Chapter 7 for a discussion of the sampling weights.) Thes 11 files at each grade were the foundation for the analysis of the 1996 State Assessment data. Before data

[1] John J. Ferris was responsible for the evaluation of the quality of the database and the date entry process; Katharine E. Pashley was responsible for database generation under the supervision of David S. Freund, Patricia E. O'Reilly and Alfred M. Rogers created the secondary-use data files.

analyses could be performed, these data files had to be integrated into a coherent and comprehensive database.

The 1996 State Assessment database for both fourth and eighth grade consisted of two files—student and school. Each record on the student file contained a student's responses to the particular assessment booklet the student was administered—Booklets 101 to 126 (in the case of excluded students, a booklet was assigned but the student response fields contain a special code indicating no response), and the information from the questionnaire that the student's mathematics teacher completed. Additionally, for a student (assessed or excluded) who was identified as SD or LEP, the data from the SD/LEP Questionnaire is included. This questionnaire is filled out for all students identified as SD and/or LEP, both assessed and excluded. (See Chapter 2 for information regarding assessment instruments.) Also added to the student files were variables with school-level information supplied by Quality Education Data, Inc. (QED), including demographic information about schools such as race/ethnicity percentages. Since the teacher data is not a representative sample of teachers and as the focus of NAEP is to report student level results, the teacher response data was added to the student records. The school files were separate files that could be analyzed on their own and could also be linked to the student files through the unique school ID code.

The creation of the student data files for fourth and eighth grade began with the reorganization of the data files received from NCS. This involved two major tasks: 1) the files were restructured, eliminating unused (blank) areas to reduce the size of the files; and 2) in cases where students had chosen not to respond to an item, the missing responses were recoded as either "omitted" or "not reached," as discussed in Chapter 9. Next, the student response data were merged with the student weights files. The resulting file was then merged with the SD/LEP and teacher data. In all merging steps, the 10-digit booklet ID (the three-digit booklet number common to every booklet with the same block of items, a six-digit serial number unique to the booklet a student was given, and a single check digit, distinguishing bilingual booklets) was used as the matching criterion.

The school file for each grade was created by merging the School Characteristics and Policies Questionnaire file with the file of school weights and school variables, supplied by Westat. The state and school codes were used as the matching criteria. Since some schools did not return a questionnaire, some of the records in the school file contained only school-identifying information and sampling weight information.

When the student and school files for each grade had been created, the database was ready for analysis. In addition, whenever new data values, such as composite background variables or scale scores, were derived, they were added to the appropriate database files using the same matching procedures described above.

For archival purposes and to provide data to the states, to researchers, and to policymakers, secondary-use data files and codebooks for each jurisdiction were generated from this database. The secondary-use data files, described in Section 6.5.2, contain all responses and response-related data from the assessment, including responses from the student booklets, Teacher Questionnaires, and School Characteristics and Policies Questionnaires, scale scores, sampling weights, and variables used to compute standard errors.

6.3 CREATING THE MASTER CATALOG

A critical part of any database is its processing control and descriptive information. Having a central repository of this information, which may be accessed by all analysis and reporting programs, will provide correct parameters for processing the data fields and consistent labeling for identifying the results of the analyses. The State Assessment master catalog file was designed and constructed to serve these purposes for the State Assessment database.

Each record of the master catalog contains the processing, labeling, classification, and location information for a data field in the State Assessment database. The control parameters are used by the access routines in the analysis programs to define the manner in which the data values are to be transformed and processed.

Each data field has a 50-character label in the master catalog describing the contents of the field and, where applicable, the source of the field. The data fields with discrete or categorical response values (e.g., multiple-choice items, professionally scored items, and most questionnaire items, but not weight fields) have additional label fields in the catalog containing 8- and 20-character labels for those response values. These shorter labels can be used for reporting purposes as a concise description of the responses for the items.

The classification area of the master catalog record contains distinct fields corresponding to predefined classification categories (e.g., mathematics content and process areas) for the data fields. For a particular classification field, a nonblank value indicates the code of the subcategory within the classification categories for the data field. This classification area permits the grouping of identically classified items or data fields by performing a selection process on one or more classification fields in the master catalog.

The master catalog file was constructed concurrently with the collection and transcription of the State Assessment data so that it would be ready for use by analysis programs when the database was created. As new data fields were derived and added to the database, their corresponding descriptive and control information were entered into the master catalog. Machine-readable catalog files, created from the master catalog, are available as part of the secondary-use data files package for use in analyzing the data with programming languages other than SAS or SPSS (see Section 6.5.2.8). For SAS and SPSS users, files of control statements that create SAS or SPSS system files are provided (see Section 6.5.2.7).

6.4 QUALITY CONTROL EVALUATION

The purpose of the data entry quality control procedure is to gauge the overall accuracy of the process that transforms responses into machine-readable data. The procedure involves examining the actual responses made in a random sample of booklets and comparing them, mark by mark and character by character, with the responses recorded in the final database, which is used for analysis and reporting. Notwithstanding the marks made by the respondent, if the respondent's intention is unambiguous, and if the data entry system has failed to accurately capture the intended response, the erroneous data is considered a failure for purposes of this quality control evaluation.

The selection of booklets for this comparison took place at the point of first entry into the scanning process for data from the field. These selected quality control booklets were set aside in a predetermined proportion, using systematic random sampling, and then collected for subsequent close scrutiny. Selection proportions comparable to, or greater than, those used in previous assessments were used. The results of this process are discussed in detail below, and Table 6-2 contains detailed information about the sampling rates, numbers of booklets and data characters examined, and errors found.

6.4.1 Student Data

Twenty-six assessment booklets, numbered 101 through 126, were administered to students as part of the State Assessment in mathematics. Table 6-1 provides the numbers of each booklet in the database for each grade. Note that these numbers, and others reported below for various categories of data, may vary somewhat from other totals given in this report for a variety of reasons, having to do with the appropriateness of inclusion for different purposes. The variation in the numbers of student booklets is insignificant, according to a chi-square test, indicating very good control of the distribution process.

Student booklets were sampled in adequate numbers and the average rate of selection was about 1 out of 380, a selection rate comparable to that used in past assessments at both the state and national levels. The few errors found during this quality control examination did not cluster by booklet number, so there is no reason to believe that the variation in numbers of booklets selected had a significant effect on the estimates of overall error rate confidence limits reported below.

The quality control evaluation detected 32 errors in these student booklet samples, 15 at grade 4 and 17 at grade 8. All the errors involved either multiple responses that were not identified as such by the scanner or erasures that were recorded instead of ignored. To be considered a scanning error, the scanning process must have failed to correctly determine the respondent's intent when it was plain to the human eye. While such a failure might seem to cast doubt on the scanning process, the final error rate determined from the quality control evaluation was reassuring. A very large volume of data was scanned with consistently usable results. An analysis of this evaluation based on the binomial theorem permits the inference of confidence limits indicated in the last column of Table 6-2; it is unlikely, for instance, that more than a tenth of a percent (.0010) of the data characters processed at grade 4 would differ from what a careful reader would have found in the student booklets.

6.4.2 Mathematics Teacher Questionnaires

A total of 15,456 questionnaires from mathematics teachers were associated with corresponding student data in the final database at grade 4, and 11,423 at grade 8. These teacher questionnaires were sampled at the rate of about 1 in 100, about the same rate used in the previous assessment. The 265 questionnaires selected for quality control contained a total of 177 errors in 84 different booklets. This is about two to three times the error rate found in recent assessments for this instrument.

While this error rate is not bad enough to render the teacher data unusable, there is some cause for concern in the fact that about one third of these errors were concentrated in a single item—the item requesting information on classroom size. This suggests the possible need for changing the presentation of this item in the questionnaire booklet. While such changes can cause unforeseen problems with response behavior and data reliability, it is being considered in this case because the design of this item appears to be unnecessarily complex and confusing to quite a few of the teachers. Secondary users of NAEP data are cautioned that although the classroom size was included as a conditioning variable in the analysis of these data, the errors found in the responses to this question make its use inadvisable. Other classroom data items also proved to be problematic for teachers, especially at Grade 8. The issue is currently undergoing study and alternatives are being considered.

Table 6-1
Number of Mathematics Booklets Scanned into Database and Selected for Quality Control Evaluation

Booklet Number	Number of Booklets in Database: Grade 4	Number of Booklets in Database: Grade 8	Number of Booklets Selected: Grade 4	Number of Booklets Selected: Grade 8
101	4,874	4,641	13	10
102	4,827	4,602	13	13
103	4,855	4,641	12	12
104	4,820	4,643	12	12
105	4,878	4,644	13	10
106	4,858	4,659	13	12
107	4,886	4,684	13	13
108	4,877	4,637	13	12
109	4,844	4,654	14	10
110	4,877	4,643	12	12
111	4,849	4,613	12	11
112	4,825	4,654	11	12
113	4,889	4,589	13	10
114	4,892	4,644	13	11
115	4,870	4,614	12	12
116	4,838	4,601	14	12
117	4,832	4,649	13	13
118	4,836	4,659	13	11
119	4,907	4,570	14	11
120	4,879	4,643	13	12
121	4,847	4,589	13	12
122	4,871	4,596	13	10
123	4,800	4,634	12	12
124	4,867	4,647	13	11
125	4,866	4,639	12	12
126	4,823	4,587	13	11
Total	**126,287**	**120,369**	**332**	**299**

Table 6-2
Summary of the Quality Control Evaluation of Mathematics Data

Subsample	Selection Rate	Different Booklets Selected	Number of Booklets Selected	Number of Characters of Data	Number of Errors	Observed Error Rate	Upper 99.8% Confidence Limit
GRADE 4:							
Student	1/380	26	332	30,214	15	.0005	.0010
Teacher	1/103	1	150	24,450	73	.0030	.0042
School	1/75	1	61	10,858	11	.0010	.0023
SD/LEP	1/100	1	175	22,050	16	.0007	.0015
GRADE 8:							
Student	1/377	26	299	36,136	17	.0005	.0009
Teacher	1/99	1	115	18,515	104	.0056	.0070
School	1/78	1	54	9,882	6	.0006	.0017
SD/LEP	1/103	1	123	15,498	17	.0011	.0021

6.4.3 School Characteristics and Policies Questionnaires

A total of 4,595 questionnaires were collected from school administrators and included in the database at grade 4, and 4,225 at grade 8. These questionnaires were sampled for quality control evaluation at the rate of about 1 in 75, resulting in the selection of 61 questionnaires at grade 4, and 54 at grade 8. The 17 errors that were found represent an error rate about the same as that for school questionnaires in past assessments, well below any reasonable threshold for alarm.

6.4.4 SD/LEP Student Questionnaires

A total of 17,554 SD/LEP questionnaires were scanned and included in the database at grade 4, and 12,708 at grade 8. Nearly half of these questionnaires represented students who were part of the cognitive assessment; the balance of the questionnaires came from students who were excluded. The overall selection rate was about 1 in 100, roughly double that used in earlier assessments for this type of questionnaire. A total of 298 questionnaires were selected across both grades. The resulting error rate indicated that the quality of this data was second only to the student data and certainly adequate for the purposes to which it was put.

The results of the evaluation of all questionnaire data, as well as the student data, are summarized in Table 6-2.

6.5 NAEP DATABASE PRODUCTS

The NAEP database described to this point serves primarily to support analysis and reporting activities that are directly related to the NAEP cooperative agreement. This database has a singular structure and access methodology that is integrated with the NAEP analysis and reporting programs. One of the directives of the NAEP cooperative agreement is to provide secondary researchers with a nonproprietary version of the database that is portable to any computer system. In the event of transfer of NAEP to another client, the cooperative agreement further requires ETS to provide a full copy of the internal database in a format that may be installed on a different computer system.

In fulfillment of these requirements, ETS provides two sets of database products: the item information database and the secondary-use data files. The contents, format, and usage of these products are documented more extensively in the publications listed under the appropriate sections below.

6.5.1 The Item Information Database

The NAEP item information database contains all of the descriptive, processing, and usage information for each item or variable used for NAEP since 1970. The primary unit of this database is the item. Each NAEP item is associated with different levels of information, including usage across years and age cohorts, subject area classifications, response category descriptors, and locations of response data on secondary-use data files.

The item information database can be used for a variety of NAEP tasks: providing statistical information to aid in test construction, determining the usage of items across assessment years and ages for trend and cross-sectional analyses, providing text labels for analyses and reports, and organizing items by subject area classifications for scaling analysis.

6.5.2 The Secondary-Use Data Files

The secondary-use data files are designed to enable any researcher with an interest in NAEP to perform secondary analysis on the same data as those used for analysis at ETS. Supporting documentation accompanies the data files. The set of files for each sample (e.g., the North Dakota grade 4 assessed students) or instrument (e.g., the Florida grade 4 school data) includes: a file containing the data; a file of control statements that will generate an SPSS system file; a file of control statements that will generate a SAS system file; and a machine-readable catalog file. Each machine-readable catalog file (discussed in Section 6.5.2.8) contains sufficient control and descriptive information to aid those users without SAS or SPSS to set up and perform data analyses. The printed documentation consists of three volumes: a guide to the use of the data files, and for each grade, a set of data file layouts and codebooks for each participating jurisdiction.

The remainder of this section summarizes the procedures used in generating the data files and related materials. More information about the contents and use of the data files is contained in the *NAEP 1996 State Assessment Program in Mathematics Secondary-Use Data Files User Guide* (O'Reilly, Zelenak, Rogers, & Kline, 1997).

6.5.2.1 File Definition

There are essentially four samples for analysis in the 1996 State Assessment in mathematics: the students (assessed and excluded), the schools in the State Assessment, and the students and the schools in a matched National Reporting Sample drawn from the national mathematics assessment. The four samples are divided into separate files by grade and also by participating jurisdiction (for the two State Assessment samples), resulting in a total of over 190 files; however, the same file formats, file linking conventions, and analysis considerations apply to each file within a given sample. For example, the analysis specification that links school and student data for a given grade for California would apply identically to New York, Tennessee, or any other participating jurisdiction or group of jurisdictions.

Every data file for each participating jurisdiction requires its own data codebook, detailing the frequencies of data values within that jurisdiction for the given sample and grade. The file layouts, SPSS and SAS syntax, and machine-readable catalog files, however, need only be generated for each of the four samples at grade 4 and at grade 8, since the individual jurisdiction data files for each 1996 State Assessment sample at a given grade are identical in format and data code definition.

6.5.2.2 Definition of the Variables

Prior to the 1990 assessment, information that could potentially be used to identify students or schools was not included on the secondary-use files. When these public-use data files were replaced by the current restricted-use data files, the restraint on confidential data was lifted. This change simplified the variable definition process, as it permitted the transfer of *all* variables from the database to the secondary-use files.

The initial step in this process was the generation of a LABELS file of descriptors of the variables for each data file to be created. Each record in a LABELS file contains, for a single data field, the variable name, a short description of the variable, and processing control information to be used by later steps in the process of generating the secondary-use data files. ETS staff could edit this file for deletion of variables, modification of control parameters, or reordering of the variables within the file. The LABELS file is an intermediate file only; it is not distributed with the secondary-use data files.

The next program in the processing stream, GENLYT, produced a printed layout for each data file from the information in its corresponding LABELS file. These layouts are reviewed for the ordering of the variables. The variables on all data files are grouped and arranged in the following order: identification information, weights, derived variables, scale scores (where applicable), and item response data. On the student data files, these fields are followed by the teacher response data and the SD/LEP student questionnaire data, where applicable. The identification information is taken from the front covers of the instruments. The weight data include sample descriptors, selection probabilities, and replicate weights for the estimation of sampling error. The derived data include sample descriptions from other sources and variables that are derived from the item response data for use in analysis or reporting. Item response data consist of responses to questionnaire items; for assessed students, these data include responses to cognitive items, as well.

In the assessed student data files for each participating jurisdiction of the State Assessment in mathematics and for the National Reporting Sample, the item response data within each block were left in their order of presentation. The blocks, however, were arranged according to the following scheme: common background, subject-related background, the cognitive blocks in ascending numerical order, and student motivation. The responses to cognitive blocks that were not present in a given booklet were left blank, signifying a condition of 'missing by design.'

In order to process and analyze the spiral sample data effectively, the user must also be able to determine, from a given booklet record, which blocks of item response data were present and their relative order in the instrument. The user obtains this information from a set of control variables, one for each block, which indicate not only the presence or absence of the block but its order in the instrument. These control variables created by ETS are included with the derived variables.

6.5.2.3 Data Definition

To enable the data files to be processed on any computer system using any procedural or programming language, it was desirable that the data be expressed in numeric format. This was possible, but not without the adoption of certain conventions for expressing the data values numerically.

During creation of the NAEP database, the responses to all multiple-choice items (both cognitive multiple-choice items and those in the questionnaires) were processed and stored in the database using the letter codes printed in the instruments. This scheme afforded the advantage of saving storage space for items with 10 or more response options, but at the expense of translating these codes into their numeric equivalents for analysis purposes. The response data fields for most of these items would require a simple alphabetic-to-numeric conversion. However, the data fields for items with 10 or more response choices would require "expansion" before the conversion, since the numeric value would require two column positions. One of the processing control parameters on the LABELS file indicates whether or not the data field is to be expanded before conversion and output to the secondary-use data files.

The ETS database contained special codes to indicate certain response conditions: "I don't know" responses, multiple responses, omitted responses, not-reached responses, and unresolvable responses, which included out-of-range responses and responses that were missing due to errors in printing or processing. The scoring guides for the mathematics constructed-response items included additional special codes for ratings of erased or crossed out and for ratings of illegible, "I don't know," off task, or nonratable by the scorers. All of these codes had to be reexpressed in a consistent numeric format.

The following convention was adopted and used in the designation of these codes: The "I don't know" and nonratable response codes (including off-task and illegible responses) were always converted to 7; the omitted response codes were converted to 8; the not-reached response codes were converted to 9; the multiple response codes were converted to 0; and the erased and crossed out response codes were converted to 5. The out-of-range and missing responses were coded as blank fields, corresponding to the 'missing by design' designation.

This coding scheme created conflicts for those multiple-choice items that had seven or more valid response options as well as the "I don't know" response, and also for those constructed-response items whose scoring guide had five or more categories. These data fields were also expanded to accommodate the valid response values and the special codes. In these cases, the special codes were 'extended' to fill the output data field: the "I don't know" and nonratable codes were extended from 7 to 77, omitted response codes from 8 to 88, etc.

Each numeric variable on the secondary-use files was classified as either continuous or discrete. These classifications are related to machine-level characteristics, rather than to the precise mathematical meaning of these terms. The discrete variables include those items for which each numeric value corresponds to a response category. The continuous variables include the weights, scale scores, the identification information codes, and questionnaire item responses for which counts or percentages were requested. The designation of "discrete" includes those derived variables to which numeric classification categories have been assigned. The constructed-response items were treated as a special subset of the discrete variables and were assigned to a separate category to facilitate their identification in the documentation.

6.5.2.4 Data File Catalogs

The LABELS file contains sufficient descriptive information for generating a brief layout of the data file. However, to generate a complete codebook document, substantially more information about the data is required. The CATALOG file provides most of this information.

The CATALOG file is created by the GENCAT program from the LABELS file and the 1996 master catalog file, as described in Section 6.3. Each record on the LABELS file generates a CATALOG record by first retrieving the master catalog record corresponding to the field name. The master catalog record contains usage, classification, and response code information, along with positional information from the LABELS file: field sequence number, output column position, and field width. Like the LABELS file, the CATALOG file is an intermediate file and is not included with the secondary-use data files.

The information for the response codes, also referred to as "foils," consists of the valid data values for the discrete numeric fields and a 20-character descriptive label for each valid data value. (Readers who are familiar with standard usage of the term "foil" in testing and measurement will notice that it has an expanded meaning in this discussion of the secondary-use data files.) The GENCAT program uses additional control information from the LABELS file to determine if extra foils should be generated and saved with each CATALOG record. The first flag controls generation of the "I don't know" or nonratable foil; the second flag regulates omitted or not-reached foil generation; and the third flag denotes the possibility of multiple responses for that field and sets up an appropriate foil. All of these control parameters, including the expansion flag, may be altered in the LABELS file by use of a text editor, in order to control the generation of data or descriptive information for any given field.

The LABELS file supplies control information for many of the subsequent secondary-use data processing steps. The CATALOG file provides detailed information for those and other steps.

6.5.2.5 Data File Layouts

The data file layouts, as mentioned above, were the first user product to be generated in the secondary-use data files process. The generation program, GENLYT, used a LABELS file, described in Section 6.5.2.2, and a CATALOG file as input and produced a printable file. The LAYOUT file is basically a formatted listing of the LABELS file; it documents the layout and contents of the data files. The layouts are part of the printed documentation; the secondary-use data file package includes not only the printed layouts, but also the electronic files from which they were printed.

Each line of the LAYOUT file contains the following information for a single data field: sequence number, field name, output column position, field width, number of decimal places, data type, value range, key or correct response value, and a short description of the field. The sequence number of each field is implied from its order on the LABELS file. The field name is an 8-character label for the field that is used consistently by all secondary-use data file materials to refer to that field on that file. The output column position is the relative location of the beginning of that field on each record for that file, using bytes or characters as the unit of measure. The field width indicates the number of columns used in representing the data values for a field. If the field contains continuous numeric data, the value under the number of decimal places entry indicates how many places to shift the decimal point before processing data values.

The data type category uses five codes to designate the nature of the data in the field: Continuous numeric data are coded "C"; discrete numeric data are coded "D"; constructed-response item data are coded "OS" if the item was dichotomized for scaling and "OE" if it was scaled under a polytomous response model. Additionally, the discrete numeric fields that include "I don't know" response codes are coded "DI." If the field type is discrete numeric, the value range is listed as the minimum and maximum permitted values separated by a hyphen to indicate range. If the field is a response to a multiple-choice item, the correct option value, or key, is printed; if the field is an assigned score for a constructed-response item that was scaled as a dichotomous item using cutpoint scoring, the range of correct scores is printed. Each variable is further identified by its 50-character descriptive label.

6.5.2.6 Data Codebooks

The data codebooks form the bulk of the printed documentation of the secondary-use data files; they contain complete descriptive information for each data field. Most of this information originates from the CATALOG file; the remaining data comes from the COUNTS file and the IRT parameters file, described below. The secondary-use data file package includes the electronic files from which the codebooks were printed, in addition to the printed codebooks.

Each data field receives at least one line of descriptive information in the codebook. If the data type is continuous numeric, no more information is given. If the variable is discrete numeric, the codebook lists the foil codes, foil labels, and frequencies of each value in the data file. Additionally, if the field represents an item used in IRT scaling, the codebook lists the final parameters estimated by the scaling program. (See Chapters 8 and 9 for information about scaling.)

Certain blocks of cognitive items in the 1996 assessment that are to be used again in later assessments for trend comparisons have been designated as nonreleased. In order to maintain confidentiality of nonreleased multiple-choice items, generic foil labels have been substituted for the foils (i.e., the response category descriptions) for these items in the data codebooks and the secondary-use files.

The frequency counts are not available on the CATALOG file, but must be generated from the data. The GENFREQ program creates the COUNTS file using the field name to locate the variable in the database, and the foil values to validate the range of data values for each field. This program also serves as a check on the completeness of the foils in the CATALOG file, as it flags any data values not represented by a foil value and label.

The IRT parameter file is linked to the CATALOG file through the field name. Printing of the IRT parameters is governed by a control flag in the classification section of the CATALOG record. If an item has been scaled, and, thus, used in deriving the scale scores, the IRT parameters are listed to the right of the foil values and labels, and the score value for each response code is printed to the immediate right of the corresponding frequency.

The LAYOUT and CODEBOOK files are written by their respective generation programs to print-image disk data files. Draft copies are printed and distributed for review before the production copy is generated. The production copy is printed on an IBM printer that uses laser-imaging technology to produce high-quality, reproducible documentation.

6.5.2.7 Control Statement Files for Statistical Packages

An additional requirement of the NAEP cooperative agreement is to provide, for each secondary-use data file, a file of SAS control statements that will convert the secondary-use data file into a system data file for use with the SAS statistical system. Also required is a file of SPSS control statements that will produce a system data file for the SPSS statistical system. Two separate programs, GENSAS and GENSPX, generate these control statement files using the CATALOG file as input.

The control statement files create a SAS or SPSS system data file that corresponds to an entire NAEP secondary-use data file. NAEPEX, the NAEP data extraction software described in Section 6.5.2.9, can be used to produce control statement files that create a SAS or SPSS system data file corresponding to a user-defined subset of the NAEP secondary-use data files. Also described in that section are the NAEP analysis modules, currently available for use with SPSS® for Windows™.

Each of the control statement files contains separate sections for variable definition, variable labeling, missing value declaration, value labeling, and creation of scored variables from the cognitive items. The variable definition section describes the locations of the fields, by name, in the file, and, if applicable, the number of decimal places or type of data. The variable label identifies each field with its 50-character descriptive label. The missing value section identifies values of those variables that are to be treated as missing and excluded from analyses. The value labels correspond to the foils in the CATALOG file. The code values and their descriptors are listed for each discrete numeric variable. The scoring section is provided to permit secondary users to generate item score variables in addition to the item response variables.

Each of the control statement generation programs combines three steps into one complex procedure. As each CATALOG file record is read, it is broken into several component records according to the information to be used in each of the resultant sections. These component records are tagged with the field sequence number and a section sequence code. They are then sorted by section code and sequence number. Finally, the reorganized information is output in a structured format dictated by the syntax of the processing language.

ETS tests the control statement files by using them to generate system data files from the secondary-use data files. The control statement files are distributed in the secondary-use data files package to permit users with access to SAS and/or SPSS to create their own system data files.

6.5.2.8 Machine-Readable Catalog Files

For those NAEP data users who have neither SAS nor SPSS capabilities, yet require processing control information in a computer-readable format, the distribution files also contain machine-readable catalog files. Each machine-readable catalog record contains processing control information, IRT parameters, and foil codes and labels.

6.5.2.9 Secondary-Use Data Files on CD-ROM

The complete set of secondary-use data files described above are available on CD-ROM as part of the NAEP Data on Disk product suite. This medium can be used by researchers and policy makers operating in a personal computing environment.

The NAEP Data on Disk product suite includes two additional components that facilitate the analysis of NAEP secondary-use data. The PC-based NAEP data extraction software, NAEPEX, enables users to create customized extracts from the NAEP secondary-use data files and to generate SAS or SPSS control statements for preparing analyses or generating customized system files. Both Windows 3.1 and DOS versions of NAEPEX are available. The NAEP analysis modules, which currently run under SPSS® for Windows™, use output files from the extraction software to perform analyses that incorporate statistical procedures appropriate for the NAEP design.

Summarized NAEP data in tabular format (the NAEP data almanacs described in Chapter 10) are also available on CD-ROM. This product, which is distinct from the secondary-use data files, includes the NAEP almanac viewer, a program that allows users to locate and display data of interest.

Chapter 7

WEIGHTING PROCEDURES AND VARIANCE ESTIMATION[1]

John Burke and Penny James
Westat, Inc.

7.1 OVERVIEW

Following the collection of assessment and background data from and about assessed and excluded students, the processes of deriving sampling weights and associated sets of replicate weights were carried out. The sampling weights are needed to make valid inferences from the student samples to the respective populations from which they were drawn. Replicate weights are used in the estimation of sampling variance, through the procedure known as *jackknife repeated replication*.

Each student was assigned a weight to be used for making inferences about the state's students. This weight is known as the *full-sample* or *overall* sample weight. The full-sample weight contains three components. First, a base weight is established that is the inverse of the overall probability of selection of the sampled student. The base weight incorporates the probability of selecting a school and the student within a school. This weight is then adjusted for two sources of nonparticipation—school level and student level. These weighting adjustments seek to reduce the potential for bias from such nonparticipation by increasing the weights of students from schools similar to those schools not participating, and increasing the weights of students similar to those students from within participating schools who did not attend the assessment session (or makeup session) as scheduled. The details of how these weighting steps were implemented are given in Sections 7.2 and 7.3.

Section 7.4 addresses the effectiveness of the adjustments made to the weights using the procedures described in Section 7.3. The section examines characteristics of nonresponding schools and students, and investigates the extent to which nonrespondents differ from respondents in ways not accounted for in the weight adjustment procedures. Section 7.5 considers the distributions of the final student weights in each jurisdiction, and whether there were outliers that called for further adjustment.

In addition to the full-sample weights, a set of replicate weights was provided for each student. These replicate weights are used in calculating the sampling errors of estimates obtained from the data, using the jackknife repeated replication method. Full details of the method of using these replicate weights to estimate sampling errors are contained in the *Technical Report of the NAEP 1994 Trial State Assessment Program in Reading* (Mazzeo, Allen, & Kline, 1995) and in earlier state technical reports. Section 7.6 of this report describes how the sets of replicate weights were generated for the 1996 State Assessment data. The methods of deriving these weights were aimed at reflecting the features of the sample design appropriately in each jurisdiction, so that when the *jackknife variance estimation* procedure is implemented, approximately unbiased estimates of sampling variance result.

[1] In addition to his responsibility in the sampling activities, John Burke was responsible for directing all weighting and variance estimation procedures. Penny James contributed by carrying out most of these procedures.

As detailed in Chapter 4, two different sets of inclusion rules indicated by the sample type field were used in the 1996 State Assessment program. To enable ETS to analyze these subsets separately, the student weights for each subset were raked in order to force agreement with the totals estimated using both subsets combined. This *raking* process is detailed in Section 7.7.

7.2 CALCULATION OF BASE WEIGHTS

7.2.1 Calculation of School Base Weights

The base weight assigned to a school w_i^{sch} was the reciprocal of the probability of selection of that school. For the eighth-grade samples and fourth-grade Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS) and Department of Defense Dependents Schools (DoDDS), the school base weight depended on the subject of assessment because some schools were so small that students were tested in only one subject. For "new" schools selected using the supplemental new school sampling procedures (see Chapter 3), the school base weight reflected the combined probability of selection of the district, and school within district.

In each jurisdiction, all schools included in the sample with certainty were assigned school base weights of unity. Schools sampled with certainty were sometimes selected more than once in the systematic sampling process. For example, a school that was selected twice was allocated twice the usual number of students for the assessments, or two sessions; a school that was selected three times was allocated three times the usual number of students for the assessments, or three sessions. All schools at grade 8 and DDESS and DoDDS schools at grade 4 that had less than 20 students were assigned one subject (See Chapter 3). For these schools, the base weight included a factor of 2. Additional details about the weighting process are given in the sections below.

7.2.2 Weighting New Schools

New public schools were identified and sampled through a two-stage sampling process, involving the selection of districts, and then of new schools within selected districts. This process is described in Chapter 3. There were two distinct processes used depending upon the size of the district.

Within each jurisdiction, public school districts were partitioned into "small" districts, which are those having at most three schools on the aggregate frame and no more than one fourth-, one eighth-, and one twelfth-grade school. The remainder of the districts were denoted as "large" districts. For the larger districts (those having multiple schools in at least one of grades 4, 8, and 12), a sample of districts was selected in each jurisdiction. Districts in the sample were asked to identify schools having grade 4 or grade 8 that were not included on the school frame. A sample of these newly identified schools was then selected. The base weight for these schools reflected both the probability that the district was selected for this updating process, and that the school was included in the NAEP sample, having been identified as new by the district. If the school was in grade 8 or grade 4 DDESS and DoDDS schools, but was only large enough to do one subject, the base weight included a factor of 2 as described in Section 7.2.1.

There were no schools identified in small districts (see Tables 3-9 and 3-10).

7.2.3 Treatment of Substitute and Double-Session Substitute Schools

Schools that replaced a refusing school (i.e., substitute schools) were assigned the weight of the refusing school. Thus the substitute school was treated as if it were the original school that it replaced, for purposes of obtaining school base weights. Schools conducting extra sessions that served as substitutes for a refusing school (i.e., double-session substitutes) in effect had two school weights. The students in the school who were assigned to the original session were given the school base weight of the participating school, while those students assigned to the extra session(s) were assigned the school base weight of the refusing school. The base weight was adjusted by a factor of 2 if the grade 8 or DDESS or DoDDS school was only large enough to do one subject.

7.2.4 Calculation of Student Base Weights

Within the sampled schools, eligible students were sampled for assessment using the procedures described in Chapter 3. The within-school probability of selection for mathematics therefore depended on the number of grade-eligible students in the school and the number of students selected for the assessment (usually 30). The within-school weights for the substitute schools were further adjusted to compensate for differences in the sizes of the substitute and the originally sampled (replaced) schools. In the case of the fourth grade DDESS and DoDDS schools and all eighth-grade schools, the within-school weight also reflected the fact that a small school could have been selected for one subject but not the other. Thus, in general, the within-school student weight for the jth student in school i was equal to:

$$W_{ij}^{within} = \frac{N_i}{n_i} K_{1i} \; K_{2i}$$

where

N_i = the number of grade-eligible students enrolled in the school, as reported in the sampling worksheets; and

n_i = the number of students selected for the given subject.

The factors K_{1i} and K_{2i} in the formula for the within-school student weight generally apply to only a few schools in each jurisdiction. The factor K_{1i} adjusts the count of grade-eligible students in a substitute school to be consistent with the corresponding count of the originally sampled (replaced) school. Specifically, for substitute schools,

$$K_{1i} = \frac{E_i}{E_i'}$$

with

E_i = the grade enrollment of the originally sampled (replaced) school; and

E_i^s = the grade enrollment of the substitute school.

For nonsubstitute schools, $K_{1i} = 1$.

The factor K_{2i}, that was applied to schools determined to be year-round schools, is defined as:

$$K_{2i} = \frac{1}{1 - p_{off}}$$

where p_{off} is the percentage of students enrolled in the school who were not scheduled to attend school at the time of assessment. For schools that are not year-round schools (the great majority), $K_{2i} = 1$.

The overall student base weight for a student j selected for the mathematics assessment in school i was obtained by multiplying the school base weight by the within-school student weight and therefore was computed as:

$$W_{ij}^{base} = W_i^{sch} \; W_{ij}^{within} \; .$$

7.3 ADJUSTMENTS FOR NONRESPONSE

As mentioned earlier, the base weight for a student was adjusted by two factors: one to adjust for nonparticipating schools for which no substitute participated, and one to adjust for students who were invited to the assessment but did not appear in the scheduled sessions (original or makeup).

7.3.1 Defining Initial School-Level Nonresponse Adjustment Classes

School-level nonresponse adjustment classes were created separately for public and nonpublic schools within each jurisdiction. For each set these classes were defined as a function of their sampling strata, as follows.

Public Schools. For each jurisdiction, except Guam, the initial school nonresponse adjustment classes were formed by crossclassifying the level of urbanization and minority status (see Chapter 3 for definitions of these characteristics). Where there were no minority strata within a particular level of urbanization, a categorized version of median household income was used. For this purpose within each level of urbanization, public schools were sorted by the median household income, and then divided into three groups of about equal size, representing low, middle, and high income areas. In Guam, where there was no information on minority status or median household income, grade enrollment was used.

DDESS and DoDDS Schools. For the jurisdictions comprised of DDESS and DoDDS schools, the initial nonresponse adjustment classes were defined by other geographic variables. For the DDESS schools, the classes were defined by military installation and grouped by nearby jurisdictions. For DoDDS, schools were grouped by the regions of Europe or the Pacific where the military installation was located.

Nonpublic Schools. For each jurisdiction (excluding District of Columbia and Guam nonpublic schools), initial nonresponse adjustment classes were formed by crossclassifying school type (Catholic and non-Catholic) and metropolitan status (metro/nonmetro). For District of Columbia nonpublic schools, these classes were defined by crossclassifying school type and two levels of estimated grade enrollment (25 or fewer students, versus 26 or more students). For Guam, initial nonresponse classes for nonpublic schools were defined by school type only. The District of Columbia is entirely metropolitan, and Guam is entirely nonmetropolitan, so alternatives were needed for these two jurisdictions.

7.3.2 Constructing the Final Nonresponse Adjustment Classes

The objective in forming the nonresponse adjustment classes is to create as many classes as possible that are internally as homogeneous as possible, but such that the resulting nonresponse adjustment factors are not subject to large random variation. Consequently, all initial nonresponse adjustment classes deemed unstable were collapsed with suitable neighboring classes so that: (1) the combined class contained at least six sessions, and (2) the resulting nonresponse adjustment factor did not exceed 1.35 (in a few cases a factor in excess of 1.35 was permitted). These limits had been used for the 1994 Trial State Assessment. One change was implemented for the 1996 State Assessment. When 100 percent of the public schools in a jurisdiction responded, no action was taken for a public-school adjustment class that contained fewer than six sessions. The same approach was used for nonpublic schools where 100 percent of them participated. Although clearly there is no adjustment for school nonresponse in these cases, this change in procedure could have an effect on the final definition of the student nonresponse adjustment classes (Section 7.3.4).

Public Schools. For these schools, inadequate nonresponse adjustment classes were reinforced by collapsing adjacent levels of minority status (or median household income level if minority information was missing). In doing so, metropolitan and nonmetropolitan schools were not mixed. All DDESS and DoDDS schools cooperated, so no collapsing of schools was necessary.

Nonpublic Schools. For nonpublic schools, excluding schools in District of Columbia, Guam, DDESS, and DoDDS, inadequate classes were reinforced by collapsing adjacent levels of metropolitan-area status. Catholic and non-Catholic schools were kept apart to the extent possible, particularly when the only requirement to combine such schools was as a means of reducing the adjustment factors below 1.35. For schools in the District of Columbia, inadequate classes were collapsed over similar values of estimated grade enrollment. Catholic and non-Catholic schools were kept apart to the extent possible. For nonpublic schools in Guam, Catholic and non-Catholic schools were collapsed together in order to form a stable nonresponse adjustment class.

7.3.3 School Nonresponse Adjustment Factors

The school-level nonresponse adjustment factor for the ith school in the hth class was computed as:

$$F_h^{(1)} = \frac{\sum_{i \in C_h} W_{hi}^{sch} E_{hi}}{\sum_{i \in C_h} W_{hi}^{sch} E_{hi} \delta_{hi}}$$

where

C_h = the subset of school records in class h;

W_{hi}^{sch} = the base weight of the ith school in class h;

E_{hi} = the grade enrollment for the ith school in class h;

$$\delta_{hi} = \begin{cases} 1 & \text{if the } i\text{th school in adjustment class } h \text{ participated in the assessments; and} \\ 0 & \text{otherwise.} \end{cases}$$

Both the numerator and denominator of the nonresponse adjustment factor contained only schools that were determined to have eligible students enrolled.

In the calculation of the above nonresponse adjustment factors, a school was said to have participated if:

- It was selected for the sample from the frame or from the lists of new schools provided by participating school districts, and student assessment data were obtained from the school; or

- The school participated as a substitute school and student assessment data were obtained (so that the substitute participated in place of the originally selected school).

The nonresponse-adjusted weight for the ith school in class h was computed as:

$$W_{hi}^{adj} = F_h^{(1)} W_{hi}^{sch} \ .$$

7.3.4 Student Nonresponse Adjustment Classes

The initial student nonresponse classes for assessed students were formed based on several variables. The first of these was public/nonpublic strata. Public/nonpublic strata were then crossclassified by a variable created from combining SD/LEP status and the sample type for the student. SD denotes students with disabilities, while LEP denotes students classified as having limited English proficiency. Within these categories, the initial student nonresponse adjustment classifications were defined separately depending on the SD/LEP status of a student.

If a student was SD or LEP, then the class was formed by urbanicity crossclassified by student age. Age was used to classify students into two groups (for grade 4, those born in September 1985 or earlier and those born in October 1985 or later, and for grade 8, those born in September 1981 or earlier and those born in October 1981 or later). If a student was neither SD nor LEP, then the initial nonresponse adjustment class was formed by urbanicity crossclassified by student age (as defined above), by the quality control monitoring status (see Chapter 3), then finally by minority status as collapsed for the school nonresponse. For the DDESS and DoDDS schools, the nonresponse adjustment classes for SD and LEP students was student age crossclassified by the geographic variable as defined for the school nonresponse adjustment classes.

Following creation of the initial student nonresponse adjustment classifications, all unstable classes were identified for possible collapsing with other classes. A class was considered to be unstable when either of the following conditions was true for the given class:

- Number of responding eligible students was fewer than 20; or
- Nonresponse adjustment factor exceeded 1.5.

All classes deemed unstable in the previous step were collapsed with other classes using the following rules:

- Do not collapse across public and nonpublic;
- Do not collapse across SD/LEP and non-SD/non-LEP;
- If within cells defined by the crossclassification of public/nonpublic and SD-LEP/nonSD-nonLEP status, and sample type within the SD/LEP categories, all of the adjustments are one, no adjustments are made; and
- Collapse across the last variable of the nonresponse adjustment cell only (i.e., collapse across geography for SD/LEP students in Department of Defense Education Activity (DoDEA) schools).

More collapsing was necessary only if the resulting classes had fewer than 15 responding eligible students. Collapsing then continued within the successive variables until the class size was no longer deficient or until a "set" boundary that could not be crossed was reached.

7.3.5 Student Nonresponse Adjustments

As described above, the student-level nonresponse adjustments for the assessed students were made within classes defined by the SD/LEP status, sample type, final school-level nonresponse adjustment classes, monitoring status of the school, and age group of the students. Subsequently, in each jurisdiction, the final student weight for the *j*th student of the *i*th school in class *k* was then computed as:

$$W_{kij}^{final} = W_i^{adj} \times W_{ij}^{within} \times F_k$$

where

W_i^{adj} = the nonresponse-adjusted school weight for school i;

W_{ij}^{within} = the within-school weight for the *j*th student in school i;

and

$$F_k = \frac{\sum_j W_{ij}}{\sum_j W_{ij}\delta_{kj}} .$$

In the above formulation, the summation included all students, j, in the *k*th final (collapsed) nonresponse class. The indicator variable δ_{kj} had a value of 1 when the *j*th student in adjustment class *k* participated in the assessment; otherwise, $\delta_{kj} = 0$.

For excluded students, no nonresponse adjustment procedures were applied because excluded students were not required to complete an assessment. In effect, all excluded students were considered respondents. Weights are provided for excluded students so as to estimate the size of this group and its population characteristics. Tables 7-1 through 7-4 summarize the unweighted and final weighted counts of assessed and excluded students in public and nonpublic schools for each jurisdiction and grade.

Table 7-1

Unweighted and Final Weighted Counts of Assessed and Excluded Students by Jurisdiction
Grade 4 Public Schools

Jurisdiction	Assessed Unweighted	Assessed Weighted	Excluded Unweighted	Excluded Weighted	Assessed and Excluded Unweighted	Assessed and Excluded Weighted
Alabama	2,610	51,861	189	3,716	2,799	55,578
Alaska	2,456	9,237	134	454	2,590	9,691
Arizona	2,213	53,327	333	7,508	2,546	60,835
Arkansas	2,090	30,099	142	2,047	2,232	32,146
California	2,247	342,180	537	73,235	2,784	415,416
Colorado	2,731	46,828	223	3,681	2,954	50,508
Connecticut	2,679	35,194	284	3,411	2,963	38,605
Delaware	2,073	7,797	168	555	2,241	8,352
District of Columbia	2,609	4,953	340	629	2,949	5,583
Florida	2,690	153,556	308	16,370	2,998	169,926
Georgia	2,618	90,729	231	7,599	2,849	98,327
Guam	1,497	2,403	175	271	1,672	2,674
Hawaii	2,698	13,487	170	817	2,868	14,304
Indiana	2,545	65,220	151	3,700	2,696	68,920
Iowa	2,435	34,536	170	2,370	2,605	36,905
Kentucky	2,627	43,170	175	2,775	2,802	45,945
Louisiana	2,758	56,898	256	5,109	3,014	62,006
Maine	2,178	15,786	214	1,412	2,392	17,198
Maryland	2,547	56,121	223	4,786	2,770	60,908
Massachusetts	2,628	63,186	269	6,169	2,897	69,356
Michigan	2,435	115,749	171	7,930	2,606	123,679
Minnesota	2,548	58,933	162	3,495	2,710	62,428
Mississippi	2,767	36,384	164	2,088	2,931	38,472
Missouri	2,744	62,724	185	4,000	2,929	66,724
Montana	2,317	12,533	119	598	2,436	13,131
Nebraska	2,816	21,143	175	1,193	2,991	22,336
Nevada	2,299	18,557	247	1,755	2,546	20,312
New Jersey	2,017	81,411	137	5,383	2,154	86,794
New Mexico	2,566	21,373	322	2,506	2,888	23,879
New York	2,321	195,835	217	17,463	2,538	213,299
North Carolina	2,743	85,495	225	6,739	2,968	92,234
North Dakota	2,758	8,494	123	332	2,881	8,826
Oregon	2,362	37,991	226	3,535	2,588	41,526
Pennsylvania	2,384	133,892	126	6,354	2,510	140,246
Rhode Island	2,622	10,663	201	728	2,823	11,392
South Carolina	2,433	46,406	168	3,097	2,601	49,502
Tennessee	2,574	61,138	162	3,648	2,736	64,786
Texas	2,597	262,594	309	29,394	2,906	291,988
Utah	2,739	31,973	163	1,786	2,902	33,759
Vermont	2,213	7,753	174	572	2,387	8,325
Virginia	2,659	73,389	234	6,246	2,893	79,635
Washington	2,733	68,834	170	4,083	2,903	72,918
West Virginia	2,608	20,233	246	1,836	2,854	22,069
Wisconsin	2,500	59,946	207	4,731	2,707	64,677
Wyoming	2,889	7,293	123	293	3,012	7,586
Total	**112,573**	**2,717,303**	**9,448**	**266,400**	**122,021**	**2,983,703**

Table 7-2

Unweighted and Final Weighted Counts of Assessed and Excluded Students by Jurisdiction

Grade 4 Nonpublic Schools

	Assessed		Excluded		Assessed and Excluded	
Jurisdiction	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**
Alabama	239	5,898	0	0	239	5,898
Arizona	207	5,121	3	99	210	5,219
Arkansas	176	2,072	4	47	180	2,119
California	256	44,677	0	0	256	44,677
Colorado	179	3,670	4	99	183	3,770
Connecticut	255	4,351	3	48	258	4,399
Delaware	338	1,844	2	10	340	1,854
District of Columbia	410	1,090	2	6	412	1,096
DoDEA/DDESS	1,340	2,866	58	117	1,398	2,983
DoDEA/DoDDS	2,670	6,527	143	342	2,813	6,869
Florida	232	16,799	2	115	234	16,913
Georgia	255	7,502	8	203	263	7,705
Guam	317	431	4	5	321	436
Indiana	298	8,206	1	26	299	8,232
Iowa	289	4,025	11	158	300	4,183
Kentucky	303	5,463	3	35	306	5,498
Louisiana	447	10,132	6	116	453	10,248
Maine	103	819	0	0	103	819
Maryland	269	8,600	1	91	270	8,691
Massachusetts	318	8,683	2	52	320	8,735
Michigan	343	15,387	4	161	347	15,548
Minnesota	278	7,503	3	72	281	7,575
Mississippi	269	4,510	0	0	269	4,510
Missouri	454	9,825	3	63	457	9,889
Montana	177	733	2	8	179	741
Nebraska	437	3,361	1	8	438	3,369
Nevada	173	833	0	0	173	833
New Jersey	349	13,858	1	44	350	13,902
New Mexico	226	1,987	19	213	245	2,200
New York	496	36,060	7	495	503	36,555
North Dakota	179	713	9	36	188	750
Oregon	69	2,778	0	0	69	2,778
Pennsylvania	406	24,853	3	181	409	25,034
Texas	101	16,967	2	267	103	17,235
Utah	146	779	0	0	146	779
Vermont	145	511	5	14	150	525
Wisconsin	480	13,567	0	0	480	13,567
Wyoming	85	228	2	6	87	234
Total	**13,714**	**303,228**	**318**	**3,138**	**14,032**	**306,366**

Table 7-3

Unweighted and Final Weighted Counts of Assessed and Excluded Students by Jurisdiction
Grade 8 Public Schools

Jurisdiction	Assessed		Excluded		Assessed and Excluded	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Alabama	2,305	51,710	210	4,396	2,515	56,106
Alaska	1,548	8,335	93	382	1,641	8,717
Arizona	2,248	52,529	205	4,434	2,453	56,964
Arkansas	1,879	32,991	165	2,632	2,044	35,624
California	2,432	339,680	303	37,215	2,735	376,895
Colorado	2,629	46,967	146	2,330	2,775	49,297
Connecticut	2,552	32,922	274	3,152	2,826	36,075
Delaware	1,890	7,807	139	464	2,029	8,271
District of Columbia	1,744	4,140	205	413	1,949	4,553
Florida	2,498	144,325	285	14,882	2,783	159,207
Georgia	2,417	82,372	200	6,058	2,617	88,430
Guam	933	2,245	47	94	980	2,340
Hawaii	2,266	12,191	124	629	2,390	12,821
Indiana	2,429	72,542	163	4,458	2,592	77,001
Iowa	2,277	35,087	128	1,793	2,405	36,880
Kentucky	2,526	45,635	118	1,959	2,644	47,594
Louisiana	2,663	53,687	190	3,370	2,853	57,056
Maine	2,341	15,778	149	912	2,490	16,690
Maryland	2,198	53,640	181	3,912	2,379	57,553
Massachusetts	2,405	57,944	229	5,012	2,634	62,956
Michigan	2,198	109,908	132	5,915	2,330	115,823
Minnesota	2,508	61,935	102	2,391	2,610	64,326
Mississippi	2,539	38,421	202	2,863	2,741	41,284
Missouri	2,453	58,293	179	3,857	2,632	62,151
Montana	1,973	12,235	71	376	2,044	12,611
Nebraska	2,737	22,507	110	861	2,847	23,367
Nevada	1,009	18,821	85	1,651	1,094	20,472
New Hampshire	1,801	14,604	98	668	1,899	15,272
New Jersey	1,691	77,186	167	6,736	1,858	83,922
New Mexico	2,505	21,438	262	1,957	2,767	23,395
New York	2,025	179,782	190	14,963	2,215	194,745
North Carolina	2,706	85,239	138	4,146	2,844	89,384
North Dakota	2,688	9,271	76	265	2,764	9,536
Oregon	2,401	36,601	134	1,748	2,535	38,349
Rhode Island	2,184	9,837	167	685	2,351	10,522
South Carolina	2,184	46,657	166	3,144	2,350	49,801
Tennessee	2,391	60,055	105	2,661	2,496	62,717
Texas	2,382	245,688	222	20,282	2,604	265,970
Utah	2,766	36,869	198	2,321	2,964	39,190
Vermont	2,059	7,525	118	406	2,177	7,931
Virginia	2,653	78,426	208	5,468	2,861	83,894
Washington	2,539	68,561	153	3,627	2,692	72,188
West Virginia	2,646	22,706	250	1,978	2,896	24,684
Wisconsin	2,216	63,977	208	5,299	2,424	69,277
Wyoming	2,789	7,847	91	251	2,880	8,098
Total	**102,223**	**2,546,920**	**7,386**	**193,018**	**109,609**	**2,739,938**

Table 7-4

Unweighted and Final Weighted Counts of Assessed and Excluded Students by Jurisdiction
Grade 8 Nonpublic Schools

	Assessed		Excluded		Assessed and Excluded	
Jurisdiction	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**	**Unweighted**	**Weighted**
Alabama	119	3,561	0	0	119	3,561
Arkansas	62	1,467	0	0	62	1,467
California	232	36,249	0	0	232	36,249
Connecticut	266	4,761	2	32	268	4,793
Delaware	284	1,671	0	0	284	1,671
District of Columbia	228	1,022	0	0	228	1,022
DoDEA/DDESS	635	1,372	40	81	675	1,453
DoDEA/DoDDS	2,215	4,842	62	127	2,277	4,968
Georgia	267	5,492	6	36	273	5,527
Guam	203	560	0	0	203	560
Iowa	284	4,724	0	0	284	4,724
Kentucky	221	4,978	0	0	221	4,978
Louisiana	429	11,073	6	151	435	11,224
Maryland	302	8,564	1	26	303	8,590
Massachusetts	306	9,159	4	148	310	9,307
Michigan	293	13,137	0	0	293	13,137
Minnesota	250	6,007	0	0	250	6,007
Missouri	355	7,387	1	19	356	7,406
Montana	121	578	4	19	125	597
Nebraska	367	3,332	1	14	368	3,346
Nevada	101	734	0	0	101	734
New Hampshire	212	1,174	1	6	213	1,180
New Jersey	323	12,888	6	209	329	13,097
New Mexico	233	2,373	1	25	234	2,398
New York	541	34,961	4	189	545	35,150
North Dakota	211	652	1	3	212	655
Oregon	43	2,622	0	0	43	2,622
Rhode Island	425	1,717	2	8	427	1,725
South Carolina	164	3,501	1	19	165	3,520
Texas	168	17,505	1	91	169	17,596
Utah	40	750	1	16	41	766
Vermont	115	380	0	0	115	380
Washington	182	4,203	0	0	182	4,203
Wisconsin	366	10,867	1	25	367	10,892
Wyoming	51	178	0	0	51	178
Total	**10,614**	**224,438**	**146**	**1,244**	**10,760**	**225,682**

7.4 CHARACTERISTICS OF NONRESPONDING SCHOOLS AND STUDENTS

In the previous section, procedures were described for adjusting the survey weights so as to reduce the potential bias of nonparticipation of sampled schools and students. To the extent that a nonresponding school or student is different from those respondents in the same nonresponse adjustment class, potential for nonresponse bias remains.

In this section we examine the potential for remaining nonresponse bias in two related ways. First, we examine the weighted distributions, within each grade and jurisdiction, of certain characteristics of schools and mathematics students, both for the full sample and for respondents only. This analysis is of necessity limited to those characteristics that are known for both respondents and nonrespondents, and hence cannot directly address the question of nonresponse bias. The approach taken does reflect the reduction in bias obtained through the use of nonresponse weighting adjustments. As such, it is more appropriate than a simple comparison of the characteristics of nonrespondents with those of respondents for each jurisdiction.

The second approach involves modeling the probability that a school is a nonrespondent, as a function of the nonresponse adjustment class within which the school is located, together with other school characteristics. This has been achieved using linear logistic regression models, with school response status as the dependent variable. By testing to see if the school characteristics add any predictive ability to the model, over and above using the membership of the nonresponse adjustment class to make this prediction, we can obtain some insight into the remaining potential for nonresponse bias. If these factors are substantially marginally predictive, there is a danger that significant nonresponse bias remains. These models have been developed for public schools in each of the 12 jurisdictions in grade 4 and 11 jurisdictions in grade 8 having public-school participation (after substitution) of below 90 percent (with a participation rate prior to substitution in excess of 70%).

7.4.1 Weighted Distributions of Schools Before and After School Nonresponse

Tables 7-5 and 7-6 show the mean values of certain school characteristics for public schools, both before and after nonresponse. The means are weighted appropriately to reflect whether nonresponse adjustments have been applied (i.e., to respondents only) or not (to the full set of in-scope schools). The variables for which means are presented are the percentage of students in the school who are Black, the percentage who are Hispanic, the median household income (1989) of the ZIP code area where the school is located, and the type of location. All variables were obtained from the sample frame, and so from Quality Education Data, Inc. (QED), described in Chapter 3, with the exception of the type of location. This variable was derived for each sampled school using U.S. Bureau of Census data. The type of location variable has seven possible levels, which are defined in Chapter 3. Although this variable is not interval-scaled, the mean value does give an indication of the degree of urbanization of the population represented by the school sample (lower values for type of location indicate a greater degree of urbanization).

Table 7-5

Weighted Mean Values Derived from Sampled Public Schools - Grade 4

Jurisdiction	Weighted Participation Rate After Substitution (%)	Weighted Mean Values Derived from Full Sample				Weighted Mean Values Derived from Responding Sample, with Substitutes and School Nonresponse Adjustment			
		Percent Black	Percent Hispanic	Median Income	Type of Location	Percent Black	Percent Hispanic	Median Income	Type of Location
Alabama	93.36	35.26	0.30	$23,633	4.79	35.69	0.32	$23,415	4.79
Alaska	91.12	3.97	2.19	$36,227	4.87	4.01	2 22	$36,685	4.87
Arizona	87.07	3.83	25.17	$31,014	3.13	3.97	25.53	$31,099	3.12
Arkansas	77.50	23.73	0.59	$22,309	5.35	23.27	0.45	$22,203	5.35
California	93.69	8.76	36.08	$34,909	3.18	9.02	36.80	$34,451	3.18
Colorado	99.06	4.28	16.37	$32,561	3.77	4.47	16.08	$32,552	3.77
Connecticut	100.00	13.15	9.75	$44,906	3.74	13.15	9.75	$44,906	3.74
Delaware	100.00	29.02	2.99	$26,200	4.51	29.02	2.99	$26,200	4.51
District of Columbia	100.00	88.13	5.54	$27,908	1.00	88.13	5.54	$27,908	1.00
DoDEA/DDESS	100.00	-----	-----	-----	-----	-----	-----	-----	-----
DoDEADoDDS	100.00	-----	-----	-----	-----	-----	-----	-----	-----
Florida	100.00	24.07	13.29	$28,752	3.26	24.07	13.29	$28,752	3.26
Georgia	98.07	27.67	1.20	$30,602	4.42	27.59	1.20	$30,767	4.43
Guam	100.00	2.35	0.50	-----	7.00	2.35	0.50	-----	7.00
Hawaii	100 00	3.02	4.88	$35,598	4.02	3.02	4.88	$35,598	4.02
Indiana	90.77	10.24	1.99	$28,289	4.46	10.28	2.00	$28,461	4.46
Iowa	86.77	3.35	1.70	$27,498	5.02	3.54	1.83	$27,190	5.02
Kentucky	96.20	10.39	0.24	$23,706	5.28	10.22	0.27	$23,580	5.28
Louisiana	100.00	42.07	1.50	$23,399	4.28	42.07	1.50	$23,399	4.28
Maine	86.73	0.13	0.54	$28,824	5.72	0.13	0.53	$28,885	5.75
Maryland	92.52	34.46	2.51	$40,401	3.47	35.48	2.18	$39,889	3.47
Massachusetts	97.19	7.47	7.90	$41,309	4.07	7.55	7.88	$40,973	4.06
Michigan	87.94	16.23	2.46	$33,181	4.18	15.29	2.76	$33,065	4.23
Minnesota	93.34	3.81	1.29	$33,531	4.75	3.98	1.34	$33,517	4.74
Mississippi	97.24	50.99	0.06	$20,952	5.60	51.08	0.06	$20,939	5.59
Missouri	99.49	15.89	0.66	$28,984	4.61	15.94	0.67	$29,044	4.61
Montana	81.46	0.52	1.71	$24,568	5.40	0.56	1.48	$24,749	5.37
Nebraska	99.94	5.12	2.30	$28,148	4.99	5.12	2.30	$28,148	4.99
Nevada	86.11	9.92	12.88	$32,587	3.80	10.68	13.22	$32,420	3.77
New Jersey	72.76	19.75	11.58	$43,197	3.61	22.03	10.98	$42,916	3.61
New Mexico	100.00	2.46	43.96	$24,326	4.67	2.46	43.96	$24,326	4.67
New York	85.71	17.11	15.37	$34,061	3.31	16.79	15.88	$34,416	3.31
North Carolina	97.23	30.66	0.85	$28,322	4.91	30.31	0.86	$28,458	4.92
North Dakota	96.09	0.82	0.79	$27,007	5.19	0.79	0.73	$26,990	5.10
Oregon	89.61	2.57	4.93	$29,885	3.75	1.42	5.01	$29,973	3.75
Pennsylvania	85.63	12.79	3.75	$31,861	4.27	12.54	3.72	$30,477	4.28
Rhode Island	99.29	6.31	7.49	$31,867	3.46	6.24	7.47	$31,699	3.42
South Carolina	87.85	40.68	0.83	$26,500	5.11	41.53	0.85	$26,752	5.11
Tennessee	94.20	23.09	0.39	$25,494	4.23	22.98	0.37	$25,576	4.23
Texas	97.18	13.52	33.01	$28,030	3.45	13.78	32.85	$28,056	3.44
Utah	100.00	0.54	3.68	$32,427	4.34	0.54	3.68	$32,427	4.34
Vermont	80.71	0.57	0.22	$31,786	6.24	0.60	0.27	$31,640	6.20
Virginia	100.00	21.18	1.86	$38,391	4.19	21.18	1.86	$38,391	4.19
Washington	99.14	5.05	5.74	$34,451	4 07	5.07	5.72	$34,481	4.07
West Virginia	100.00	3.72	0.25	$22,247	5 61	3.72	0.25	$22,247	5.61
Wisconsin	94.26	10.69	2.57	$32,385	4.47	10.65	2.61	$32,187	4.47
Wyoming	100.00	1.06	6 09	$31,296	5.43	1.06	6.09	$31,296	5.43

Table 7-6

Weighted Mean Values Derived from Sampled Public Schools - Grade 8

Jurisdiction	Weighted Participation Rate After Substitution (%)	Weighted Mean Values Derived from Full Sample: Percent Black	Percent Hispanic	Median Income	Type of Location	Weighted Mean Values Derived from Responding Sample, with Substitutes and School Nonresponse Adjustment: Percent Black	Percent Hispanic	Median Income	Type of Location
Alabama	89.64	36.17	0.20	$23,795	4.91	36.10	0.23	$23,603	4.91
Alaska	[illegible]	4.79	2.02	$35,861	4.78	4.74	2.02	$35,982	4.78
Arizona	87.38	4.13	25.04	$30,779	3.16	3.82	26.08	$30,376	3.17
Arkansas	70.69	22.65	0.34	$22,476	5.44	22.30	0.36	$22,577	5.46
California	94.06	7.78	33.36	$36,591	3.26	7.81	32.95	$36,473	3.23
Colorado	100.00	5.94	16.31	$32,219	3.70	5.94	16.31	$32,219	3.70
Connecticut	100.00	11.71	8.77	$45,934	3.84	11.71	8.77	$45,934	3.84
Delaware	100.00	27.50	3.02	$35,376	5.04	27.50	3.02	$35,376	5.04
District of Columbia	100.00	89.10	5.66	$29,059	1.00	89.10	5.66	$29,059	1.00
DoDEA/DDESS	100.00	-----	-----	-----	-----	-----	-----	-----	-----
DoDEA/DoDDS	100.00	-----	-----	-----	-----	-----	-----	-----	-----
Florida	100.00	23.64	14.76	$28,865	3.31	23.64	14.76	$28,865	3.31
Georgia	99.00	28.60	1.14	$30,466	4.39	28.53	1.14	$30,568	4.39
Guam	100.00	3.19	0.53	-----	7.00	3.19	0.53	-----	7.00
Hawaii	99.95	2.40	5.45	$34,998	4.20	2.40	5.45	$34,999	4.20
Indiana	90.57	12.07	2.05	$28,365	4.46	12.32	2.09	$28,508	4.45
Iowa	84.09	3.03	1.13	$27,724	5.01	3.09	1.08	$27,701	5.02
Kentucky	92.33	8.64	0.09	$23,600	5.33	8.85	0.15	$23,739	5.34
Louisiana	100.00	42.39	0.94	$23,593	4.56	42.39	0.94	$23,593	4.56
Maine	90.28	0.15	0.51	$29,391	5.68	0.16	0.55	$29,457	5.68
Maryland	85.59	32.29	2.49	$41,211	3.60	32.58	2.34	$41,372	3.60
Massachusetts	92.38	8.05	7.67	$41,890	4.03	8.22	7.85	$42,450	4.03
Michigan	85.71	16.12	1.84	$33,491	4.29	17.27	1.90	$33,700	4.30
Minnesota	88.39	3.80	1.31	$32,730	4.91	3.77	1.22	$32,849	4.90
Mississippi	95.36	49.15	0.07	$20,989	5.64	48.89	0.07	$21,020	5.63
Missouri	95.96	14.61	0.65	$28,470	4.81	14.59	0.67	$28,576	4.82
Montana	74.69	0.28	1.10	$25,061	5.42	0.34	1.11	$24,843	5.42
Nebraska	99.82	5.66	2.72	$28,687	4.99	5.66	2.73	$28,683	4.99
Nevada	37.82	9.77	13.00	$32,336	3.81	11.15	14.26	$31,597	3.70
New Hampshire	68.77	0.90	0.85	$39,281	5.27	0.93	0.66	$39,181	5.33
New Jersey	64.71	16.90	11.61	$43,809	3.73	18.66	13.79	$42,371	3.67
New Mexico	100.00	2.30	45.45	$24,205	4.72	2.30	45.45	$24,205	4.72
New York	79.58	19.63	13.99	$35,173	3.32	18.52	13.34	$35,812	3.36
North Carolina	100.00	30.67	0.77	$28,071	4.89	30.67	0.77	$28,071	4.89
North Dakota	94.82	0.60	0.65	$27,692	5.17	0.63	0.61	$27,519	5.08
Oregon	91.64	2.19	4.60	$29,813	3.89	2.41	4.77	$29,769	3.89
Rhode Island	89.94	6.06	6.64	$32,566	3.53	6.17	7.10	$32,254	3.52
South Carolina	86.70	41.49	0.39	$26,878	4.98	41.60	0.38	$27,022	4.98
Tennessee	91.67	21.13	0.19	$25,640	4.40	20.13	0.21	$26,070	4.40
Texas	95.11	12.98	33.28	$28,421	3.51	13.15	32.76	$28,238	3.48
Utah	100.00	0.60	3.65	$32,232	4.36	0.60	3.65	$32,232	4.36
Vermont	74.18	0.52	0.19	$31,773	6.12	0.53	0.17	$31,331	6.06
Virginia	100.00	21.10	1.69	$38,695	4.30	21.10	1.69	$38,695	4.30
Washington	95.13	4.06	5.71	$34,762	4.07	4.07	5.82	$34,684	4.06
West Virginia	100.00	3.99	0.06	$22,565	5.49	3.99	0.06	$22,565	5.49
Wisconsin	78.30	7.74	1.89	$32,098	4.63	8.35	2.05	$31,701	4.64
Wyoming	100.00	0.73	5.83	$31,294	5.41	0.73	5.83	$31,294	5.41

Two sets of means are presented for these four variables. The first set shows the weighted mean derived from the full sample of in-scope schools selected for mathematics; that is, respondents and nonrespondents (for which there was no participating substitute). The weight for each sampled school is the product of the school base weight and the grade enrollment. This weight therefore represents the number of students in the state represented by the selected school. The second set of means is derived from responding schools only, after school substitution. In this case the weight for each school is the product of the nonresponse-adjusted school weight and the grade enrollment of the original school, and therefore indicates the number of students in the jurisdiction represented by the responding school.

Tables 7-7 and 7-8 show some of these same statistics for all schools combined, for those jurisdictions where both the public-school participation rate prior to substitution, and the nonpublic-school participation rate prior to substitution, exceeded 70 percent. These are the jurisdictions for which assessment results have been published for both public and nonpublic schools combined. Data on minority enrollment were not available for nonpublic schools, and so are not included in Tables 7-7 and 7-8.

The differences between these sets of means give an indication of the potential for nonresponse bias that has been introduced by nonresponding schools for which there was no participating substitute. For example, in Kentucky at grade 8 the mean percentage Black enrollment, estimated from the original sample of public schools, is 8.64 percent (Table 7-6). The estimate from the responding schools is 8.85 percent. Thus there may be a slight bias in the results for Kentucky because these two means differ. Note, however, that throughout these four tables the differences in the two sets of mean values are generally very slight, at least in absolute terms, suggesting that it is unlikely that substantial bias has been introduced by schools that did not participate and for which no substitute participated. Of course in a number of states (as indicated) there was no nonresponse at the school level, so that these sets of means are identical. Even in those jurisdictions where school nonresponse was relatively high (such as Arkansas at both grade 4 and grade 8 and Vermont at grade 8), the absolute differences in means are slight. Occasionally the relative difference is large (the "Percent Black" in New Jersey at grade 4, for example), but these are for small population subgroups, and thus are very unlikely to have a large impact on results for the jurisdiction as a whole.

7.4.2 Characteristics of Schools Related to Response

In an effort to evaluate the possibility that substantial bias remains as a result of school nonparticipation, following the use of nonresponse adjustments, a series of analyses were conducted on the response status for public schools. This analysis was restricted to those jurisdictions with a participation rate below 90 percent (after substitution), because these are the jurisdictions where the potential for nonresponse bias is likely to be the greatest. Those jurisdictions with an initial public-school response rate below 70 percent were not included, since NAEP does not report results for these jurisdictions because of concern about nonresponse bias. Information about this can be found in Chapter 10. Nonpublic schools were omitted from these analyses because of the small sample sizes involved, which means that it is difficult to assess whether a potential for bias exists.

Table 7-7

Weighted Mean Values Derived from All Sampled Schools for Jurisdictions Achieving Minimal Required Public and Nonpublic School Participation, Before Substitution - Grade 4

Jurisdiction	Weighted Participation Rate After Substitution (%)		Weighted Mean Values Derived from Full Sample		Weighted Mean Values Derived from Responding Sample, with Substitutes and School Nonresponse Adjustment	
	Public	Nonpublic	Median Income	Type of Location	Median Income	Type of Location
Alabama	93.36	71.63	$23,876	4.72	$23,444	4.71
Arizona	87.07	86.82	$31,052	3.14	$30,907	3.15
Arkansas	77.50	85.53	$22,544	5.22	$22,470	5.24
California	93.69	73.45	$35,445	3.10	$35,144	3.11
Colorado	99.06	76.05	$32,252	3.63	$32,243	3.62
Connecticut	100.00	74.70	$44,928	3.60	$44,172	3.60
Georgia	98.07	98.78	$30,233	4.30	$30,387	4.30
Guam	100.00	77.95	-----	7.00	-----	7.00
Indiana	90.77	85.95	$28,782	4.38	$28,991	4.37
Iowa	86.77	81.98	$27,472	4.94	$27,162	4.94
Kentucky	96.20	87.03	$24,425	5.07	$24,327	5.08
Louisiana	100.00	86.05	$23,643	4.18	$23,597	4.23
Maine	86.73	74.12	$28,808	5.69	$28,797	5.70
Massachusetts	97.19	84.34	$40,908	3.95	$40,369	3.94
Michigan	87.94	93.60	$33,148	4.06	$32,821	4.12
Minnesota	93.34	78.02	$33,142	4.74	$33,007	4.75
Mississippi	97.24	79.46	$20,872	5.48	$20,861	5.48
Missouri	99.49	100.00	$29,883	4.46	$29,934	4.46
Montana	81.46	94.10	$24,628	5.34	$24,817	5.31
Nebraska	99.94	91.49	$28,700	4.82	$28,756	4.80
Nevada	86.11	100.00	$32,572	3.75	$32,399	3.70
New Mexico	100.00	89.81	$24,466	4.65	$24,302	4.67
New York	85.71	91.02	$33,482	3.07	$33,625	3.09
Utah	100.00	80.93	$32,541	4.33	$32,501	4.34
Vermont	80.71	74.26	$31,907	6.16	$31,651	6.08
Wyoming	100.00	95.45	$31,191	5.40	$31,176	5.40

BEST COPY AVAILABL

Table 7-8

Weighted Mean Values Derived from All Sampled Schools for Jurisdictions Achieving Minimal Required Public and Nonpublic School Participation, Before Substitution - Grade 8

Jurisdiction	Weighted Participation Rate After Substitution (%)		Weighted Mean Values Derived from Full Sample		Weighted Mean Values Derived from Responding Sample, with Substitutes and School Nonresponse Adjustment	
	Public	Nonpublic	Median Income	Type of Location	Median Income	Type of Location
California	94.06	74.69	$37,081	3.26	$37,136	3.23
Georgia	99.00	88.38	$30,763	4.21	$30,931	4.20
Guam	100.00	76.28	-----	7.00	-----	7.00
Iowa	84.09	88.18	$27,815	4.89	$27,731	4.90
Louisiana	100.00	73.24	$24,361	4.28	$24,239	4.34
Massachusetts	92.38	73.59	$41,809	3.90	$41,919	3.85
Michigan	85.71	88.42	$33,750	4.21	$33,743	4.23
Minnesota	88.39	74.84	$32,994	4.77	$33,041	4.82
Missouri	95.96	100.00	$29,636	4.61	$29,728	4.62
Montana	74.69	78.49	$24,985	5.40	$24,754	5.38
Nebraska	99.82	84.90	$28,648	4.81	$28,597	4.85
New Mexico	100.00	87.48	$24,083	4.65	$23,994	4.65
New York	79.58	90.47	$35,257	3.15	$35,623	3.18
North Dakota	94.82	85.85	$27,722	5.10	$27,625	5.00
Rhode Island	89.94	81.32	$32,318	3.33	$31,763	3.30
South Carolina	86.70	76.11	$26,906	4.90	$27,025	4.89
Texas	95.11	92.95	$28,464	3.46	$28,319	3.43
Vermont	74.18	73.14	$31,729	6.08	$31,326	5.99
Washington	95.13	85.71	$34,840	4.00	$34,836	4.01
Wyoming	100.00	74.49	$31,232	5.40	$31,231	5.41

The 12 jurisdictions investigated at grade 4 were (with the public-school participation rate shown in parentheses): Arizona (87%), Arkansas (78%), Iowa (87%), Maine (87%), Michigan (88%), Montana (81%), Nevada (86%), New Jersey (73%), New York (86%), Pennsylvania (86%), South Carolina (88%), and Vermont (81%). The jurisdictions for grade 8 were: Arizona (87%), Arkansas (71%), Iowa (84%), Maryland (86%), Michigan (86%), Minnesota (88%), Montana (75%), New York (80%), South Carolina (87%), Vermont (74%), and Wisconsin (78%). The approach used was to develop a logistic regression model within each jurisdiction and grade, to predict the probability of participation as a function of the nonresponse adjustment classes and other school characteristics. The aim was to determine whether the response rates are significantly related to school characteristics, after accounting for the effect of the nonresponse class. Thus "dummy" variables were created to indicate nonresponse class membership.

If there are k nonresponse classes within a jurisdiction, let

$$X_{ij} = 1 \text{ if the school } j \text{ is classified in nonresponse class } i$$
$$= 0 \text{ otherwise, for } i = 1,\ldots,(k-1)$$

Within each jurisdiction a logistic model was fitted to the data on public-school participation. In the model, the indicator variables for nonresponse class were included, and also additional variables available for participating and nonparticipating schools alike. These variables were the percentage of Black students (Y_1), the percentage of Hispanic students (Y_2), the estimated grade 4 or grade 8 enrollment size of the school (Y_3), and the median household income of the ZIP code area in which the school was located (Y_4).

The model fitted in each jurisdiction was the following:

$$L_j = A + \Sigma B_i X_{ij} + \Sigma C_i Y_{ij} .$$

Let P_j denote the probability that school j is a participant, and let L_j denote the logit of P_j That is,

$$L_j = ln(P_j / (1 - P_j)).$$

Note that this model cannot be estimated if there are nonresponse classes in which all schools participated (so that no adjustments for nonresponse were made for schools in such a class). Even though this analysis was restricted to those jurisdictions with relatively poor response, this occurred in a number of instances. When this happened, those (responding) schools in such classes were dropped from the analyses. Tables 7-9 and 7-10 show the proportion of the state public-school student population that is represented in the sample by schools from classes with less than 100 percent response for each grade. Thus in grade 4 for Maine, Nevada, New Jersey, and Vermont, there was some nonresponse within every adjustment class, whereas for the other eight states in grade 4, some portion of the population is not represented because schools were dropped from classes with no nonresponse.

The tables show that for both grades only one of the models that contained all of the variables was significant. This was the model for Arkansas grade 8 that has a p-value of .014. The only individual variable for this model that was slightly significant was the dummy variable corresponding to nonresponse class 2, which indicates for this state that the nonresponse classes significantly explain the variation in the response rates. There were two other states in grade 8, Michigan and Wisconsin, that had significant nonresponse class variables; however in these two cases, the overall model was not significant.

For Pennsylvania grade 4, the single variable designating median household income is somewhat significant. This variable was used in forming nonresponse adjustment classes in Pennsylvania only in large/small towns and rural areas, as minority enrollment was used in all other areas (see Table 3-4). From Table 7-5, the median household income for the full sample is $31,861, while for the respondents it is $30,477. This indicates that the final sample is somewhat under-representative of schools with relatively high median household income.

Median household income is somewhat significant for Michigan grade 8. This variable was used in forming nonresponse adjustment classes in Michigan in large/small towns and rural areas. Minority enrollment was used in other areas in Michigan (see Appendix I). This significance does not translate into the results of Table 7-6, since the median household income for the full sample is $33,491, which is very close to the value of $33,700 for the respondents.

Another variable that is significant for various states is the estimated grade-specific enrollment. This variable is significant for Arizona grade 4 and Wisconsin grade 8. For public schools, this variable was not used in forming nonresponse adjustment classes in these states (it was used only in Guam). This variable is not shown in Tables 7-5 and 7-6. However, the sign of the coefficient for this variable in the logistic model indicates that smaller schools are somewhat under-represented in each of these states.

To determine if the variables other than the nonresponse adjustment class variables added explanatory power to the model, all variables except the nonresponse adjustment class variables were tested collectively to see if the estimates of the parameters were equal to zero. This evaluates whether, taken as a group, the *Y* variables are significantly related to the response probability, after accounting for nonresponse class. The results are shown in the last columns of Tables 7-9 and 7-10. None of the tests were significant, which suggests that the variables did not add to the model after accounting for the nonresponse adjustment classes, even though on occasion an individual variable was significant. These results hold for Arkansas grade 8, where the full model was significant. For Arkansas grade 8, the significant variable was the nonresponse class 2, which seems to indicate for this state that the nonresponse adjustment classes alone explain the significant variations in the probability of participation.

These results indicate that on occasion there are differences between the original samples of schools and those that participated, that are not fully removed by the process of creating nonresponse adjustments. Although these effects are not dramatic, they are sometimes statistically significant, and may be reflected in noticeable differences in population characteristics estimated from the respondents, compared to those obtained for the full sample. However, the evidence presented here does not permit valid speculation about the likely size or even direction of the bias in mathematics achievement results in the few states where these sample differences are noticeable.

Table 7-9

Results of Logistic Regression Analysis of School Nonresponse - Grade 4

			Model with All Variables			Test: Y_{ij}'s = 0	
Jurisdiction	School Participation Rate (%)	Percent of Population Covered by Model	Degrees of Freedom	Significance	Significant Variables	Degrees of Freedom	Significance
Arizona	87.07	83.03	10	p=.347	est. enrollment p=.018	4	p=.193
Arkansas	77.50	92.65	9	p=.624	none	4	p=.526
Iowa	86.77	78.55	8	p=.066	none	4	p=.086
Maine	86.73	100.00	11	p=.681	none	4	p=.262
Michigan	87.94	73.32	9	p=.161	none	4	p=.275
Montana	81.46	84.98	7	p=.827	none	4	p=.914
Nevada	86.11	100.00	8	p=.344	none	4	p=.290
New Jersey	72.76	100.00	8	p=.867	none	4	p=.462
New York	85.71	83.76	9	p=.619	none	4	p=.197
Pennsylvania	85.63	78.75	9	p=.281	median p=.026	4	p=.182
South Carolina	87.85	64.93	7	p=.347	none	4	p=.375
Vermont	80.71	100.00	7	p=.776	none	4	p=.872

Table 7-10

Results of Logistic Regression Analysis of School Nonresponse - Grade

Jurisdiction	School Participation Rate (%)	Percent of Population Covered by Model	Model with All Variables: Degrees of Freedom	Model with All Variables: Significance	Model with All Variables: Significant Variables	Test: Yij's = 0: Degrees of Freedom	Test: Yij's = 0: Significance
Arizona	87.38	82.20	7	$p=.139$	none	4	$p=.102$
Arkansas	70.69	91.19	12	$p=.014$	nonresponse cell 2 $p=.045$	4	$p=.976$
Iowa	84.09	100.00	11	$p=.807$	none	4	$p=.700$
Maryland	85.59	100.00	7	$p=.067$	none	4	$p=.453$
Michigan	85.71	59.41	7	$p=.234$	nonresponse cell 2 $p=.028$ median $p=.044$	4	$p=.334$
Minnesota	88.39	79.97	9	$p=.143$	none	4	$p=.822$
Montana	74.69	100.00	6	$p=.731$	none	4	$p=.695$
New York	79.58	46.38	7	$p=.468$	none	4	$p=.196$
South Carolina	86.70	73.43	9	$p=.081$	none	4	$p=.710$
Vermont	74.18	100.00	5	$p=.620$	none	4	$p=.817$
Wisconsin	78.30	100.00	9	$p=.632$	nonresponse cell 4 $p=.037$ est. enrollment $p=.0203$	4	$p=.191$

7.4.3 Weighted Distributions of Students Before and After Student Absenteeism

Tables 7-11 and 7-12 show, for the public schools in each jurisdiction and grade, the weighted sampled percentages of students by gender (male) and race/ethnicity (White, not Hispanic; Black, not Hispanic; Hispanic), SD/LEP status for the full sample of students (after student exclusion), and for the assessed sample. The mean student age in months is also presented on each basis. Tables 7-13 and 7-14 show these results for both grades for all students, public and nonpublic, in those jurisdictions having adequate school response rates to permit reporting of combined results for public and nonpublic students.

The weight used for the full sample is the adjusted student base weight, defined in Section 7.2.4. The weight for the assessed students is the final student weight, defined in Section 7.3.5. The difference between the estimates of the population subgroups is an estimate of the bias in estimating the size of the subgroup, resulting from student absenteeism.

Care must be taken in interpreting these results, however. First, note that there is generally very little difference in the proportions estimated from the full sample and those estimated from the assessed students. While this is encouraging, it does not eliminate the possibility that bias exists, either within the state as a whole, or for results for gender and race/ethnicity subgroups, or for other subgroups. Second, on the other hand, where differences do exist they cannot be used to indicate the likely magnitude or direction of the bias with any reliability. For example, in Table 7-12, for New York the percentages of Black and Hispanic students in the full sample are respectively 18.33 and 17.26 percent. For assessed students, these percentages are 16.05 for Black students and 15.84 for Hispanic students. While these differences raise the possibility that some bias exists, it is not appropriate to speculate on the magnitude of this bias by considering the assessment results for Black and Hispanic students, in comparison to other students in the state. The reason is that the underrepresented Black and Hispanic students may not be typical of students that were included in the sample, and similarly those students within the same racial/ethnic groups who are disproportionately overrepresented may not be typical either. The reason is that not all students within the same race/ethnicity group receive the same student nonresponse adjustment.

Table 7-11

Weighted Student Percentages Derived From Sampled Public Schools - Grade 4

Jurisdiction	Weighted Student Participation (%)	Weighted Estimates Derived form Full Sample							Weighted Estimates Derived from Assessed Sample, with Student Nonresponse Adjustment						
		Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)	Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)
Alabama	95.98	50.21	58.90	32.11	6.12	4.91	0.13	130.49	50.16	60.33	30.83	6.03	5.30	0.12	130.59
Alaska	91.39	50.09	58.10	4.06	10.57	9.76	6.58	129.95	49.88	57.20	4.03	11.41	9.53	6.76	129.84
Arizona	94.58	51.08	55.36	3.96	28.66	3.65	6.57	129.49	51.11	55.60	3.91	29.21	3.67	6.38	129.49
Arkansas	96.00	49.70	68.46	20.94	6.02	3.14	0.34	129.34	50.00	68.73	20.46	6.21	3.04	0.35	129.39
California	94.50	50.04	41.72	8.22	36.88	3.73	14.72	126.88	50.61	42.16	8.31	36.60	3.54	14.96	126.79
Colorado	94.68	51.35	68.85	3.77	20.52	6.45	2.04	129.00	51.27	68.52	3.62	20.76	6.46	2.03	129.06
Connecticut	95.67	50.14	72.11	11.12	12.81	6.89	1.21	127.44	50.01	71.93	11.18	12.89	6.89	1.18	127.49
Delaware	94.40	49.71	61.29	25.53	9.18	7.04	0.65	127.12	49.71	61.51	24.82	9.41	7.04	0.65	127.10
Distric. of Columbia	94.54	48.82	6.29	81.95	9.64	1.40	1.63	127.77	48.34	6.16	81.56	10.03	1.42	1.61	127.71
DoDEA/DDESS	94.89	50.88	48.88	25.43	17.76	4.61	0.28	128.21	50.09	48.64	25.25	18.21	4.66	0.22	128.16
DoDEA/DoDDS	94.48	50.77	48.00	18.20	15.68	4.29	0.85	127.83	50.86	48.04	18.52	16.00	4.23	0.91	127.80
Florida	93.85	51.62	54.92	20.86	20.73	7.70	3.46	129.89	52.03	54.46	20.82	21.10	7.61	3.48	129.91
Georgia	94.86	50.17	57.28	31.43	7.49	5.24	0.92	130.49	50.01	56.97	31.26	7.77	5.24	0.93	130.44
Guam	93.91	51.80	7.96	3.35	20.29	1.55	4.66	126.72	52.21	7.98	3.52	21.66	1.52	4.70	126.68
Hawaii	95.31	52.53	18.44	3.92	20.39	5.57	3.67	125.81	52.30	18.07	4.07	21.34	5.47	3.74	125.81
Indiana	96.31	49.05	81.63	9.42	6.53	5.56	0.54	132.52	48.82	82.04	9.03	6.47	5.80	0.44	132.46
Iowa	96.85	51.21	88.16	2.81	5.73	5.76	0.85	130.69	51.21	88.11	2.50	6.11	5.94	0.81	130.75
Kentucky	95.49	51.66	84.98	9.62	3.70	4.35	0.05	129.42	52.21	85.04	9.44	3.68	4.22	0.07	129.33
Louisiana	95.34	50.42	48.91	40.22	6.40	5.82	0.67	131.06	50.31	48.98	39.70	6.70	5.78	0.70	131.01
Maine	93.53	49.94	93.21	1.02	3.48	7.04	0.22	130.04	50.06	92.88	1.10	3.70	7.01	0.25	130.02
Maryland	95.70	49.57	53.25	34.26	7.13	6.54	0.39	125.95	49.46	53.36	33.71	7.40	6.52	0.41	125.95
Massachusetts	94.95	50.48	78.63	6.29	10.53	8.12	1.60	128.43	51.21	77.17	6.62	11.31	8.02	1.80	128.58
Michigan	93.72	50.23	73.88	14.47	6.75	4.56	0.39	128.66	50.69	73.71	13.72	7.65	4.64	0.40	128.66
Minnesota	94.46	51.52	83.58	4.53	5.49	6.36	2.13	130.15	51.23	83.32	4.24	6.05	6.42	2.18	130.02
Mississippi	95.73	49.59	44.33	47.99	5.19	3.08	0.06	132.37	50.04	45.22	46.88	5.39	3.01	0.07	132.42
Missouri	95.21	49.73	76.69	13.80	6.23	8.44	0.25	131.34	49.55	75.82	14.48	6.31	8.27	0.25	131.32
Montana	96.41	53.82	81.61	0.78	6.55	5.31	0.17	130.92	53.36	79.00	0.78	6.91	5.40	0.17	130.88
Nebraska	94.96	51.13	81.95	5.94	8.59	9.76	1.00	129.76	51.32	81.41	6.16	8.78	9.72	1.00	129.70
Nevada	92.31	51.05	59.81	8.19	22.44	4.18	4.27	128.47	50.87	59.95	7.88	22.77	4.39	4.33	128.45
New Jersey	94.68	49.65	58.85	20.77	13.75	4.04	1.06	128.74	49.39	58.77	20.29	14.02	3.99	1.10	128.73
New Mexico	94.14	48.59	42.89	2.85	43.34	7.03	5.83	129.91	48.52	42.58	2.83	43.64	6.96	5.91	130.00
New York	93.88	49.43	60.30	16.35	17.27	4.92	2.63	126.99	49.79	58.48	16.16	18.71	4.58	2.65	126.88
North Carolina	95.62	50.04	65.59	27.00	4.18	6.42	0.85	128.80	50.23	65.15	27.10	4.40	6.39	0.88	128.83
North Dakota	96.20	50.90	89.51	0.80	4.56	6.90	0.15	130.57	50.22	89.35	0.82	4.71	6.93	0.19	130.65
Oregon	95.13	49.34	77.36	1.72	11.25	7.77	3.45	128.89	49.35	77.33	1.71	11.28	7.66	3.36	128.87
Pennsylvania	94.77	50.10	76.65	11.29	9.11	3.70	0.21	129.64	50.36	78.94	9.57	8.25	4.18	0.15	129.63
Rhode Island	94.79	51.45	75.56	5.92	12.98	9.08	3.78	127.54	52.19	76.40	5.42	12.89	9.02	3.58	127.39
South Carolina	95.07	50.20	53.66	37.96	5.73	6.52	0.07	128.68	50.06	53.88	37.40	5.98	6.46	0.07	128.65
Tennessee	95.85	51.10	72.68	20.77	4.15	7.40	0.30	130.19	51.04	72.45	20.85	4.37	7.41	0.29	130.13
Texas	95.56	51.45	48.78	13.78	33.68	6.05	10.01	130.54	51.59	49.05	13.89	33.13	6.10	9.89	130.48
Utah	95.27	50.50	82.22	1.02	11.29	6.87	1.73	128.98	50.27	81.91	1.04	11.67	6.91	1.69	129.07
Vermont	95.52	50.69	88.16	1.42	6.27	7.16	0.28	128.23	51.12	87.91	1.42	6.52	7.45	0.29	128.27
Virginia	95.13	49.42	65.52	23.92	5.71	5.37	1.21	127.98	49.27	65.17	23.84	5.92	5.30	1.29	128.03
Washington	93.80	51.68	73.33	4.65	10.32	6.01	1.90	129.53	51.77	73.01	4.67	10.62	5.87	2.05	129.53
West Virginia	95.44	51.48	87.28	3.79	5.84	5.58	0.15	130.16	51.55	86.84	3.90	6.12	5.58	0.16	130.19
Wisconsin	95.03	50.54	80.22	9.04	6.44	4.05	0.90	130.29	50.52	80.47	8.65	6.54	4.07	0.91	130.33
Wyoming	95.69	49.92	81.29	1.26	12.35	8.65	0.66	130.65	50.43	80.96	1.29	12.75	8.70	0.67	130.57

Table 7-12

Weighted Student Percentages Derived from Sampled Public Schools - Grade 8

Jurisdiction	Weighted Student Participation (%)	Weighted Estimates Derived form Full Sample: Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)	Weighted Estimates Derived from Assessed Sample, with Student Nonresponse Adjustment: Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)
Alabama	92.74	48.77	59.13	34.28	3.97	5.77	0.04	179.91	48.92	58.99	34.08	4.31	5.72	0.10	179.79
Alaska	80.48	51.69	67.48	4.48	5.54	7.67	3.95	177.21	51.49	68.18	4.04	6.57	7.65	3.93	177.06
Arizona	90.50	49.44	57.87	3.13	30.45	4.38	5.61	178.14	48.51	57.94	3.07	30.44	4.38	5.58	178.14
Arkansas	92.35	49.84	74.31	20.09	2.96	3.82	0.42	179.31	50.02	74.04	20.02	3.10	3.88	0.47	179.24
California	90.47	49.09	37.81	9.22	39.84	3.90	7.76	175.76	48.89	39.39	7.82	38.54	3.94	7.55	175.65
Colorado	90.97	51.29	69.82	5.09	20.80	6.90	1.13	177.99	51.01	69.75	5.03	20.70	6.88	1.15	177.95
Connecticut	90.67	50.74	75.93	9.90	10.68	6.24	0.53	176.21	50.73	76.41	9.37	10.73	6.27	0.47	176.20
Delaware	90.26	49.54	65.71	24.11	5.72	7.02	0.34	176.46	49.58	65.82	23.47	5.90	7.02	0.36	176.39
District of Columbia	84.70	46.60	3.38	83.65	10.22	2.59	2.02	178.46	46.47	3.59	82.22	11.23	2.56	2.05	178.09
DoDEA/DDESS	95.24	50.82	40.62	30.42	21.98	6.03	0.46	176.64	51.52	40.71	29.71	22.24	6.03	0.46	176.63
DoDEA/DoDDS	93.56	51.99	45.75	20.32	15.28	4.03	0.50	176.02	51.76	45.69	20.32	15.58	3.99	0.55	176.04
Florida	90.72	48.22	55.33	21.48	20.40	6.02	1.45	179.22	47.79	54.12	21.71	21.17	5.82	1.65	179.06
Georgia	90.20	49.93	57.90	35.35	4.22	3.53	0.40	179.32	49.63	57.24	35.61	4.54	3.55	0.38	179.19
Guam	86.21	53.34	3.76	1.26	14.77	2.62	0.78	175.97	52.39	4.05	1.22	17.12	2.68	0.72	175.80
Hawaii	90.65	51.71	15.89	2.56	15.68	5.34	2.24	174.92	51.76	15.59	2.59	17.16	5.14	2.40	174.75
Indiana	92.64	51.38	82.26	10.71	5.33	6.76	0.38	179.21	50.79	82.37	10.39	5.52	6.72	0.37	179.30
Iowa	93.39	52.11	90.77	3.00	3.14	7.94	0.34	178.87	51.78	91.20	2.78	3.08	8.01	0.30	178.72
Kentucky	93.92	51.64	87.04	9.20	2.23	5.22	0.18	179.13	51.48	86.65	9.26	2.42	5.27	0.19	179.08
Louisiana	89.16	48.23	53.53	40.46	3.82	4.22	0.35	179.95	48.43	52.93	40.74	4.06	4.16	0.41	179.71
Maine	91.58	49.72	94.92	0.49	1.92	6.04	0.44	179.09	50.01	94.72	0.50	2.01	6.06	0.43	179.13
Maryland	91.27	49.99	55.43	33.47	4.90	5.50	0.21	174.98	49.64	55.50	32.74	5.25	5.52	0.20	174.95
Massachusetts	92.34	51.75	80.03	6.77	7.92	8.73	0.94	177.37	51.72	80.21	6.52	7.84	8.73	0.90	177.29
Michigan	90.33	49.66	73.59	17.48	4.73	3.49	0.67	178.12	49.82	75.58	15.21	5.11	3.48	0.62	178.10
Minnesota	91.81	50.83	85.53	4.56	3.15	6.87	0.71	178.08	50.57	85.84	3.98	3.20	6.91	0.73	178.01
Mississippi	92.56	48.09	48.54	44.87	4.92	4.54	0.04	181.89	47.95	48.11	44.80	5.33	4.41	0.04	181.72
Missouri	91.41	49.80	81.01	13.51	3.11	5.60	0.15	179.33	49.34	82.03	12.17	3.32	5.68	0.13	179.37
Montana	92.32	50.41	83.17	0.38	4.51	6.14	0.20	179.44	50.12	83.46	0.39	4.58	6.31	0.21	179.26
Nebraska	91.01	50.60	86.82	4.52	5.69	8.06	0.43	178.06	50.77	86.59	4.62	5.78	8.19	0.51	178.09
Nevada	90.31	50.03	60.22	6.40	25.81	4.88	3.90	176.94	50.13	60.08	6.19	25.75	4.70	4.02	176.80
New Hampshire	89.44	50.22	92.12	0.70	3.10	10.68	0.12	179.20	49.73	91.58	0.55	3.48	10.68	0.13	179.18
New Jersey	92.71	48.66	59.05	16.31	17.70	4.48	0.89	176.69	48.50	59.25	15.60	17.97	4.36	0.93	176.64
New Mexico	90.00	48.19	35.63	2.32	51.20	8.72	2.09	178.14	47.65	35.79	2.33	51.18	8.54	2.26	178.13
New York	90.76	51.12	57.05	18.33	17.26	5.26	1.66	176.02	50.48	60.19	16.05	15.84	5.09	1.75	176.03
North Carolina	91.01	48.30	64.05	28.06	3.50	4.69	0.35	177.80	48.05	64.18	27.48	3.80	4.66	0.37	177.78
North Dakota	94.30	50.63	91.37	1.11	2.69	7.11	0.44	178.53	50.72	92.28	0.91	2.58	6.86	0.28	178.57
Oregon	90.06	50.30	82.24	2.78	7.25	6.51	0.92	177.75	50.45	82.45	2.62	7.44	6.58	0.89	177.59
Rhode Island	89.50	48.36	79.57	5.07	9.91	8.78	2.30	176.91	48.71	79.06	5.04	10.44	8.63	2.43	176.67
South Carolina	89.13	47.68	53.02	40.44	3.83	3.98	0.13	178.53	47.10	52.92	39.88	4.15	3.98	0.15	178.45
Tennessee	90.51	50.30	78.20	17.77	2.75	7.23	0.06	179.62	50.35	77.80	17.79	3.01	7.23	0.06	179.52
Texas	92.30	47.82	47.14	12.19	37.25	5.91	4.79	179.49	47.68	47.78	11.47	37.05	5.75	4.82	179.42
Utah	90.62	50.09	87.63	0.56	7.53	5.22	0.17	176.96	50.39	87.23	0.56	7.79	5.20	0.20	176.98
Vermont	93.21	51.15	93.19	0.68	2.82	7.16	0.41	177.27	50.89	93.04	0.69	2.92	7.12	0.45	177.24
Virginia	91.20	49.57	65.64	24.44	4.75	5.91	1.59	177.37	49.72	65.66	24.12	5.00	5.74	1.64	177.33
Washington	89.96	50.95	76.59	4.18	9.16	6.84	1.23	178.58	50.99	76.21	4.12	9.51	6.64	1.42	178.48
West Virginia	92.44	50.09	92.32	3.05	2.47	5.08	0.03	179.04	50.30	91.93	3.07	2.69	5.08	0.04	178.91
Wisconsin	92.16	51.05	84.05	7.14	4.88	4.46	0.33	178.39	50.84	84.29	6.60	5.11	4.45	0.35	178.29
Wyoming	92.56	50.45	86.61	0.75	8.90	6.94	0.34	178.59	50.83	86.16	0.69	9.24	6.90	0.40	178.56

BEST COPY AVAILABLE

Table 7-13

Weighted Student Percentages Derived From All Schools Sampled - Grade 4

Jurisdiction	Weighted Student Participation (%) Public	Nonpublic	Weighted Estimates Derived from Full Sample: Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)	Weighted Estimates Derived from Assessed Sample, with Student Nonresponse Adjustment: Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)
Alabama	95.98	96.74	49.99	61.69	29.84	5.59	4.32	0.12	130.33	50.04	62.54	29.08	5.60	4.76	0.11	130.45
Arizona	94.58	98.89	50.81	54.84	4.02	27.65	3.64	9.15	129.40	51.00	55.28	4.00	27.97	3.62	8.91	129.41
Arkansas	96.00	96.69	49.73	69.96	19.61	5.87	3.09	0.32	129.36	50.03	70.17	19.20	6.07	3.00	0.32	129.39
California	94.50	97.74	50.17	42.83	7.36	36.37	3.23	12.76	127.01	50.68	43.08	7.56	36.21	3.13	13.23	126.91
Colorado	94.68	95.83	51.12	68.54	4.84	20.02	6.15	1.90	128.97	51.12	68.17	4.75	20.27	6.16	1.88	129.01
Connecticut	95.67	95.52	50.59	72.69	10.46	12.85	6.80	1.16	127.36	50.48	72.54	10.46	12.99	6.80	1.13	127.41
Georgia	94.86	93.55	50.15	58.52	30.25	7.25	5.01	0.85	130.44	50.01	58.17	30.12	7.52	5.01	0.85	130.40
Guam	93.91	94.36	50.98	9.55	3.16	19.02	1.31	4.00	126.54	51.32	9.65	3.32	20.29	1.29	4.03	126.52
Indiana	96.31	96.44	49.65	82.40	8.83	6.50	5.11	0.48	132.38	49.52	82.80	8.45	6.46	5.30	0.39	132.33
Iowa	96.85	95.87	51.15	88.67	2.51	5.71	5.31	0.75	130.66	51.12	88.55	2.26	6.07	5.51	0.72	130.73
Kentucky	95.49	96.70	51.95	84.92	9.53	3.68	3.93	0.04	129.49	52.54	85.02	9.33	3.62	3.85	0.07	129.40
Louisiana	95.34	96.56	50.12	54.49	35.47	6.07	5.47	0.57	130.67	49.99	54.47	35.08	6.35	5.44	0.60	130.62
Maine	93.53	96.52	49.88	93.25	1.05	3.53	6.87	0.21	130.04	50.12	92.94	1.12	3.73	6.83	0.24	130.01
Massachusetts	94.95	95.78	50.53	79.05	6.28	10.41	8.51	1.42	128.62	51.06	77.68	6.61	11.15	8.39	1.58	128.77
Michigan	93.72	96.73	50.56	73.72	14.33	7.20	4.17	0.38	128.65	50.97	73.41	13.90	7.92	4.26	0.39	128.67
Minnesota	94.46	95.54	50.77	84.33	4.34	5.40	5.95	1.88	130.28	50.47	84.08	4.05	5.92	6.01	1.94	130.17
Mississippi	95.73	95.96	49.91	48.98	42.77	4.86	3.22	0.06	132.31	50.36	49.50	42.02	5.07	3.15	0.06	132.35
Missouri	95.21	95.34	49.23	77.67	12.68	6.55	7.57	0.22	131.31	49.01	76.93	13.28	6.59	7.45	0.22	131.29
Montana	96.41	95.02	53.69	82.26	0.73	6.61	5.07	0.16	130.97	53.36	79.67	0.73	6.96	5.19	0.16	130.93
Nebraska	94.96	98.74	50.01	82.85	5.34	8.33	8.57	0.91	129.78	50.25	82.46	5.48	8.51	8.61	0.92	129.75
Nevada	92.31	96.46	51.20	60.31	8.23	21.96	4.00	4.08	128.49	50.95	60.41	7.94	22.31	4.21	4.14	128.47
New Mexico	94.14	94.21	48.68	41.23	2.73	42.14	6.46	6.51	129.78	48.64	41.02	2.72	42.37	6.40	6.58	129.86
New York	93.88	95.92	50.51	60.33	17.66	16.22	4.21	3.48	126.99	50.78	59.35	17.07	17.36	3.94	3.33	126.89
Utah	95.27	95.35	50.65	82.22	1.02	11.27	6.71	1.69	128.96	50.42	81.89	1.05	11.65	6.75	1.65	129.04
Vermont	95.52	97.13	50.60	88.33	1.41	6.18	6.70	0.27	128.22	50.97	88.08	1.12	6.43	6.98	0.27	128.25
Wyoming	95.69	96.26	50.16	81.42	1.23	12.29	8.46	0.64	130.69	50.60	81.14	1.25	12.67	8.46	0.65	130.60

Table 7-14

Weighted Student Percentages Derived From All Schools Sampled - Grade 8

Jurisdiction	Weighted Student Participation (%) Public	Nonpublic	Weighted Estimates Derived from Full Sample: Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)	Weighted Estimates Derived from Assessed Sample, with Student Nonresponse Adjustment: Percent Male	Percent White	Percent Black	Percent Hispanic	Percent SD	Percent LEP	Mean Age (Months)
California	90.47	97.48	48.63	39.84	8.94	37.56	3.52	6.92	175.68	48.58	41.10	7.69	36.57	3.60	6.82	175.59
Georgia	90.20	96.98	49.48	59.65	33.60	4.26	3.36	0.37	179.21	49.26	59.04	33.83	4.56	3.38	0.36	179.08
Guam	86.21	94.88	53.30	4.92	1.29	13.23	2.10	0.81	175.46	52.33	5.04	1.18	15.18	2.15	0.76	175.30
Iowa	93.39	95.97	51.45	91.10	2.71	3.34	7.08	0.30	178.76	51.23	91.42	2.51	3.29	7.23	0.27	178.63
Louisiana	89.16	95.53	48.38	58.55	34.72	4.10	3.83	0.29	179.19	48.50	57.96	34.97	4.35	3.78	0.34	178.99
Massachusetts	92.34	95.43	52.23	80.71	6.29	7.71	8.52	0.81	177.22	52.58	81.14	6.05	7.44	8.11	0.78	177.13
Michigan	90.33	95.68	49.56	73.35	17.15	4.77	3.20	0.59	177.92	49.61	75.25	15.13	5.08	3.21	0.55	177.91
Minnesota	91.81	95.58	51.13	86.13	4.20	3.10	6.28	0.70	178.19	50.97	86.38	3.68	3.15	6.33	0.72	178.13
Missouri	91.41	96.29	49.76	81.89	12.53	3.02	5.18	0.14	179.18	49.31	82.92	11.24	3.20	5.24	0.12	179.21
Montana	92.32	95.17	50.01	83.00	0.36	4.55	5.96	0.22	179.43	49.75	83.30	0.37	4.63	6.13	0.24	179.26
Nebraska	91.01	95.48	50.64	87.44	4.10	5.74	7.34	0.39	178.03	50.83	87.21	4.18	5.85	7.45	0.46	178.05
New Mexico	90.00	88.68	47.99	35.01	2.13	48.71	8.29	1.87	178.11	47.48	35.60	2.16	49.25	8.15	2.03	178.19
New York	90.76	94.82	50.16	55.73	19.61	[illegible]	4.34	1.39	175.72	49.93	58.47	17.47	16.58	4.29	1.49	175.73
North Dakota	94.30	95.99	50.64	91.30	1.03	2.59	6.75	0.91	178.51	50.84	92.15	0.85	2.50	6.56	0.70	178.54
Rhode Island	89.50	96.37	48.48	79.47	5.71	9.61	7.61	1.96	176.66	48.81	78.96	5.73	10.07	7.48	2.07	176.47
South Carolina	89.13	95.84	47.78	55.80	37.90	3.60	3.69	0.12	178.35	47.26	55.70	37.37	3.90	3.70	0.11	178.27
Texas	92.30	92.50	47.60	47.68	11.47	36.99	5.49	4.52	179.39	47.64	48.30	10.85	36.70	5.37	4.57	179.35
Vermont	93.21	94.60	51.32	93.24	0.68	2.89	6.92	0.39	177.20	51.16	93.09	0.69	3.00	6.88	0.43	177.16
Washington	89.96	96.52	50.81	76.99	4.10	8.94	6.44	1.15	178.44	50.84	76.60	4.06	9.29	6.26	1.34	178.45
Wyoming	92.56	97.08	50.28	86.72	0.73	8.85	6.86	0.33	178.58	50.68	86.28	0.67	9.18	6.82	0.39	178.56

One other feature to note is that, for assessed students, information as to the student's gender and race/ethnicity is provided by the student, while for absent students this information is provided by the school. Evidence from past NAEP assessments (see, for example, Rust & Johnson, 1992) indicates that there can be substantial discrepancies between those two sources, especially with regard to classifying grade 4 students as Hispanic.

7.5 VARIATION IN WEIGHTS

After computation of full-sample weights, an analysis was conducted on the distribution of the final student weights in each jurisdiction. The analysis was intended to (1) check that the various weight components had been derived properly in each jurisdiction, and (2) examine the impact of the variability of the sample weights on the precision of the sample estimates, both for the jurisdiction as a whole and for major subgroups within the jurisdiction.

The analysis was conducted by looking at the distribution of the final student weights for the assessed students in each jurisdiction and grade separately by public and nonpublic schools. Two key aspects of the distribution were considered in each case: the coefficient of variation (equivalently, the relative variance) of the weight distribution; and the presence of outliers-that is, cases whose weights were several standard deviations away from the median weight.

It was important to examine the coefficient of variation of the weights because a large coefficient of variation reduces the effective size of the sample. Assuming that the variables of interest for individual students are uncorrelated with the weights of the students, the sampling variance of an estimated average or aggregate is approximately $\left(1+\left[\frac{C}{100}\right]^2\right)$ times as great as the corresponding sampling variance based on a self-weighting sample of the same size, where C is the coefficient of variation of the weights expressed as a percent. Outliers, or cases with extreme weights, were examined because the presence of such an outlier was an indication of the possibility that an error was made in the weighting procedure, and because it was likely that a few extreme cases would contribute substantially to the size of the coefficient of variation.

In most jurisdictions, the coefficients of variation were 35 percent or less, both for the whole sample and for all subgroups. This means that the quantity $\left(1+\left[\frac{C}{100}\right]^2\right)$ was generally below 1.1, and the variation in sampling weights had little impact on the precision of sample estimates.

A few relatively large student weights were observed in each grade in some jurisdictions. An evaluation was made of the impact of trimming these largest weights back to a level consistent with the largest remaining weights found in the state and grade. Such a procedure produced an appreciable reduction in the size of the coefficient of variation for these weights, and hence this trimming was implemented. Westat judged that this procedure had minimal potential to introduce bias, while the reduction in the coefficient of variation of the weights gives rise to an appreciable decrease in sampling error for the jurisdictions and grades.

7.6 CALCULATION OF REPLICATE WEIGHTS

A replication method known as *jackknife* was used to estimate the variance of statistics derived from the full sample. The process of replication involves repeatedly selecting portions of the sample (replicates) and calculating the desired statistic (replicate estimates). The variability among the calculated replicate estimates is then used to obtain the variance of the full-sample estimate.

In each jurisdiction, replicates were formed in two steps. First, each school was assigned to one of a maximum of 62 replicate groups, each group containing at least one school. In the next step, a random subset of schools (or, in some cases, students within schools) in each replicate group was excluded. The remaining subset and all schools in the other replicate groups then constituted one of the 62 replicates. The process of forming these replicate groups, core to the process of variance estimation, is described below.

7.6.1 Defining Replicate Groups and Forming Replicates for Variance Estimation

Replicate groups were formed separately for public and nonpublic schools. Once replicate groups were formed for all schools, students were then assigned to their respective school replicate groups.

Public Schools. Noncertainty schools were sorted by jurisdiction according to sample type. Then within sample type, the schools were sorted by new school status and the order in which they were selected from the sampling frame. The schools were then grouped in pairs. Where there was an odd number of schools, the last replicate group contained three schools instead of two. In those jurisdictions where the number of pairs exceeded 62 (Nebraska, grade 4), the pair numbering proceeded up to 62, and then decreased back from 62 for the last few pairs.

Each of the certainty public schools was assigned to one or more replicate groups of its own. If a school was selected three or more times in the sampling process, then it was assigned to two replicate groups. Here, schools were sorted by the estimated grade enrollment prior to group assignments. Again, depending on the jurisdiction, a maximum of 62 certainty groups was formed. The group numbering resumed from the last group number used for the noncertainty schools if the total number of public-school groups was less than 62. Otherwise, the numbering started from 62 down to the number needed for the last certainty public school. In the District of Columbia grade 4, which had only 109 certainty schools (no noncertainty schools), groups started at 1 and continued up to 62 and then back down to 16. In the District of Columbia grade 8, which had only 36 certainty schools, the groups went from 1 to 53. Eighteen of the 36 certainty schools in the District of Columbia were selected three or more times and thus were assigned to two replicate groups. A replicate was formed by randomly deleting one half of the students in a certainty school from the sample. For certainty schools that were assigned to two replicate groups, the students were split equally between four "halves," two halves in each of the two replicate groups. This was repeated for each certainty school.

The purpose of this scheme was to assign as many replicates to a jurisdiction's public schools as permitted by the design, to a maximum of 62. When more than 62 replicates were assigned, the procedure ensured that no subset of the replicate groups (pairs of noncertainty schools, individual certainty schools, or groups of these) was substantially larger than the other replicate groups. The aim was to maximize the degrees of freedom available for estimating variances for public-school data.

A single replicate estimate was formed by dropping one member assigned to a particular replicate group. This process was repeated successively across replicate groups, giving up to 62 replicate estimates.

Nonpublic Schools. Replicate groups for noncertainty nonpublic schools were formed in one of the two methods described below. If any of the following conditions was true for a given jurisdiction, then the subsequent steps were taken to form replicate groups. Here, the numbering started at 62 down to the last needed number.

Conditions for Method 1:

- fewer than 11 nonpublic noncertainty schools; or
- fewer than 2 Catholic noncertainty schools; or
- fewer than 2 non-Catholic noncertainty schools.

Steps for Method 1:

- all schools were grouped into a single replicate group;
- schools were randomly sorted; and
- starting with the second school, replicates were formed by consecutively leaving out one of the remaining *n - 1* schools; each replicate included the first school.

When a given jurisdiction did not match conditions of the first method (i.e., when all of the following conditions were true), then the preceding steps were repeated separately for two groups, one consisting of Catholic schools and one consisting of non-Catholic schools.

Conditions for Method 2:

- more than 10 nonpublic noncertainty schools; and
- more than 1 Catholic noncertainty school; and
- more than 1 non-Catholic noncertainty school.

For jurisdictions with certainty nonpublic schools (Delaware, District of Columbia, and Montana at grade 4, and Delaware, District of Columbia, Maryland, North Dakota, Rhode Island, Vermont, and Wyoming at grade 8) each school was assigned to one or more groups. If a school was selected three or more times in the sampling, it was assigned to two groups. Prior to this assignment, schools were sorted in descending order of the estimated grade enrollment. The group numbering started at the last number where the noncertainty nonpublic schools ended. A replicate was formed by randomly deleting one half of the students in a certain school from the sample. For the certainty schools that were assigned to two replicate groups, the students were split equally between four "halves," two halves in each of two replicate groups. This was repeated for each certainty school.

Again, the aim was to maximize the number of degrees of freedom for estimating sampling errors for nonpublic schools (and indeed for public and nonpublic schools combined) within the constraint of forming 62 replicate groups. Where a jurisdiction had a significant contribution from both Catholic and non-Catholic schools, Westat ensured that the sampling error estimates reflected the stratification on this characteristic.

Guam. For Guam, where all schools were selected with certainty, schools were assigned to one or more replicate groups proportional to their estimated grade enrollment.

DDESS and DoDDS Schools. Schools in the DDESS grade 8 sample were assigned to one or more replicate groups proportional to their estimated grade enrollment. Schools in all other DDESS and DoDDS samples were assigned to replicate groups following the general rules described above for all public schools.

7.6.2 School-Level Replicate Weights

As mentioned above, each replicate sample had to be reweighted to compensate for the dropped unit(s) defining the replicate. This reweighting was done in two stages. At the first-stage, the *i*th school included in a particular replicate *r* was assigned a replicate-specific school base weight defined as:

$$W_{ri}^{sch} = K_r \times W_i^{sch}$$

where W_i^{sch} is the full-sample base weight for school *i*, and, for public schools:

$$K_r = \begin{cases} 1.5 & \text{if school } i \text{ was contained in a "pair" consisting of 3 units from which} \\ & \text{the complementary member was dropped to form replicate } r, \\ 2 & \text{if school } i \text{ was contained in a pair consisting of 2 units from which the} \\ & \text{complementary member was dropped to form replicate } r, \\ 0 & \text{if school } i \text{ was dropped to form replicate } r, \text{ and} \\ 1 & \text{if school } i \text{ was not assigned to replicate } r \text{ or if school } i \text{ was a certainty.} \end{cases}$$

For nonpublic schools, Method 1:

$$K_r = \begin{cases} \dfrac{n}{n-1} & \text{if school } i \text{ was not dropped in forming replicate } r \\ 0 & \text{if school } i \text{ was dropped to form replicate } r \end{cases}$$

For nonpublic schools, Method 2 (with n_1 Catholic schools and n_2 non-Catholic schools):

$$K_r = \begin{cases} \dfrac{n_1}{n_1 - 1} & \begin{array}{l}\text{if school } i \text{ was Catholic, not dropped from replicate } r, \\ \text{and replicate } r \text{ was formed by dropping a Catholic school}\end{array} \\ 1 & \text{if school } i \text{ was Catholic and replicate } r \text{ was formed by dropping a nonCatholic school} \\ \dfrac{n_2}{n_2 - 1} & \begin{array}{l}\text{if school } i \text{ was nonCatholic, not dropped from replicate } r, \\ \text{and replicate } r \text{ was formed by dropping a nonCatholic school}\end{array} \\ 1 & \text{if school } i \text{ was nonCatholic and replicate } r \text{ was formed by dropping a Catholic school} \\ 0 & \text{if school } i \text{ was dropped to form replicate } r \end{cases}$$

Using the replicate-specific school base weights, W_{ri}^{sch}, the school-level nonresponse weighting adjustments were recalculated for each replicate r. That is, the school-level nonresponse adjustment factor for schools in replicate r and adjustment class k was computed as:

$$F_{rk} = \frac{\sum_{i \in C_k} \left(W_{rki}^{sch} \times E_{ki} \right)}{\sum_{i \in C_k} \left(W_{rki}^{sch} \times E_{ki} \times \delta_{rki} \right)}$$

where

C_k = the subset of school records in adjustment class k;

W_{rki}^{sch} = the replicate-r base weight of the ith school in class k;

E_{ki} = the grade enrollment for the ith school in class k;

In the above formulation, the indicator variable δ_{rki} had a nonzero value only when the ith school in replicate r and adjustment class k participated in the assessment. The replicate-specific nonresponse-adjusted school weight for the ith school in replicate r in class k was then computed as:

$$W_{rki}^{adj} = F_{rk} \times W_{rki}^{sch} \times \delta_{rki} .$$

7.6.3 Student-Level Replicate Weights

The replicate-specific adjusted student base weights were calculated by multiplying the replicate-specific adjusted school weights as described above by the corresponding within-school student weights. That is, the adjusted student base weight for the *j*th student in adjustment class *k* in replicate *r* was initially computed as:

$$W_{rkij} = W_{rki}^{adj} \times W_{ij}^{within}$$

where

W_{rki}^{adj} = the nonresponse-adjusted school weight for school *i* in school adjustment class *k* and replicate *r*; and

W_{ijr}^{within} = the within-school weight for the *j*th student in school *i*.

The final replicate-specific student weights were then obtained by applying the student nonresponse adjustment procedures to each set of replicate student weights. Let F_{rk} denote the student-level nonresponse adjustment factor for replicate *r* and adjustment class *k*. The final replicate-*r* student weight for student *j* in school *i* in adjustment class *k* was calculated as:

$$W_{rkij}^{final} = F_{rk} \times W_{rki}^{adj} \times W_{ij}^{within} .$$

Finally, estimates of the variance of sample-based estimates were calculated as:

$$Var_{JK}(\hat{x}) = \sum_{r=1}^{62} (\hat{x}_r - \hat{x})^2 ,$$

where

$$\hat{x} = \sum_{i,j} W_{kij}^{final} \times x_{kij}$$

denotes an estimated total based on the full sample, and $\hat{x}_r$ denote the corresponding estimate based on replicate *r* with 62 replicates. The standard error of an estimate $\hat{x}$ is estimated by taking the square root of the estimated variance, $Var_{JK}(\hat{x})$.

7.7 RAKING OF WEIGHTS

Raking (also known as iterative proportional fitting) is done in place of poststratification. Unlike poststratification, it is performed iteratively to two or more different distributions of a population total (i.e., gender and age). It is typically used in situations in which the interior cells of a cross-tabulation are either unknown, or some sample sizes in the cells are too small for efficient estimation. In raking, the marginal population totals, $N_{i.}$ and $N_{.j}$ are known (i.e., age and gender population counts), however, the interior cells of the cross-tabulation N_{ij} (the age by gender cells) are estimated from the sample by $\hat{N}_{ij}$, where these are the sum of weights in the cells. The raking algorithm proceeds by proportionally scaling the $\hat{N}_{ij}$, such that the following relations are satisfied:

$$\sum_j \hat{N}_{ij} = N_{i.}$$

and

$$\sum_i \hat{N}_{ij} = N_{j.}$$

The 1996 State Assessment program used two different sets of inclusion rules indicated by sample type = 1 and sample type = 2 (see Chapter 3). The mathematics assessment was analyzed omitting the sample type = 2 SD/LEP students; and the science assessment was analyzed omitting the sample type = 1 SD/LEP students. The SD/LEP student weights were raked separately for the two subsets as defined by sample type and public/nonpublic schools. Agreement was forced with totals estimated using both of the subsets combined for each of the school types. The purpose of this was to enhance the reliability (i.e., reduce the sampling error) of estimates produced by using information about student characteristics from the whole sample to enhance the estimates.

7.7.1 Raking Dimensions for Full Sample Student Weights

Public Schools. Five variables were used for the raking dimensions. These variables included two levels of SD (SD/nonSD), two levels of LEP (LEP/nonLEP), two levels of GENDER, five levels of RACE (White and Other; Black; Hispanic; Asian or Pacific Islander; and American Indian or Alaskan Native). and two levels of AGE. The variable AGE was defined as follows: for grade 4, those born in August 1985 or earlier and those born in September 1985 or later and for grade 8, those born in August 1981 or earlier and those born in September 1981 or later. Collapsing of levels was done so that no level of a single dimension contained fewer than 30 students for a state and grade.

Tables 7-15 and 7-16 show for each jurisdiction and grade, the final collapsed levels that were used for the raking dimensions. A dash indicates that all levels were combined, and thus, the variable was not used as a raking dimension. An asterisk for the RACE variable indicates that all other levels of the dimension were combined into one level. For example in fourth grade for Alaska, there are four levels of race: White, Hispanic, American Indian or Alaskan Native, and all others combined.

Nonpublic Schools. Because of the small numbers of nonpublic-school students, no raking was carried out. A factor of 2 was applied to the weights for the SD/LEP students since only half the SD/LEP sample was used for analysis.

7.7.2 Raking Student Replicate Weights

The replicate weights for the public SD/LEP students were raked similarly. Control totals for each replicate were calculated based on the totals for the replicate weights. The levels of the raking dimensions that were used for the replicates were the same collapsed levels as shown in Tables 7-15 and 7-16. For the nonpublic schools, again a factor of 2 was applied to the replicate weights of the SD/LEP students.

Table 7-15
Final Collapsed Levels Used for Raking Dimensions, Grade 4

Jurisdiction					
Alabama	Gender	Age	Race: W / *	-	-
Alaska	Gender	Age	Race: W / H / N / *	SD	LEP
Arizona	Gender	Age	Race: H / *	SD	LEP
Arkansas	Gender	Age	Race: W / *	-	-
California	Gender	Age	Race: W / H / *	SD	LEP
Colorado	Gender	Age	Race: W / H / *	SD	LEP
Connecticut	Gender	Age	Race: W / H / *	SD	LEP
Delaware	Gender	-	Race: W / B / *	-	-
District of Columbia	Gender	Age	Race: B / *	SD	-
Florida	Gender	Age	Race: W / H / *	SD	LEP
Georgia	Gender	Age	Race: W / B / *	-	-
Hawaii	Gender	-	Race: H / A / *	SD	LEP
Indiana	Gender	Age	Race: W / *	-	-
Iowa	Gender	Age	Race: W / *	-	-
Kentucky	Gender	Age	-	-	-
Louisiana	Gender	Age	Race: B / *	-	-
Maine	Gender	Age	-	-	-
Maryland	Gender	-	Race: W / *	-	-
Massachusetts	Gender	Age	Race: W / *	SD	-
Michigan	Gender	Age	Race: W / *	-	-
Minnesota	Gender	Age	Race: W / *	SD	-
Mississippi	Gender	Age	Race: B / *	-	-
Missouri	Gender	Age	Race: W / *	-	-
Montana	Gender	Age	-	-	-
Nebraska	Gender	Age	Race: W / H / *	-	-
Nevada	Gender	Age	Race: H / *	SD	LEP
New Jersey	Gender	Age	Race: W / *	-	-
New Mexico	Gender	Age	Race: W / H / *	SD	LEP
New York	Gender	Age	Race: W / *	SD	-
North Carolina	Gender	Age	Race: W / B / *	-	-
North Dakota	Gender	Age	-	-	-
Oregon	Gender	Age	Race: W / *	SD	LEP
Pennsylvania	Gender	Age	-	-	-
Rhode Island	Gender	Age	Race: W / *	SD	LEP
South Carolina	Gender	Age	Race: B / *	-	-
Tennessee	Gender	Age	Race: W / *	-	-
Texas	Gender	Age	Race: W / H / *	SD	LEP
Utah	Gender	Age	Race: W / *	-	LEP
Vermont	Gender	Age	-	-	-
Virginia	Gender	Age	Race: W / B / *	-	-
Washington	Gender	Age	Race: W / *	SD	-
West Virginia	Gender	Age	-	-	-
Wisconsin	Gender	Age	Race: W / *	-	-
Wyoming	Gender	Age	Race: W / *	-	-
Other jurisdictions					
Guam	Gender	-	-	SD	LEP
DoDEA/DDESS	-	-	-	-	-
DoDEA/DoDDS	Gender	Age	Race: W / *	-	-

Table 7-16
Final Collapsed Levels Used for Raking Dimensions, Grade 8

Jurisdiction					
Alabama	Gender	Age	Race: W / *	-	-
Alaska	Gender	Age	Race: W / *	-	-
Arizona	Gender	Age	Race: H / *	SD	LEP
Arkansas	Gender	Age	Race: W / *	-	-
California	Gender	Age	Race: W / H / *	SD	LEP
Colorado	Gender	Age	Race: W / *	-	-
Connecticut	Gender	Age	Race: W / *	-	-
Delaware	Gender	Age	Race: W / *	-	-
District of Columbia	Gender	Age	Race: B / *	SD	-
Florida	Gender	Age	Race: W / H / *	SD	-
Georgia	Gender	Age	Race: W / *	-	-
Hawaii	Gender	-	Race: A / *	SD	LEP
Indiana	Gender	Age	Race: W / *	-	-
Iowa	Gender	Age	-	-	-
Kentucky	Gender	Age	-	-	-
Louisiana	Gender	Age	Race: B / *	-	-
Maine	Gender	Age	-	-	-
Maryland	Gender	Age	Race: B / *	-	-
Massachusetts	Gender	Age	Race: W / *	-	-
Michigan	Gender	Age	-	-	-
Minnesota	Gender	Age	-	-	-
Mississippi	Gender	Age	Race: B / *	-	-
Missouri	Gender	Age	Race: W / *	-	-
Montana	-	Age	-	-	-
Nebraska	Gender	Age	Race: W / *	-	-
Nevada	-	-	-	-	-
New Hampshire	Gender	Age	-	-	-
New Jersey	Gender	Age	Race: W / *	-	-
New Mexico	Gender	Age	Race: W / H / *	SD	LEP
New York	Gender	Age	Race: W / H / *	SD	-
North Carolina	Gender	Age	Race: W / *	-	-
North Dakota	Gender	Age	-	-	-
Oregon	Gender	Age	Race: W / *	-	-
Rhode Island	Gender	Age	Race: W / *	SD	-
South Carolina	Gender	Age	Race: B / *	-	-
Tennessee	Gender	Age	Race: W / *	-	-
Texas	Gender	Age	Race: H / *	SD	LEP
Utah	Gender	Age	-	-	-
Vermont	Gender	Age	-	-	-
Virginia	Gender	Age	Race: W / *	-	-
Washington	Gender	Age	Race: W / *	-	LEP
West Virginia	Gender	Age	-	-	-
Wisconsin	Gender	Age	Race: W / *	-	-
Wyoming	Gender	Age	-	-	-
Other jurisdictions					
Guam	-	-	-	-	-
DoDEA/DDESS	-	-	-	-	-
DoDEA/DoDDS	-	-	Race: W / *	-	-

Chapter 8

THEORETICAL BACKGROUND AND PHILOSOPHY OF NAEP SCALING PROCEDURES[1]

Eugene G. Johnson and Nancy L. Allen
Educational Testing Service

8.1 OVERVIEW

The primary method by which results from the State Assessment are disseminated is scale-score reporting. With scaling methods, the performance of a sample of students in a subject area or subarea can be summarized on a single scale or a series of scales even when different students have been administered different items. This chapter presents an overview of the scaling methodologies employed in the analyses of the data from NAEP surveys in general and from the State Assessment in mathematics in particular. Details of the scaling procedures specific to the 1996 State Assessment in mathematics are presented in Chapter 9.

8.2 BACKGROUND

The basic information from an assessment consists of the responses of students to the items presented to them. For NAEP, these items are constructed to measure performance on sets of objectives developed by nationally representative panels of learning area specialists, educators, and concerned citizens. Satisfying the framework and specifications for the assessment and ensuring that the items selected to measure each part of the framework cover a range of difficulty levels typically requires many items. For example, the State Assessment in mathematics required 104 items at grade 4 only, 129 items at grade 8 only, and 54 items at both grades 4 and 8 to meet the specifications provided for the assessment. To reduce student burden, each assessed student was presented only a fraction of the full pool of items through multiple matrix sampling procedures.

The most direct manner of presenting the assessment results is to report separate results for each item. However, because of the vast amount of information, having separate results for each of the items in the assessment pool hinders our understanding of the overall performance of subgroups of the population. Item-by-item reporting masks our understanding of similarities in trends and subgroup comparisons common across items.

An obvious way to summarize performance across a collection of items is to calculate the average of the separate item scores. The advantage of averaging is that it tends to cancel out the effects of peculiarities in items that can affect item difficulty in unpredictable ways. Furthermore, averaging makes it easier to compare the general performances of subpopulations.

[1] Nancy L. Allen was responsible for the psychometric and statistical analysis of state and national NAEP data. Eugene G. Johnson is a senior psychometrician with special expertise in the design of NAEP and sampling issues. Robert J. Mislevy and Neal Thomas contributed greatly to previous versions of this chapter.

Despite their advantages, there are a number of significant problems with average item scores. First, the interpretation of these averages depends on the items that happen to be administered to a group of students. Since all students are not administered the same items, the average item score of students who happen to be administered a set of easy or difficult items would make that group's performance appear to be overly high or low. Second, again since the average score is related to the particular items administered direct comparisons of subpopulations become difficult because they require that those subpopulations be administered the same set of items. Third, because this approach limits comparisons to average scores on specific sets of items, it provides no simple way to report trends over time when the specific content of the item pool changes. Finally, direct estimates of quantities such as the proportion of students who would achieve a specific score across the items in the pool are not possible when every student is administered only a small fraction of the item pool. While the mean score across all items in the pool can be readily obtained (by calculating the average of the individual item scores), statistics that provide distributional scores across the full set of items in the pool cannot be readily obtained without additional assumptions.

These limitations can be overcome by the use of response scaling methods. When several items require similar skills, the regularities observed in response patterns can often be used to characterize both students and items using a relatively small number of variables. These variables include a student-specific variable, commonly called proficiency, estimated by the scale score, which quantifies a student's tendency to answer items correctly (or, for multipoint items, to achieve a certain score) and item-specific characteristics of an item such as its difficulty, effectiveness in distinguishing between students with different levels of proficiency, and chances of a very low proficiency student correctly answering a multiple-choice item. (These variables are discussed in more detail in the next section.) When combined through appropriate mathematical formulas, these characteristics capture the dominant features of the data. Furthermore, all students' proficiencies can be measured on a common scale, even though none of the students took all of the items in the pool. Using the common scale, it becomes possible to estimate distributions of proficiency in a population or subpopulation and to estimate the relationships between the scale scores and student background variables.

It is important to point out that any procedure of aggregation, whether it be a simple average or a more complex multidimensional scaling model, highlights certain patterns at the expense of other potentially interesting patterns that may reside within the data. Every item in a NAEP survey is of interest and can provide useful information about what young Americans know and can do. The choice of an aggregation procedure must be driven by a conception of which patterns are most important for a particular purpose.

The scaling for the State Assessment in mathematics was carried out separately for each of the five mathematics content strands specified in the framework for grade 4 mathematics and then for grade 8 mathematics. This scaling within subareas was done because it was anticipated that different patterns of performance might exist for these essential subdivisions of the subject area. The five content strands are: *number sense, properties, and operations*; *measurement*; *geometry and spatial sense*; *data analysis, statistics, and probability*; and *algebra and functions*. By creating a separate scale for each of these content strands, any differences in subpopulation performance between the content strands are preserved. Comparisons of the difficulty of one subarea with another are not possible with scale results. Average item scores for the different subareas could be compared, but these average scores are related to the particular items in the assessment, rather than to any innate characteristics of items within any subarea.

The creation of a series of separate scales to describe mathematics performance does not preclude the reporting of a single index of overall mathematics performance—that is, an overall mathematics composite. A composite is computed as the weighted average of the five content strand scales, where the weights correspond to the relative importance given to each content strand as defined by the framework. The composite provides a global measure of performance within mathematics, whereas the content strand scales allow the measurement of important interactions among these subdivisions of mathematics.

8.3 SCALING METHODOLOGY

This section reviews the scaling models employed in the analyses of data from the State Assessment in mathematics and the 1996 national mathematics assessment. It also reviews the multiple imputation or "plausible values" methodology that allows such models to be used with NAEP's sparse item-sampling design. The reader is referred to Mislevy (1991) for an introduction to plausible values methods and a comparison with standard psychometric analyses, to Mislevy, Johnson, and Muraki (1992) and Beaton and Johnson (1992) for additional information on how the models are used in NAEP, and to Rubin (1987) for the theoretical underpinnings of the approach. It should be noted that the imputation procedure used by NAEP is a mechanism for providing plausible values for scale score averages and not for filling in blank responses to background or cognitive variables.

While the NAEP procedures were developed explicitly to handle the characteristics of NAEP data, they build on work paralleled by other researchers. See, for example Dempster, Laird, and Rubin (1977); Little and Rubin (1983, 1987); Andersen (1980); Engelen (1987); Hoijtink (1991); Laird (1978); Lindsey, Clogg, and Grego (1991); Zwinderman (1991); Tanner and Wong (1987); and Rubin (1987, 1991).

The 104 mathematics items administered exclusively at grade 4, the 129 items administered exclusively at grade 8, and the 54 items administered at both grades 4 and 8 in the State Assessment were also administered to students of the same grades in the national mathematics assessment. The number of items actually scaled differs from the number of items administered due to decisions about the treatment of items in scaling (see Tables 9-1 through 9-4 in Chapter 9). However, because the administration procedures differed, the State Assessment data were scaled independently from the national data. The national assessment also included results for students in grade 12; and results on an estimation scale for each grade. Details of the scaling of the State Assessment and the subsequent linking to the results from the national mathematics assessment are provided in Chapter 9.

8.3.1 The Scaling Models

Three distinct scaling models, depending on item type and scoring procedure, were used in the analysis of the data from the State Assessment. Each of the models is based on item response theory (IRT; e.g., Lord, 1980). Each is a "latent variable" model, which is defined separately for each of the scales at each grade. A latent variable model expresses students' tendencies to respond (such as correct/incorrect) on the items as a function of a characteristic that is not directly observed. This characteristic is called proficiency. Students' proficiencies are estimated by scale scores.

A three-parameter logistic (3PL) model was used for the multiple-choice items (which were scored correct/incorrect). The fundamental equation of the 3PL model is the probability that a student, whose proficiency on scale k is characterized by the *unobservable* variable θ_k, will respond correctly to item j:

$$P(x_j = 1|\theta_k, a_j, b_j, c_j) = c_j \frac{(1-c_j)}{1+\exp[-1.7a_j(\theta_k - b_j)]} \equiv P_{j1}(\theta_k) \tag{8.1}$$

In Equation 8.1:

x_j is the response to item j, 1 if correct and 0 if not;

a_j where $a_j > 0$, is the slope parameter of item j, characterizing the strength of its relationship to the latent proficiency;

b_j is the location parameter of item j. characterizing its difficulty with respect to the latent proficiency; and

c_j where $0 \leq c_j < 1$, is the lower asymptote parameter of item j, reflecting the chances of students of very low proficiency selecting the correct option.

Further, the probability of an incorrect response to the item is defined as:

$$P_{j0} = P(x_j = 0|\theta_k, a_j, b_j, c_j) = 1 - P_{j1}(\theta_k). \tag{8.2}$$

A two-parameter logistic (2PL) model was used for short constructed-response items, which were scored correct or incorrect. The equations of the 2PL model are the same as those of Equations 8.1 and 8.2, with the c_j parameter fixed at zero.

In addition to the multiple-choice and short constructed-response items, a number of extended constructed-response items (5 at grade 4 and 6 at grade 8) were administered in the State and national assessments. Each of these items was scored on a multipoint ranging from 0 to 4. Additionally, as discussed in Chapter 9, certain sets of items consisting of highly correlated parts were combined into cluster items or "testlets" (Wainer & Kiely, 1987) where the score assigned to a cluster item was the number of constituent parts answered correctly. Items which are scored on a multipoint scale are referred to as polytomous items. The multiple-choice and short constructed-response items, which are scored correct/incorrect, are referred to as dichotomous items.

The polytomous items were scaled using a generalized partial credit model (Muraki, 1992). The fundamental equation of this model is the probability that a person, whose proficiency on scale k is characterized by the unobservable variable θ_k, will respond to item j in a way to be scored i:

$$P(x_j = i|\theta_k, a_j, b_j, d_{j,1}, \ldots, d_{j,m_j-1}) = \frac{\exp\left(\sum_{v=0}^{i} 1.7a_j(\theta_k - b_j + d_{j,v})\right)}{\sum_{g=0}^{m_j-1} \exp\left(\sum_{v=0}^{g} 1.7a_j(\theta_k - b_j + d_{j,v})\right)} \equiv P_{ji}(\theta_k) \tag{8.3}$$

where

m_j	is the number of ordered categories in response to item j
x_j	is the response to item j, with possibilities $i = 0,1,\ldots,m_j - 1$
a_j	is the slope parameter;
b_j	is the item location parameter characterizing overall difficulty with respect to the latent proficiency; and
$d_{j,i}$	is the category i threshold parameter (see below).

Indeterminacies in the parameters of the above model are resolved by setting $d_{j,0} = 0$ and setting $\sum_{i=1}^{m_j-1} d_{j,i} = 0$. Muraki (1992) points out that $b_j - d_{j,i}$ is the point on the θ_k scale at which the plots of $P_{j,i-1}(\theta_k)$ and $P_{ji}(\theta_k)$ intersect and so characterizes the point on the θ_k scale at which the student's response to item j has equal probability of falling in score category i - 1 and falling in score category i.

When $m_j = 2$, so that there are two score categories (such as 0,1), it can be shown that $P_{ji}(\theta_k)$ of Equation 8.3 for i=0,1 corresponds respectively to $P_{j0}(\theta_k)$ and $P_{j1}(\theta_k)$ of the 2PL model (Equations 8.1 and 8.2 with c_j=0).

A typical assumption of item response theory is the independence of the response by a student to a set of items, given or conditional on the student's proficiency. That is, for a student with a specific proficiency of θ_k, the joint probability of a particular response pattern $\underline{x} = (x_1,\ldots,x_n)$ across a set of n items is simply the product of terms based on Equations 8.1, 8.2, and 8.3:

$$P(\underline{x}|\theta_k, item\ parameters) = \prod_{j=1}^{n} \prod_{i=0}^{m_j-1} P_{ji}(\theta_k)^{u_{ji}} \tag{8.4}$$

where $P_{ji}(\theta_k)$ is of the form appropriate to the type of item (dichotomous or polytomous), m_j is taken equal to 2 for the dichotomously scored items, and u_{ji} is an indicator variable defined by

$$u_{ji} = \begin{cases} 1 \text{ if response } x_j \text{ was in score category } i \\ 0 \text{ otherwise} \end{cases}$$

It is also typically assumed that response probabilities are conditionally independent of background variables $(\underline{y})$, given θ_k, or

$$P(\underline{x} \mid \theta_k, item\ parameters, \underline{y}) = p(\underline{x} \mid \theta_k, item\ parameters). \tag{8.5}$$

After $\underline{x}$ has been observed, Equation 8.4 can be viewed as a likelihood function, and provides a basis for inference about θ_k or about item parameters. Estimates of item parameters (see Appendix D) were obtained by the NAEP BILOG/PARSCALE program, which combines Mislevy and Bock's (1982) BILOG and Muraki and Bock's (1991) PARSCALE computer programs, and which concurrently estimates parameters for all items (dichotomous and polytomous). The item parameters are then treated as known in subsequent calculations. The parameters of the items constituting each of the separate scales were estimated independently of the parameters of the other scales. Once items have been calibrated in this manner, a likelihood function for the scale proficiency θ_k is induced by a vector of responses to any subset of calibrated items, thus allowing θ_k-based inferences from matrix samples.

Item parameter estimation was performed separately for the grade 4 and the grade 8 data. As stated previously, item parameter estimation was performed independently for the State Assessment and for the national mathematics assessment. In both cases, the identical scale definitions were used.

In all NAEP IRT analyses, missing responses *at the end of each block* of items a student was administered were considered "not-reached," and treated as if they had not been presented to the student. Missing responses to dichotomous items *before the last observed response in a block* were considered intentional omissions, and treated as fractionally correct and assigned a score equal to the reciprocal of the number of response alternatives. These conventions are discussed by Mislevy and Wu (1988). With regard to the handling of not-reached items, Mislevy and Wu found that ignoring not-reached items introduces slight biases into item parameter estimation. The degree of this bias depends on the number of not-reached items and whether speed is correlated with ability. With regard to omissions, they found that the method described above provides consistent limited-information likelihood estimates of item and ability parameters under the assumption that students omit only it they can do no better than responding randomly.

Because the extended constructed-response items were always the last item in a block and because considerably more effort was required of the student to answer these items, nonresponse to an extended constructed-response item was considered an intentional omission (and scored as the lowest category, 0); however, if a student also did not respond to the item immediately preceding that item, the extended constructed-response item was considered not reached and treated as if it had not been presented to the student.

Although the IRT models are employed in NAEP only to summarize performance, a number of checks are made to detect serious violations of the assumptions underlying the models (such as conditional independence). When warranted, remedial efforts are made to mitigate the effects of such violations on inferences. These checks include comparisons of empirical and theoretical item response functions to identify items for which the IRT model may provide a poor fit to the data.

The scales in NAEP are determined *a priori* by grouping items into the content strands defined by the frameworks developed by the National Assessment Governing Board. A proficiency scale θ_k is defined *a priori* by the collection of items representing each scale. What is important, therefore, is that the models capture salient information in the response data to effectively summarize the overall performance on the content strand of the populations and subpopulations being assessed in the content strand. NAEP routinely conducts differential item functioning (DIF) analyses to guard against potential biases in making subpopulation comparisons based on the scale score distributions.

The local independence assumption embodied in Equation 8.4 implies that item response probabilities depend only on θ_k and the specified item parameters, and not on the position of the item in the booklet, the content of other items near an item of interest, the test-administration conditions, or the timing conditions. However, these factors are certainly present in any administration. The practical question is whether inferences based on the IRT probabilities obtained via Equation 8.4 are robust with respect to these violations of the ideal assumptions underlying the IRT model. Our experience with the 1986 NAEP reading anomaly (Beaton & Zwick, 1990) has shown that for measuring small changes over time, changes in item context and speededness conditions can lead to unacceptably large error components. These can be avoided by presenting items used to measure change in identical test forms, with identical timings and administration conditions. Thus, we do *not* maintain that the item parameter estimates obtained in any particular booklet configuration are appropriate for other conceivable booklet configurations. Rather, we assume that the parameter estimates are context-bound. (For this reason, we prefer common population equating to common item equating whenever equivalent random samples are available for linking.) This is the reason that the data from the State Assessment were calibrated separately from the data from the national NAEP—since the administration procedures differed somewhat between the State Assessment and the national NAEP, the values of the item parameters could be different. Chapter 9 provides details on the procedures used to link the results of the 1996 State Assessment to those of the 1996 national assessment and, hence, to those of the 1990 and 1992 Trial State and national assessments.

8.3.2 An Overview of Plausible Values Methodology

Item response theory was developed in the context of measuring individual students' performance. In that setting, each student is administered enough items (often 60 or more) to permit precise estimation of their latent proficiency θ. This may be accomplished by using a maximum likelihood estimate $\hat{\theta}$, for example. When there are enough items administered to each student, the uncertainty associated with each θ is negligible. As a result, the distribution of θ, or the joint distribution of θ with other variables, can then be closely approximated using students' $\hat{\theta}$ values as if they were true θ values.

This approach breaks down in the assessment setting when, in order to provide broader content coverage in limited testing time, each student is administered relatively few items in a scale. The problem is that the uncertainty associated with individual proficiencies is too large to ignore, and the $\hat{\theta}$ distribution, as an estimate of the θ distribution, can be seriously biased. (The failure of this approach was verified in early analyses of the 1984 NAEP reading survey; see Wingersky, Kaplan, & Beaton, 1987.) Plausible value methodology was developed as a way to estimate key population features consistently. A detailed development of plausible values methodology is given in Mislevy (1991). Along with theoretical justifications, that paper presents comparisons with standard procedures, discussions of biases that arise in some secondary analyses, and numerical examples.

The following provides a brief overview of the plausible values approach, focusing on its implementation in the State Assessment analyses.

Let $\underline{y}$ represent the responses of all sampled examinees to background and attitude questions, along with design variables such as school membership, and let $\underline{\theta}$ represent the vector of scale proficiency values. If $\underline{\theta}$ were known for all sampled examinees, it would be possible to compute a statistic $t(\underline{\theta},\underline{y})$—such as a scale or composite subpopulation sample mean, a sample percentile point, or a sample regression coefficient—to estimate a corresponding population quantity T. A function $U(\underline{\theta},\underline{y})$—e.g., a jackknife estimate—would be used to gauge sampling uncertainty, as the variance of t around T in repeated samples from the population.

Because the scaling models are latent variable models, however, $\underline{\theta}$ values are not observed even for sampled students. To overcome this problem, we follow Rubin (1987) by considering $\underline{\theta}$ as "missing data" and approximate $t(\underline{\theta},\underline{y})$ by its expectation given $(\underline{x},\underline{y})$, the data that actually were observed, as follows:

$$\begin{aligned} t^{*}(\underline{x},\underline{y}) &= E[t(\underline{\theta},\underline{y})|\underline{x},\underline{y}] \\ &= \int t(\underline{\theta},\underline{y})\, p(\underline{\theta}|\underline{x},\underline{y})\, d\underline{\theta}\,. \end{aligned} \tag{8.6}$$

It is possible to approximate t^{*} using random draws from the conditional distribution of the scale score averages given the item responses x_i, background variables y_i, and model parameters for sampled student i. These values are referred to as imputations in the sampling literature, and plausible values in NAEP. The value of $\underline{\theta}$ for any student that would enter into the computation of t is thus replaced by a randomly selected value from the student's conditional distribution. Rubin (1987) proposes that this process be carried out several times—multiple imputations—so that the uncertainty associated with imputation can be quantified. The average of the results of, M estimates of t, each computed from a different set of plausible values, is a Monte Carlo approximation of Equation 8.6; the variance among them, B, reflects uncertainty due to not observing θ, and must be added to the estimated expectation of $U(\underline{\theta},\underline{y})$, which reflects uncertainty due to testing only a sample of students from the population. Section 8.5 explains how plausible values are used in subsequent analyses.

It cannot be emphasized too strongly that **plausible values are *not* test scores for *individuals*** in the usual sense. Plausible values are offered only as intermediary computations for calculating integrals of the form of Equation 8.6, in order to estimate *population* characteristics. When the underlying model is correctly specified, plausible values will provide consistent estimates of population characteristics, even though they are not generally unbiased estimates of the scale score averages of the individuals with whom they are associated. The key idea lies in a contrast between plausible values and the more familiar θ estimates of educational measurement that are in some sense optimal for each examinee (e.g., maximum likelihood estimates, which are consistent estimates of an examinee's θ, and Bayes estimates, which provide minimum mean-squared errors with respect to a reference population): *Point estimates that are optimal for individual examinees have distributions that can produce decidedly nonoptimal (specifically, inconsistent) estimates of population characteristics* (Little & Rubin, 1983). Plausible values, on the other hand, are constructed explicitly to provide consistent estimates of population effects. For further discussion see Mislevy, Beaton, Kaplan, and Sheehan (1992).

8.3.3 Computing Plausible Values in IRT-based Scales

Plausible values for each student r are drawn from the conditional distribution $p(\underline{\theta}_r|\underline{x}_r, \underline{y}_r, \Gamma, \Sigma)$, where Γ and Σ are regression model parameters defined in this subsection. This subsection describes how, in IRT-based scales, these conditional distributions are characterized, and how the draws are taken. An application of Bayes' theorem with the IRT assumption of conditional independence produces:

$$p(\underline{\theta}_r|\underline{x}_r, \underline{y}_r, \Gamma, \Sigma) \propto P(\underline{x}_r|\underline{\theta}_r, \underline{y}_r, \Gamma, \Sigma)\, p(\underline{\theta}_r|\underline{y}_r, \Gamma, \Sigma) = P(\underline{x}_r|\underline{\theta}_r)\, p(\underline{\theta}_r|\underline{y}_r, \Gamma, \Sigma)\,, \tag{8.7}$$

where, for vector-valued $\underline{\theta}_r$, $P(\underline{x}_r|\underline{\theta}_r)$ is the product over scales of the *independent likelihoods* induced by responses to items within each scale, and $p(\underline{\theta}_r|\underline{y}_r, \Gamma, \Sigma)$ is the multivariate—and generally nonindependent—*joint density* of scale score averages for the scales, conditional on the observed value y_i of background responses, and the parameters Γ and Σ. The scales are determined by the item parameter estimates that constrain the population mean to zero and standard deviation to one. The item parameter estimates are fixed and regarded as population values in the computation described in this subsection.

In the analyses of the data from the State Assessment and the data from the national mathematics assessment, a normal (Gaussian) form was assumed for $p(\theta_r|y_r, \Gamma, \Sigma)$, with a common variance-covariance matrix, Σ, and with a mean given by a linear model with slope parameters, Γ, based on the first 170 to 271 principal components of 870 selected main effects for grade 4 and based on the first 152 to 305 principal components of 1,029 main effects for grade 8, and two-way interactions of the complete vector of background variables. The variance-covariance matrix, Σ, is common across different patterns of responses to the background variable y. The included principal components will be referred to as the *conditioning variables*, and will be denoted $\underline{y}^c$. (The complete set of original background variables used in the State Assessment mathematics analyses are listed in Appendix C.) The following model was fit to the data within each state:

$$\underline{\theta} = \Gamma\, \underline{y}^c + \underline{\varepsilon}\,, \tag{8.8}$$

where ε is multivariately normally distributed with mean zero and variance-covariance matrix Σ. The number of principal components of the conditioning variables used for each state was sufficient to account for 90 percent of the total variance of the full set of conditioning variables (after standardizing each variable). As in regression analysis, Γ is a matrix each of whose columns contains the *effects* for one scale and Σ is the matrix *variance-covariance of residuals* between scales. By fitting the model (Equation 8.8) separately within each state, interactions between each state and the conditioning variables are automatically included in the conditional joint density of scale score averages.

Maximum likelihood estimates of Γ and Σ, denoted by $\hat{\Gamma}$ and $\hat{\Sigma}$, are obtained from an enhancement of Sheehan's (1985) MGROUP computer program using the EM algorithm described in Mislevy (1985). The EM algorithm requires the computation of the mean, $\bar{\underline{\theta}}_i$, and variance, Σ_i^p, of the posterior distribution in Equation 8.7. These moments are computed using higher order asymptotic corrections (Thomas, 1993).

After completion of the EM algorithm, the plausible values are drawn in a three-step process from the joint distribution of the values of Γ for all sampled students. First, a value of Γ is drawn from a normal approximation to $P(\Gamma, \Sigma \mid x_r, y_r)$ that fixes Σ at the value $\hat{\Sigma}$, (Thomas, 1993). Second, conditional on the generated value of Γ (and the fixed value of $\Sigma = \hat{\Sigma}$), the mean, $\bar{\underline{\theta}}_r$, and variance, Σ_r^p, of the posterior distribution in Equation 8.7 (i.e., $p(\underline{\theta}_i \mid x_i, y_i, \Gamma, \Sigma)$) are computed using the same methods applied in the EM algorithm. In the third step, the $\underline{\theta}_r$ are drawn independently from a multivariate normal distribution with mean $\underline{\theta}_r$ and variance Σ_r^p, approximating the distribution in Equation 8.7. These three steps are repeated five times producing five imputations or plausible values of $\bar{\underline{\theta}}_r$ for each sampled student.

8.4 NAGB ACHIEVEMENT LEVELS

Since its beginning, a goal of NAEP has been to inform the public about what students in American schools know and can do. While the NAEP scales provide information about the distributions of proficiency, estimated by scale scores, for the various subpopulations, they do not directly provide information about the meaning of various points on the score scale. Traditionally, meaning has been attached to educational scales by norm-referencing—that is, by comparing students at a particular scale level to other students. Beginning in 1990, NAEP reports have also presented data using achievement levels. The reading achievement levels were developed and adopted by the National Assessment Governing Board (NAGB), as authorized by the NAEP legislation. The achievement levels describe selected points on the scale in terms of the types of skills that are or should be exhibited by students scoring at that level. The achievement level process was applied to the 1992 national NAEP mathematics composite and the 1994 national scales were linked to the 1992 national scales. Since the Trial State Assessment scales were linked to the national scales in both years, the interpretations of the selected levels also apply to the State Assessments in 1990, 1992, and 1996.

NAGB has determined that achievement levels shall be the first and primary way of reporting NAEP results. Setting achievement levels is a method for setting standards on the NAEP assessment that identify what students *should* know and be able to do at various points on the reading composite. For each grade in the national assessment and, here, for grades 4 and 8 in the State Assessment, four levels were defined—*basic*, *proficient*, *advanced*, and the region *below basic*. Based on initial policy definitions of these levels, panelists were asked to determine operational descriptions of the levels appropriate with the content and skills assessed in the mathematics assessment. With these descriptions in mind, the panelists were then asked to rate the assessment items in terms of the expected performance of marginally acceptable students at each of these levels. These ratings were then mapped onto the NAEP scale to obtain the achievement level cutpoints for reporting. Further details of the achievement level-setting process appear in Appendix F.

8.5 ANALYSES

When survey variables are observed without error from every student, standard variance estimators quantify the uncertainty associated with sample statistics from the only source of uncertainty, namely the sampling of students. Item-level statistics for NAEP cognitive items meet this requirement, but scale-score values, which estimate proficiency, do not. The IRT models used in their construction posit an unobservable proficiency variable θ to summarize performance on the items in the subarea. The fact that θ values are not observed even for the students in the sample requires additional statistical analyses to draw inferences about θ distributions and to quantify the uncertainty associated with those inferences. As described above, Rubin's (1987) multiple imputations procedures were adapted to the context of latent variable models to produce the plausible values upon which many analyses of the data from the State Assessment were based. This section describes how plausible values were employed in subsequent analyses to yield inferences about population and subpopulation distributions of scale score averages.

8.5.1 Computational Procedures

Even though one does not observe the θ value of student i, one does observe variables that are related to it: $\underline{x}_i$, the student's answers to the cognitive items he or she was administered in the area of interest, and $\underline{y}_i$, the student's answers to demographic and background variables. Suppose one wishes to draw inferences about a number $T(\underline{\theta},\underline{Y})$ that could be calculated explicitly if the θ and $\underline{y}$ values of each member of the population were known. Suppose further that if θ values were observable, we would be able to estimate T from a sample of N pairs of θ and y values by the statistic $t(\underline{\theta},\underline{y})$ [where $(\underline{\theta},\underline{y}) \equiv (\theta_1,\underline{y}_1,\ldots,\theta_N,\underline{y}_N)$], and that we could estimate the variance in t around T due to sampling students by the function $U(\underline{\theta},\underline{y})$. Given that observations consist of $(\underline{x}_i,\underline{y}_i)$ rather than $(\underline{\theta}_i,\underline{y}_i)$, we can approximate t by its expected value conditional on $(\underline{x},\underline{y})$, or

$$t^*(\underline{x},\underline{y}) = E[t(\underline{\theta},\underline{y})|\underline{x},\underline{y}] = \int t(\underline{\theta},\underline{y})\, p(\underline{\theta}\,|\underline{x},\underline{y})\, d\underline{\theta}.$$

It is possible to approximate t^* with random draws from the conditional distributions $p(\underline{\theta}_i|\underline{x}_i,\underline{y}_i)$, which are obtained for all students by the method described in Section 8.3.3. Let $\hat{\underline{\theta}}_m$ be the mth such vector of plausible values, consisting of a multidimensional value for the latent variable of each student. This vector is a plausible representation of what the true $\underline{\theta}$ vector might have been, had we been able to observe it.

The following steps describe how an estimate of a scalar statistic $t(\underline{\theta},\underline{y})$ and its sampling variance can be obtained from M (>1) such sets of plausible values. (Five sets of plausible values are used in analyses of the NAEP State Assessment.)

1. Using each set of plausible values $\hat{\underline{\theta}}_m$ in turn, evaluate t as if the plausible values were true values of $\underline{\theta}$. Denote the results $\hat{t}_m$ for $m=1,\ldots,M$.

2. Using the jackknife variance estimator defined in Chapter 7, compute the estimated sampling variance of $\hat{t}_m$, denoting the result U_m.

3. The final estimate of t is

$$t^{*} = \sum_{m=1}^{M} \frac{\hat{t}_m}{M}.$$

4. Compute the average sampling variance over the M sets of plausible values, to approximate uncertainty due to sampling students:

$$U^{*} = \sum_{m=1}^{M} \frac{U_m}{M}.$$

5. Compute the variance among the M estimates $\hat{t}_m$, to approximate uncertainty due to not observing θ values from students:

$$B = \sum_{m=1}^{M} \frac{(\hat{t}_m - t^{*})^2}{(M - 1)}$$

6. The final estimate of the variance of t^{*} is the sum of two components:

$$V = U^{*} + (1 + M^{-1})\, B.$$

Note: Due to the excessive computation that would be required, NAEP analyses did not compute and average jackknife variances over all five sets of plausible values, but only on the first set. Thus, in NAEP reports, U^{*} is approximated by U_1.

8.5.2 Statistical Tests

Suppose that if θ values were observed for sampled students, the statistic $(t - T)/U^{1/2}$ would follow a t-distribution with d degrees of freedom. Then the incomplete-data statistic $(t^{*} - T)/V^{1/2}$ is approximately t-distributed, with degrees of freedom given by:

$$\nu = \frac{1}{\dfrac{f^2}{M - 1} + \dfrac{(1 - f)^2}{d}}$$

where f is the proportion of total variance due to not observing θ values:

$$f = (1+M^{-1})\, B / V.$$

1(

When B is small relative to U^*, the reference distribution for incomplete-data statistics differs little from the reference distribution for the corresponding complete-data statistics. This is the case with main NAEP reporting variables. If, in addition, d is large, the normal approximation can be used to flag "significant" results.

For k-dimensional t, such as the k coefficients in a multiple regression analysis, each U_m and U^* is a covariance matrix, and B is an average of squares and cross-products rather than simply an average of squares. In this case, the quantity $(T-t^*)\ V^{-1}\ (T-t^*)'$ is approximately F distributed, with degrees of freedom equal to k and ν, with ν defined as above but with a matrix generalization of f:

$$f = (1+M^{-1})\ Trace\ (BV^{1})/k\ .$$

By the same reasoning as used for the normal approximation for scalar t, a chi-square distribution on k degrees of freedom often suffices.

8.5.3 Biases in Secondary Analyses

Statistics t^* that involve scale score averages in a scaled content strand and variables included in the conditioning variables y^c are consistent estimates of the corresponding population values T. Statistics involving background variables y that were *not* conditioned on, or relationships among scale score averages from *different* content strands, are subject to asymptotic biases whose magnitudes depend on the type of statistic and the strength of the relationships of the nonconditioned background variables to the variables that were conditioned on and to the score scale of interest. That is, the large sample expectations of certain sample statistics need not equal the true population parameters.

The *direction* of the bias is typically to underestimate the effect of nonconditioned variables. For details and derivations see Beaton and Johnson (1990), Mislevy (1991), and Mislevy and Sheehan (1987, Section 10.3.5). For a given statistic t^* involving one content strand and one or more nonconditioned background variables, the *magnitude* of the bias is related to the extent to which observed responses, x, account for the latent variable θ, and the degree to which the nonconditioned background variables are correlated with the conditioning background variables. The first factor—conceptually related to test reliability—acts consistently in that greater measurement precision reduces biases in *all* secondary analyses. The second factor acts to reduce biases in certain analyses but increase it in others. In particular,

- High shared variance between conditioned and nonconditioned background variables *mitigates* biases in analyses that involve only scale score and nonconditioned variables, such as marginal means or regressions.

- High shared variance *exacerbates* biases in regression coefficients of conditional effects for nonconditioned variables, when nonconditioned and conditioned background variables are analyzed jointly as in multiple regression.

The large number of background variables that have been included in the conditioning vector for the State Assessment allows a large number of secondary analyses to be carried out with little or no bias, and mitigates biases in analyses of the marginal distributions of θ in nonconditioned variables. Kaplan and Nelson's analysis of the 1988 NAEP reading data (some results of which are summarized in Mislevy, 1991), which had a similar design and fewer conditioning variables, indicates that the potential bias for nonconditioned variables in multiple regression analyses is below 10 percent, and biases in simple regression of such variables is below 5 percent. Additional research (summarized in Mislevy, 1990) indicates that most of the bias reduction obtainable from conditioning on a large number of variables can be captured by instead conditioning on the first several principal components of the matrix of all original conditioning variables. This procedure was adopted for the State Assessment by replacing the conditioning effects by the first K principal components, where K was selected so that 90 percent of the total variance of the full set of conditioning variables (after standardization) was captured. Mislevy (1990) shows that this puts an upper bound of 10 percent on the average bias for all analyses involving the original conditioning variables.

Chapter 9

DATA ANALYSIS AND SCALING FOR THE 1996 STATE ASSESSMENT PROGRAM IN MATHEMATICS[1]

Frank Jenkins, Edward Kulick, Bruce A. Kaplan,
Steve Wang, Jiahe Qian, and Xiaohui Wang
Educational Testing Service

9.1 OVERVIEW

This chapter describes the analyses used in developing the 1996 State Assessment mathematics scales. The procedures used were similar to those employed in the analysis of the 1992 Trial State Assessment (Johnson, Mazzeo, & Kline, 1993) and are based on the philosophical and theoretical rationale given in the previous chapter. However, the nature and scope of the 1992 assessment was altered in a number of ways to accommodate the evolving nature of NAEP, particularly in the State Assessment. The changes incorporated into the 1996 State Assessment included, on the one hand, the assessment of both public and nonpublic students for most jurisdictions and using considerably more constructed-response items. In addition, subsamples of the 1996 State Assessment were presented with different student inclusion rules. Since comparisons of mathematics results for 1996 and previous assessments are important, the sample of students used for most analyses and reporting were formed so that the old inclusion rules were used. On the other hand, estimation items that were included in the 1992 Trial State Assessment were not included in the 1996 State Assessment. Furthermore, the status of the assessment has changed. In 1992, the State Assessment was designated as a *trial*, while now it is considered to be a standard assessment (see Chapter 1).

There were five major steps in the analysis of the State Assessment mathematics data, each of which is described in a separate section:

- conventional item and test analyses, and DIF analyses (Section 9.3);
- item response theory (IRT) scaling (Section 9.4);
- estimation of state and subgroup proficiency distributions based on the "plausible values" methodology (Section 9.5);
- linking of the 1996 State Assessment scales to the corresponding scales from the 1996 national assessment (Section 9.6); and
- creation of the State Assessment mathematics composite scale (Section 9.7).

A final section provides an explanation of sampling weights (Section 9.8).

To set the context within which to describe the methods and results of scaling procedures, a brief review of the assessment instruments and administration procedures is provided.

---

[1] Frank Jenkins had the primary responsibility for the planning and coordination of the mathematics state and national analyses. Jiahe Qian assisted with the mathematics state assessment analyses. Computer activities for these analyses were directed by Edward Kulick and completed by Steve Wang and Xiaohui Wang. Bruce Kaplan has responsibility for preparing student sampling weights for use in NAEP analyses.

9.2 DESCRIPTION OF ITEMS, ASSESSMENT BOOKLETS, AND ADMINISTRATION PROCEDURES

The general design structure of the 1996 State Assessment was the same as that used in 1992. However, the particulars of the 1996 design differed in several respects from those of 1992. First, the 1992 assessment was administered to public-school students only, while the 1996 assessment included samples of both public- and nonpublic-school students. Second, the 1996 assessment used a somewhat different set of instruments from those used in 1992. The 1996 item pool was based on the same curriculum framework used for 1990 and 1992 national and Trial State Assessments and contained five blocks of items at each grade level that were identical to blocks administered in 1992. The 1996 item pool, on the other hand, included an expanded number of blocks containing new material. The new material included a greater proportion of those constructed-response items. The longer constructed response items were scored from 0 to 2, 0 to 3, or 0 to 4. Further, there were extended constructed-response items that were scored on a 0 to 4 scale, requiring about five minutes to complete. These item types are discussed in Chapter 5 with actual codes used for the data files; they are discussed here in terms of the meaning of the responses for analysis purposes.

The fourth-grade item pool contained 144 scaled items, each of which was classified into one of the five content strands: 59 items for *number sense, properties, and operations*; 25 items for *measurement*; 25 for *geometry and spatial sense*; 17 for *data analysis, statistics, and probability*; and 18 for *algebra and functions*. These items consisted of 79 multiple-choice items, 35 constructed-response items scored dichotomously, 29 constructed-response items scored polytomously, and 1 "cluster item."[2] The items were divided into 13 mutually exclusive blocks. The composition of each block of items, in terms of content and format, is given in Table 9-1.[3] Table 9-2 shows the composition of each block after deletions of items and collapsing of categories for constructed-response items as a result of scaling. If data had poor fit with the response model for an item, the item was deleted. If a constructed response item was scored in multiple categories but one category had no (or very few) responses or had responses that did not fit the data in some categories, it was combined with other categories.

The eighth-grade item pool contained 164 scaled items, 54 of which were common to the fourth grade. Each item was classified into one of the five content strands: 47 items for *number sense, properties, and operations*; 27 items for *measurement*; 31 for *geometry and spatial sense*; 25 for *data analysis, statistics, and probability*; and 34 for *algebra and functions*. These items, consisting of 93 multiple-choice items, 41 constructed-response items scored dichotomously, 27 constructed-response items scored polytomously, and 3 cluster items. These items were divided into 13 mutually exclusive blocks. The composition of each block of items, in terms of content and format, is given in Table 9-3. Table 9-4 shows the composition of each block after certain items were dropped or had a reduced number of categories as a result of scaling.

[2]A cluster item is an aggregation of a group of items (in the case of NAEP mathematics, typically three or four items) that are related to a single content strand, topic, or stimulus, and are developed and scored as a single unit (see Wainer & Kiely, 1987, for further details and examples of different types of cluster items).

[3]The numbers in Tables 9-1 through 9-4 differ slightly from those given in Chapter 2. The numbers in Chapter 2 do not reflect the grouping of certain sets of items into cluster items for the purposes of scaling.

At both grades, 12 of the 13 blocks contained one or more constructed-response items. Six blocks at grade 4 and eight blocks at grade 8 contained extended constructed-response items scored on a to 4 scale. Two blocks at each grade consisted entirely of constructed-response items. The items contained in one of the two constructed-response blocks required the manipulation of geometric shapes for their solution. Students assigned these blocks were provided a packet containing the necessary shapes during the time period in which they worked on these items. All constructed-response items were scored by specially trained readers, as described in Chapter 5.

Special materials, including calculators, rulers, and protractors, were made available for some blocks. At grade 4, 34 items allowed the use of a calculator for their solutions. These items appeared in three of the blocks (15 items in block M8, 9 in M12, and 10 in M14). At grade 8, 47 items that allowed the use of a calculator appeared in three blocks (18 items in block M8, 9 in M12, 11 in M14, and 9 in block M15). Each student assigned a block containing items that allowed the use of a calculator was given a Texas Instruments calculator (a TI-108 four-function calculator at grade 4, a TI-30 scientific calculator at grade 8) to use while working on that block. For each item in a block for which calculators were made available, both fourth- and eighth-grade students were asked to indicate whether they had in fact used the calculator to answer the item.

Block M15 at grade 4 included some items that required the use of a ruler. Block M15 at grade 8 included some items that required the use of a protractor or ruler. Students administered these items were provided with the necessary tools for the 15-minute period during which they worked on that block. Also, two blocks (M7 and M10) at both grades required the use of either a package of manipulatives or a set of geometric cutouts to answer certain questions.

At both grades, the 13 blocks were used to form 26 different booklets according to a balanced incomplete block (BIB) design (see Chapter 2 for details). Each of these booklets contained three blocks of cognitive items, and each block of these items appeared in exactly six booklets. To balance the possible block position effects, each block appeared twice as the first block of items in a booklet, twice as the second block, and twice as the third block. In addition, the BIB design required that each block of items be paired in a booklet with every other block of items exactly once.

The design of the 1996 State Assessment in mathematics required that each student be administered one of the 26 booklets in the BIB design. Within each administration site, all booklets were "spiraled" together in a random sequence and distributed to students sequentially, in the order of the students' names on the Student Listing Form (see Chapter 4). As a result of the BIB design and the spiraling of booklets, a considerable degree of balance was achieved in the data collection process. Each block of items (and, therefore, each item) was administered to randomly equivalent samples of students within each jurisdiction. In addition, within and across jurisdictions, randomly equivalent samples received each particular block of items as the first, second, or third cognitive block within a booklet.

As described in Chapter 4, a randomly selected portion of the administration sessions within each jurisdiction were observed by Westat-trained quality control monitors. Thus, within and across jurisdictions, randomly equivalent samples of students received each block of items in a particular position within a booklet under monitored and unmonitored administration conditions. For most jurisdictions the monitored rate was about 25 percent of the schools. For jurisdictions that were new to the state assessments (Alaska, Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS), Nevada, Vermont, and Washington) 50 percent of the sessions were monitored. A comparison of the item statistics under monitored and unmonitored conditions is made in the tables included in the next section. Other results of monitoring are described in Chapter 4.

Table 9-1

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type**
Grade 4 (As defined before scaling)

	Number Sense, Properties, and Operations					Measurement					Geometry and Spatial Sense					Data Analysis, Statistics, and Probability					Algebra and Functions					Total				
Block	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**
M3	2	2	0	0	4	4	1	0	0	5	1	0	0	0	1	1	1	0	0	2	1	0	0	0	1	9	4	0	0	13
M4	7	0	0	0	7	2	0	0	0	2	2	0	0	0	2	1	0	0	0	1	2	0	0	0	2	14	0	0	0	14
M5	2	0	2	0	4	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	3	0	4	4	0	6	0	10
M6	0	4	0	0	4	0	1	0	0	1	0	3	0	0	3	0	1	0	0	1	0	2	0	0	2	0	11	0	0	11
M7	1	0	2	0	3	1	0	0	0	1	0	0	2	0	2	0	0	0	0	0	1	0	1	0	2	3	0	5	0	8
M8	8	1	0	0	9	2	0	0	0	2	2	0	0	0	2	1	0	0	0	1	1	0	0	0	1	14	1	0	0	15
M9	1	2	0	0	3	2	0	0	1	3	0	0	1	0	1	2	0	0	0	2	1	0	0	0	1	6	2	1	1	10
M10	0	0	0	0	0	0	1	0	0	1	0	4	0	0	4	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6
M11	3	3	0	0	6	2	0	0	0	2	5	0	0	0	5	1	2	0	0	3	0	0	0	0	0	11	5	0	0	16
M12	4	0	2	0	6	0	0	1	0	1	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	5	0	4	0	9
M13	3	1	0	0	4	2	0	0	0	2	0	3	0	0	3	1	1	0	0	2	0	0	1	0	1	6	5	1	0	12
M14	2	0	3	0	5	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	3	0	3	4	0	6	0	10
M15	1	0	3	0	4	1	1	1	0	3	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	3	1	6	0	10
Total	**34**	**13**	**12**	**0**	**59**	**18**	**4**	**2**	**1**	**25**	**10**	**10**	**5**	**0**	**25**	**9**	**6**	**2**	**0**	**17**	**8**	**2**	**8**	**0**	**18**	**79**	**35**	**29**	**1**	**144**

*Item types:
1 = Multiple-choice items
2 = Constructed-response items scored dichotomously
3 = Constructed-response items scored polytomously
4 = Cluster items
T = Total items in the block

BEST COPY AVAILABLE

Table 9-2

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type**

Grade 4 (As defined after scaling. Counts reflect items that were dropped and collapsed)

	Number Sense, Properties, and Operations					Measurement					Geometry and Spatial Sense					Data Analysis, Statistics, and Probability					Algebra and Functions					Total				
Block	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**
M3	2	2	0	0	4	4	1	0	0	5	1	0	0	0	1	1	1	0	0	2	1	0	0	0	1	9	4	0	0	13
M4	7	0	0	0	7	2	0	0	0	2	2	0	0	0	2	1	0	0	0	1	2	0	0	0	2	14	0	0	0	14
M5	2	0	2	0	4	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	3	0	4	4	0	6	0	10
M6	0	4	0	0	4	0	1	0	0	1	0	3	0	0	3	0	1	0	0	1	0	2	0	0	2	0	11	0	0	11
M7	1	1	1	0	3	1	0	0	0	1	0	1	1	0	2	0	0	0	0	0	1	0	1	0	2	3	2	3	0	8
M8	8	1	0	0	9	2	0	0	0	2	2	0	0	0	2	1	0	0	0	1	1	0	0	0	1	14	1	0	0	15
M9	1	2	0	0	3	2	0	0	1	3	0	0	1	0	1	2	0	0	0	2	1	0	0	0	1	6	2	1	1	10
M10	0	0	0	0	0	0	1	0	0	1	0	4	0	0	4	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6
M11	3	3	0	0	6	2	0	0	0	2	5	0	0	0	5	1	2	0	0	3	0	0	0	0	0	11	5	0	0	16
M12	4	0	2	0	6	0	0	1	0	1	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	5	0	4	0	9
M13	3	1	0	0	4	2	0	0	0	2	0	3	0	0	3	1	1	0	0	2	0	0	1	0	1	6	5	1	0	12
M14	2	0	3	0	5	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	3	0	3	4	0	6	0	10
M15	1	0	3	0	4	1	1	1	0	3	0	0	2	0	2	0	0	0	0	0	1	0	0	0	1	3	2	5	0	10
Total	**34**	**15**	**10**	**0**	**59**	**18**	**4**	**2**	**1**	**25**	**10**	**11**	**4**	**0**	**25**	**9**	**6**	**2**	**0**	**17**	**8**	**2**	**8**	**0**	**18**	**79**	**38**	**26**	**1**	**144**

*Item types:
1 = Multiple-choice items
2 = Constructed-response items scored dichotomously
3 = Constructed-response items scored polytomously
4 = Cluster items
T = Total items in the block

BEST COPY AVAILABLE

Table 9-3

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type**

Grade 8 (As defined before scaling)

	Number Sense, Properties, and Operations					Measurement					Geometry and Spatial Sense					Data Analysis, Statistics, and Probability					Algebra and Functions					Total				
Block	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**
M3	4	0	1	0	5	1	1	0	0	2	0	1	0	0	1	1	0	0	1	2	2	1	0	0	3	8	3	1	1	13
M4	7	0	0	0	7	4	0	0	0	4	4	0	0	0	4	2	0	0	0	2	4	0	0	0	4	21	0	0	0	21
M5	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	5	0	4	0	9	7	0	5	0	12
M6	0	3	0	0	3	0	1	0	0	1	0	6	0	0	6	0	3	0	0	3	0	3	0	0	3	0	16	0	0	16
M7	1	0	0	0	1	0	0	1	0	1	1	0	4	0	5	0	0	0	0	0	2	0	1	0	3	4	0	6	0	10
M8	8	0	0	0	8	2	0	0	0	2	2	0	0	0	2	1	2	0	0	3	3	0	0	0	3	16	2	0	0	18
M9	0	3	0	0	3	1	0	0	0	1	1	0	0	0	1	2	0	1	0	3	1	0	0	0	1	5	3	1	0	9
M10	0	0	0	0	0	0	2	0	0	2	0	4	0	0	4	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7
M11	2	3	0	0	5	2	1	0	0	3	5	0	0	0	5	2	2	0	0	4	2	0	0	0	2	13	6	0	0	19
M12	2	0	2	0	4	2	0	1	0	3	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	4	0	5	0	9
M13	2	2	0	0	4	0	1	1	0	2	2	0	0	0	2	1	0	0	0	1	1	1	0	0	2	6	4	1	0	11
M14	4	0	2	0	6	2	0	0	0	2	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	6	0	4	1	11
M15	1	0	0	0	1	1	0	3	0	4	0	0	1	0	1	0	0	0	0	0	1	0	1	1	3	3	0	5	1	9
Total	**32**	**11**	**5**	**0**	**48**	**15**	**6**	**6**	**0**	**27**	**15**	**11**	**5**	**0**	**31**	**10**	**8**	**5**	**2**	**25**	**21**	**5**	**7**	**1**	**34**	**93**	**41**	**28**	**3**	**165**

*Item types
1 = Multiple-choice items
2 = Constructed-response items scored dichotomously
3 = Constructed-response items scored polytomously
4 = Cluster items
T = Total items in the block

BEST COPY AVAILABLE

Table 9-4

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type**

Grade 8 (As defined after scaling. Counts reflect items that were dropped and collapsed)

	Number Sense, Properties, and Operations					Measurement					Geometry and Spatial Sense					Data Analysis, Statistics, and Probability					Algebra and Functions					Total				
Block	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**	**1**	**2**	**3**	**4**	**T**
M3	4	0	1	0	5	1	1	0	0	2	0	1	0	0	1	1	0	0	1	2	2	1	0	0	3	8	3	1	1	13
M4	7	0	0	0	7	4	0	0	0	4	4	0	0	0	4	2	0	0	0	2	4	0	0	0	4	21	0	0	0	21
M5	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	5	1	3	0	9	7	1	4	0	12
M6	0	3	0	0	3	0	1	0	0	1	0	6	0	0	6	0	3	0	0	3	0	3	0	0	3	0	16	0	0	16
M7	1	0	0	0	1	0	0	1	0	1	1	1	3	0	5	0	0	0	0	0	2	0	1	0	3	4	1	5	0	10
M8	8	0	0	0	8	2	0	0	0	2	2	0	0	0	2	1	2	0	0	3	3	0	0	0	3	16	2	0	0	18
M9	0	3	0	0	3	1	0	0	0	1	1	0	0	0	1	2	0	1	0	3	1	0	0	0	1	5	3	1	0	9
M10	0	0	0	0	0	0	2	0	0	2	0	4	0	0	4	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7
M11	2	3	0	0	5	2	1	0	0	3	5	0	0	0	5	2	2	0	0	4	2	0	0	0	2	13	6	0	0	19
M12	2	1	1	0	4	2	0	1	0	3	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	4	2	3	0	9
M13	2	2	0	0	4	0	1	1	0	2	2	0	0	0	2	1	0	0	0	1	1	1	0	0	2	6	4	1	0	11
M14	4	0	1	0	5	2	0	0	0	2	0	0	0	0	0	0	1	1	1	3	0	0	0	0	0	6	1	2	1	10
M15	1	0	0	0	1	1	0	3	0	4	0	0	1	0	1	0	0	0	0	0	1	0	1	1	3	3	0	5	1	9
Total	**32**	**12**	**3**	**0**	**47**	**15**	**6**	**6**	**0**	**27**	**15**	**12**	**4**	**0**	**31**	**10**	**9**	**4**	**2**	**25**	**21**	**7**	**5**	**1**	**34**	**93**	**46**	**22**	**3**	**164**

*Item types
1 = Multiple-choice items
2 = Constructed-response items scored dichotomously
3 = Constructed-response items scored polytomously
4 = Cluster items
T = Total items in the block

9.3 ITEM ANALYSES

9.3.1 Conventional Item and Test Analyses

Tables 9-5 through 9-8 contain summary statistics for each block of items for the fourth and the eighth grades, respectively. These statistics summarize characteristics of the items as they were treated in scaling. (See Table 9-22 for special treatment of some items.) The tables provide the item statistics separately for public- and nonpublic-school students. Block-level statistics are provided both overall and by serial position of the block within booklet. To produce these tables, data from all 47 jurisdictions were aggregated and statistics were calculated using rescaled versions of the final reporting weights provided by Westat. The rescaling, carried out within each jurisdiction, constrained the sum of the sampling weights for public-school students within that jurisdiction to be equal to 2,000. The same rescaling factor was then applied to the weights of the nonpublic-school students. Use of the rescaled weights does nothing to alter the value of statistics calculated separately within each jurisdiction. However, for statistics obtained from samples that combine students from different jurisdictions, use of the rescaled weights results in a roughly equal contribution of each jurisdiction's data to the final value of the estimate. As discussed in Mazzeo (1991), equal contribution of each jurisdiction's data to the results of the IRT scaling was viewed as a desirable outcome and, as described in the scaling section below, similarly rescaled weights were used in carrying out that scaling. Hence, the item analysis statistics shown in Tables 9-5 and 9-6 are consistent with the weighting used in scaling. Section 9.8 contains more detailed information about the weights used in the 1996 State Assessment in mathematics.

Specifically, Tables 9-5 through 9-8 show the number of students assigned each block of items, the average item score, the average biserial correlation, and the proportion of students attempting the last item in that block. The average item score for the block is the average, over items, of the score means for each of the individual items in the block. For dichotomously-scored multiple-choice and constructed-response items (0,1 scoring), these score means correspond to the proportion of students who correctly answered each item. For the cluster items and more than 2-category constructed-response items, the score means were calculated as item score mean divided by the maximum number of points possible.

In NAEP analyses (both conventional and IRT-based), a distinction is made between missing responses at the end of each block (i.e., missing responses subsequent to the last item the student answered) and missing responses prior to the last observed response. Missing responses before the last observed response are considered intentional omissions. In calculating the average score for each item, only students classified as having been presented the item were included in the denominator of the statistic. Intentional omissions were considered "omitted" and were treated as incorrect responses. Missing responses at the end of the block are considered "not-reached," and treated as if they had not been presented to the student. The proportion of students attempting the last item of a block (or, equivalently, 1 minus the proportion of students not reaching the last item) is often used as an index of the degree of speededness associated with the administration of that block of items.

Prior to 1992, standard practice at ETS was to treat all nonrespondents to the last item as if they had not reached the item. For multiple-choice and constructed-response items that only required short answers and are scored on a 0,1, a 0 to 2, or a 0 to 3 scale, the use of such a convention most often produces a reasonable pattern of results in that the proportion reaching the last item is not dramatically smaller than the proportion reaching the next-to-last item. However, for the blocks that ended with extended constructed-response items that require answers taking up to five minutes to produce, use of the standard ETS convention resulted in an extremely large drop in the proportion of students attempting the final item. A drop of such magnitude seemed somewhat implausible under the assumption that all nonresponse is due to not reaching the item rather than intentionally deleting the item. Therefore, for blocks ending with an extended constructed-response item, students who answered the next-to-last item but did not respond to the extended constructed-response item were classified as having intentionally omitted the last item.

Dichotomously-scored items were analyzed using standard procedures that result in a report for each item that includes:

- for each option of the item, for examinees omitting and not reaching the item, and for the total sample of examinees:

  ⇒ number of examinees,
  ⇒ percentage of examinees,
  ⇒ mean of number-correct scores, and
  ⇒ standard deviation of number-correct scores;

- p+, the proportion of examinees that received a correct score on the item (ratio of number correct to number correct plus wrong plus omitted);

- Δ, the inverse-normally transformed p+ scaled to mean 13 and standard deviation 4;

- the biserial correlation coefficient between the item and the number-correct scores; and

- the point-biserial correlation coefficient between the item and the number-correct scores.

Polytomously-scored items were analyzed using the following procedures:

- in place of p+, the ratio of the mean item score to the maximum possible item score was used;

- in place of Δ, the ratio of the mean item score to the maximum possible item score underwent the same transformation as that used on p+ to get Δ for dichotomously scored items;

- the polyserial correlation coefficient was used in place of the biserial; and

- the Pearson correlation coefficient was used in place of the point-biserial.

The average biserial correlation is the average, over items, of the item-level polyserial correlations (r-biserial) between the item and the number correct block score. For each item-level r-biserial, total block number-correct score (including the item in question, and with students receiving zero points for all not-reached items) was used as the criterion variable for the correlation. The number correct score was the sum of the item scores where correct dichotomous items are assigned 1 and correct polytomous (or multiple-category) items are assigned the score category assigned to the student. Data from students classified as not reaching the item were omitted from the calculation of the statistic.

As is evident from Tables 9-5 through 9-8, the difficulty and the average item-to-total correlations of the blocks varied somewhat. Such variability was expected since these blocks were not created to be parallel in either difficulty or content. Based on the proportion of students attempting the last item for public-school students, only one block for the fourth grade and one block for the eighth grade seemed to be somewhat speeded, in that they had proportions less than .8. Only 69 percent of the fourth-grade students taking block M14 and 68 percent of the eighth-grade students taking block M8 reached the last item in the block.

These tables also indicate that there was little variability in average item scores or average polyserial correlations for each block by serial position within the assessment booklet. This suggests that serial position within booklet had a negligible effect on the overall difficulty of the block. However, for the fourth grade, one aspect of block level performance that did differ by serial position was the proportion of students attempting the last item in the block. As shown in Tables 9-5 and 9-6, the majority of the blocks showed increases in the proportion attempting the last item when moving from the first to third position. Perhaps fourth-grade students are able to work more quickly in later blocks or are better able to pace themselves as a result of their experience with the first block of items that they attempt. It is interesting to note that this effect was particularly salient for blocks M8, M10, M11, M12, and M14 in the public-school sector (the items in these blocks required the manipulation of geometric shapes and allowed the use of calculators for their solution). Only two blocks at grade 8 showed a substantial position effect, M8 and M15 (the items in these blocks allowed the use of calculators for their solution). Note that these blocks do not have a greater proportion of polytomous items. Tables 9-2 and 9-4 indicate that the blocks with position effects had items of similar composition as the other blocks in the assessment.

As mentioned earlier, to maintain rigorous standardized administration procedures across the jurisdictions, a randomly selected 25 percent of all sessions within each trend jurisdiction (50% for new jurisdictions) were observed by a Westat-trained quality control monitor. The monitoring was done in similar proportions for the public and nonpublic schools. Observations from this random portion of the sessions provided information about the quality of administration procedures and the frequency of departures from standardized procedures in the monitored sessions (see the last section in Chapter 4 for a discussion of the results of these observations). Unexpectedly large differences in results from monitored and unmonitored sessions (i.e., differences larger than those to be expected due to sampling fluctuation) could be used to identify instances of cheating, breaches of test security, or other breaks in standardization occurring in the unmonitored sessions that might threaten the validity of assessment results.

When results were aggregated over all participating jurisdictions, there was little difference between the performance of students who attended monitored or unmonitored sessions. The average item score (over all 13 blocks and over all 47 participating jurisdictions) for all fourth-grade students in the State Assessment was .54 (including monitored plus unmonitored sessions and public plus nonpublic schools). The average item score for all eighth-grade students was .57. Tables 9-9 through 9-12 provide, for each block of items, the average item score, average polyserial, and the proportion of students attempting the last item for students whose sessions were monitored and students whose sessions were unmonitored, in public and nonpublic schools. For both grades, little or no differences in average item performance by session type were evident. This result held up for both public and nonpublic schools. The results for the public schools are quite consistent with those observed in the 1990 and 1992 Trial State Assessments, where no evidence was found that students who attended monitored sessions performed differently than those who attended unmonitored sessions.

Table 9-13 summarizes the differences between monitored and unmonitored average item scores for the jurisdictions. These are mean differences within a jurisdiction averaged over all items in all the blocks. The information in this table combines public- and nonpublic-school data.

At the fourth grade, the median difference (monitored minus unmonitored) was -.000, almost zero. For 24 jurisdictions, the difference was negative (i.e., students from unmonitored sessions scored higher than students from monitored sessions), with the largest difference being -.041. For the remaining 23 jurisdictions, the difference was positive, with the largest difference being .039. In evaluating the magnitude of these differences, it should be noted that the standard error for a difference in proportions from independent simple random samples of size 625 (one quarter of the typical total jurisdiction sample size of 2,500) from a population with a true proportion of .5 is about .028. For samples with complex sampling designs like NAEP, the standard errors tend to be larger than those associated with simple random sampling. A reasonable estimate of the design effect for average item scores based on past NAEP experience with item proportion correct statistics is about 1.5 (Johnson & Rust, 1992), which suggests that a typical estimate of the standard error of the difference between monitored and unmonitored sessions would be about .03. Only four of the 47 participants had absolute differences larger than or equal to .03. In summary, differences in results obtained from the two types of sessions at the fourth grade were well within the bounds expected due to sampling fluctuation.

At the eighth grade, the median difference was essentially zero (.005). For 18 jurisdictions, the differences were negative. Five were larger in absolute magnitude than .03, all of which were positive. The results indicate that across jurisdictions, there were only small differences between monitored and unmonitored sessions.

Table 9-5

Descriptive Statistics for Each Block of Items by Position Within Test Booklet and Overall Public-School Sessions, Grade 4 (As defined after scaling)

Statistic	Position	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size	1	8323	8327	8290	8257	8327	8411	8345	8297	8351	8260	8287	8299	8306
	2	8325	8294	8293	8330	8266	8311	8298	8392	8333	8320	8329	8233	8298
	3	8312	8271	8311	8272	8315	8283	8269	8246	8373	8299	8313	8297	8402
	ALL	24960	24892	24894	24859	24908	25005	24912	2493[illegible]	[illegible]057	24879	24929	24829	25006
Weighted average item score	1	0.50	0.44	0.47	0.45	0.39	0.59	0.47	0.41	0.50	0.47	0.53	0.45	0.45
	2	0.49	0.45	0.47	0.43	0.38	0.60	0.46	0.40	0.51	0.47	0.53	0.46	0.44
	3	0.50	0.44	0.45	0.42	0.37	0.59	0.46	0.39	0.50	0.45	0.53	0.44	0.44
	ALL	0.50	0.44	0.46	0.43	0.38	0.59	0.46	0.40	0.50	0.46	0.53	0.45	0.44
Weighted average r-polyserial	1	0.60	0.52	0.65	0.67	0.67	0.54	0.63	0.82	0.58	0.66	0.64	0.65	0.67
	2	0.60	0.53	0.66	0.67	0.68	0.55	0.63	0.82	0.60	0.68	0.64	0.66	0.66
	3	0.61	0.52	0.66	0.65	0.66	0.55	0.65	0.85	0.59	0.66	0.66	0.67	0.68
	ALL	0.60	0.52	0.66	0.66	0.67	0.55	0.63	0.83	0.59	0.67	0.65	0.66	0.67
Weighted proportion of students attempting last item	1	0.83	0.94	0.87	0.84	0.82	0.80	0.98	0.84	0.87	0.80	0.94	0.60	0.88
	2	0.84	0.94	0.90	0.86	0.86	0.83	0.98	0.89	0.91	0.86	0.96	0.73	0.90
	3	0.85	0.93	0.91	0.85	0.87	0.88	0.99	0.92	0.94	0.89	0.96	0.73	0.92
	ALL	0.84	0.94	0.89	0.85	0.85	0.84	0.98	0.88	0.91	0.85	0.95	0.69	0.90

Table 9-6

Descriptive Statistics for Each Block of Items by Position Within Test Booklet and Overall Nonpublic-School Sessions, Grade 4 (As defined after scaling)

Statistic	Position	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size	1	729	712	716	718	724	705	731	710	695	708	741	724	743
	2	743	730	719	717	717	723	715	720	720	699	711	718	724
	3	723	725	704	718	729	719	725	725	723	715	732	720	696
	ALL	2195	2167	2139	2153	2170	2147	2171	2155	2138	2122	2184	2162	2163
Weighted average item score	1	0.56	0.49	0.55	0.51	0.47	0.63	0.56	0.45	0.57	0.54	0.60	0.52	0.51
	2	0.55	0.49	0.56	0.48	0.45	0.64	0.53	0.46	0.59	0.54	0.60	0.52	0.51
	3	0.60	0.48	0.51	0.49	0.44	0.65	0.54	0.47	0.54	0.54	0.58	0.50	0.51
	ALL	0.57	0.48	0.54	0.49	0.45	0.64	0.55	0.46	0.56	0.54	0.59	0.51	0.51
Weighted average r-polyserial	1	0.58	0.51	0.61	0.64	0.63	0.52	0.65	0.80	0.56	0.61	0.61	0.61	0.65
	2	0.61	0.53	0.65	0.68	0.62	0.59	0.64	0.80	0.57	0.62	0.61	0.63	0.62
	3	0.63	0.52	0.64	0.66	0.66	0.53	0.65	0.77	0.58	0.63	0.63	0.66	0.67
	ALL	0.61	0.52	0.63	0.66	0.64	0.55	0.65	0.79	0.57	0.62	0.61	0.63	0.65
Weighted proportion of students attempting last item	1	0.89	0.93	0.86	0.83	0.87	0.80	0.98	0.92	0.91	0.87	0.94	0.62	0.87
	2	0.86	0.93	0.91	0.87	0.89	0.85	0.99	0.93	0.95	0.88	0.96	0.76	0.90
	3	0.89	0.94	0.92	0.84	0.86	0.92	0.99	0.95	0.94	0.88	0.97	0.73	0.97
	ALL	0.88	0.93	0.90	0.85	0.87	0.86	0.99	0.93	0.93	0.88	0.96	0.70	0.91

Table 9-7

Descriptive Statistics for Each Block of Items by Position Within Test Booklet and Overall Public-School Sessions, Grade 8 (As defined after scaling)

Statistic	Position	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size	1	7625	7531	7548	7621	7575	7572	7626	7521	7576	7587	7572	7593	7538
	2	7585	7585	7579	7504	7599	7595	7590	7583	7558	7566	7529	7595	7540
	3	7555	7541	7519	7573	7570	7566	7513	7585	7530	7583	7619	7522	7536
	ALL	22765	22657	22646	22698	22744	22733	22729	22689	22664	22736	22720	22710	22614
Weighted average item score	1	0.51	0.59	0.54	0.61	0.56	0.52	0.35	0.58	0.64	0.34	0.50	0.41	0.46
	2	0.50	0.59	0.53	0.60	0.57	0.51	0.35	0.57	0.64	0.35	0.50	0.43	0.46
	3	0.49	0.59	0.54	0.60	0.55	0.51	0.35	0.57	0.63	0.34	0.50	0.42	0.45
	ALL	0.50	0.59	0.54	0.60	0.56	0.51	0.35	0.57	0.64	0.34	0.50	0.42	0.45
Weighted average r-polyserial	1	0.64	0.54	0.61	0.67	0.66	0.60	0.61	0.78	0.65	0.66	0.63	0.54	0.67
	2	0.65	0.55	0.63	0.67	0.65	0.60	0.61	0.79	0.65	0.67	0.63	0.57	0.67
	3	0.65	0.54	0.62	0.69	0.66	0.61	0.62	0.79	0.64	0.68	0.63	0.56	0.68
	ALL	0.65	0.55	0.62	0.68	0.66	0.60	0.61	0.79	0.65	0.67	0.63	0.56	0.67
Weighted proportion of students attempting last item	1	0.96	0.86	0.96	0.91	0.77	0.66	0.96	0.89	0.88	0.81	0.98	0.89	0.83
	2	0.95	0.87	0.97	0.92	0.81	0.67	0.94	0.89	0.88	0.82	0.98	0.91	0.83
	3	0.96	0.88	0.96	0.92	0.82	0.73	0.94	0.91	0.91	0.84	0.98	0.90	0.89
	ALL	0.96	0.87	0.96	0.92	0.80	0.68	0.95	0.90	0.89	0.82	0.98	0.90	0.85

265 206

Table 9-8

Descriptive Statistics for Each Block of Items by Position Within Test Booklet and Overall Nonpublic-School Sessions, Grade 8 (As defined after scaling)

Statistic	Position	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size	1	583	574	589	584	594	588	585	584	578	579	566	569	570
	2	567	568	577	591	579	587	601	580	586	573	576	577	579
	3	572	568	587	588	575	559	578	584	586	591	586	594	570
	ALL	1722	1710	1753	1763	1748	1734	1764	1748	1750	1743	1728	1740	1719
Weighted average item score	1	0.59	0.65	0.61	0.70	0.62	0.58	0.44	0.63	0.72	0.39	0.59	0.47	0.53
	2	0.58	0.66	0.60	0.68	0.66	0.61	0.42	0.61	0.72	0.40	0.57	0.50	0.52
	3	0.59	0.65	0.61	0.67	0.64	0.59	0.44	0.61	0.69	0.43	0.61	0.47	0.50
	ALL	0.59	0.65	0.61	0.68	0.64	0.59	0.43	0.62	0.71	0.41	0.59	0.48	0.52
Weighted average r-polyserial	1	0.62	0.53	0.58	0.69	0.56	0.60	0.52	0.74	0.63	0.59	0.56	0.54	0.66
	2	0.64	0.57	0.61	0.64	0.66	0.52	0.55	0.77	0.58	0.63	0.62	0.58	0.62
	3	0.61	0.54	0.58	0.68	0.62	0.58	0.55	0.80	0.61	0.65	0.58	0.57	0.67
	ALL	0.63	0.55	0.59	0.67	0.61	0.57	0.54	0.77	0.61	0.63	0.59	0.57	0.65
Weighted proportion of students attempting last item	1	0.97	0.88	0.97	0.93	0.86	0.65	0.98	0.89	0.87	0.83	1.00	0.90	0.85
	2	0.97	0.92	0.97	0.97	0.83	0.67	0.95	0.89	0.90	0.87	1.00	0.93	0.87
	3	0.99	0.93	0.98	0.95	0.86	0.75	0.98	0.92	0.94	0.83	1.00	0.93	0.91
	ALL	0.98	0.91	0.98	0.95	0.85	0.69	0.97	0.90	0.91	0.84	1.00	0.92	0.88

BEST COPY AVAILABLE

207

208

Table 9-9

Block-Level Descriptive Statistics for Monitored and Unmonitored Public-School Sessions Grade 4 (As defined after scaling)

Statistic	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size													
Unmonitored	18321	18212	18272	18246	18264	18347	18290	18282	18402	18202	18316	18213	18357
Monitored	6639	6680	6622	6613	6644	6658	6622	6653	6655	6677	6613	6616	6649
Weighted average item score													
Unmonitored	0.49	0.44	0.45	0.43	0.37	0.59	0.45	0.40	0.49	0.46	0.52	.44	0.43
Monitored	0.48	0.44	0.45	0.43	0.36	0.58	0.46	0.40	0.49	0.46	0.52	0.44	0.44
Weighted average r-polyserial													
Unmonitored	0.61	0.52	0.66	0.66	0.67	0.55	0.63	0.83	0.59	0.67	0.65	0.66	0.67
Monitored	0.61	0.52	0.66	0.66	0.67	0.56	0.63	0.83	0.59	0.66	0.65	0.65	0.67
Weighted proportion of students attempting last item													
Unmonitored	0.83	0.94	0.89	0.85	0.85	0.84	0.98	0.88	0.91	0.85	0.95	0.69	0.90
Monitored	0.85	0.94	0.90	0.85	0.86	0.85	0.98	0.88	0.91	0.85	0.96	0.69	0.89

269

210

Table 9-10

Block-Level Descriptive Statistics for Monitored and Unmonitored Nonpublic-School Sessions
Grade 4 (As defined after scaling)

Statistic	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size													
Unmonitored	2236	2212	2199	2183	2200	2185	2204	2214	2171	2194	2223	2201	2201
Monitored	865	880	842	859	867	844	867	838	861	848	852	880	861
Weighted average item score													
Unmonitored	0.55	0.48	0.52	0.48	0.43	0.64	0.52	0.45	0.54	0.52	0.58	0.49	0.50
Monitored	0.54	0.47	0.50	0.47	0.43	0.62	0.52	0.43	0.54	0.52	0.56	0.50	0.48
Weighted average r-polyserial													
Unmonitored	0.58	0.51	0.64	0.65	0.64	0.54	0.61	0.79	0.56	0.63	0.63	0.62	0.63
Monitored	0.60	0.52	0.64	0.66	0.64	0.54	0.63	0.80	0.58	0.63	0.63	0.65	0.64
Weighted proportion of students attempting last item													
Unmonitored	0.89	0.93	0.90	0.88	0.87	0.86	0.99	0.92	0.93	0.89	0.96	0.68	0.91
Monitored	0.87	0.93	0.90	0.85	0.86	0.84	0.97	0.92	0.90	0.87	0.95	0.71	0.88

212

211

Table 9-11

Block-Level Descriptive Statistics for Monitored and Unmonitored Public-School Sessions
Grade 8 (As defined after scaling)

Statistic	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size													
Unmonitored	16858	16774	16777	16825	16816	16788	16811	16837	16785	16866	16894	16841	16736
Monitored	5907	5883	5869	5873	5928	5945	5918	5852	5879	5870	5826	5869	5878
Weighted average item score													
Unmonitored	0.49	0.58	0.53	0.60	0.55	0.51	0.35	0.57	0.63	0.34	0.50	0.42	0.45
Monitored	0.50	0.58	0.54	0.61	0.56	0.51	0.36	0.58	0.64	0.35	0.51	0.42	0.46
Weighted average r-polyserial													
Unmonitored	0.65	0.55	0.62	0.69	0.66	0.60	0.62	0.79	0.65	0.67	0.63	0.55	0.67
Monitored	0.65	0.55	0.62	0.67	0.65	0.60	0.61	0.79	0.65	0.67	0.63	0.56	0.67
Weighted proportion of students attempting last item													
Unmonitored	0.95	0.88	0.97	0.92	0.80	0.70	0.95	0.90	0.90	0.84	0.98	0.91	0.85
Monitored	0.97	0.87	0.97	0.92	0.80	0.70	0.95	0.89	0.90	0.84	0.98	0.91	0.85

213

Table 9-12

Block-Level Descriptive Statistics for Monitored and Unmonitored Nonpublic-School Sessions

Grade 8 (As defined after scaling)

Statistic	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size													
Unmonitored	1701	1694	1723	1754	1733	1711	1713	1695	1717	1728	1706	1729	1715
Monitored	653	640	670	664	667	675	687	681	680	654	651	657	636
Weighted average item score													
Unmonitored	0.56	0.63	0.57	0.66	0.62	0.57	0.41	0.61	0.69	0.39	0.56	0.46	0.49
Monitored	0.57	0.63	0.59	0.68	0.62	0.57	0.41	0.62	0.69	0.39	0.57	0.46	0.52
Weighted average r-polyserial													
Unmonitored	0.63	0.53	0.61	0.66	0.61	0.57	0.59	0.77	0.60	0.64	0.60	0.56	0.65
Monitored	0.62	0.54	0.59	0.63	0.63	0.57	0.56	0.75	0.61	0.61	0.62	0.56	0.65
Weighted proportion of students attempting last item													
Unmonitored	0.98	0.89	0.97	0.95	0.82	0.68	0.97	0.89	0.91	0.84	0.99	0.91	0.85
Monitored	0.97	0.86	0.96	0.95	0.81	0.63	0.97	0.90	0.89	0.80	0.99	0.92	0.85

215

216

Table 9-13

The Effect of Monitoring Sessions by Jurisdiction:

Average Jurisdiction Item Scores for Monitored and Unmonitored Sessions (As defined after scaling)

	Grade 4			Grade 8		
	Unmonitored	Monitored	Monitored - Unmonitored	Unmonitored	Monitored	Monitored - Unmonitored
Alabama	0.394	0.400	0.006	0.435	0.442	0.007
Alaska	0.461	0.461	0.000	0.519	0.536	0.017
Arizona	0.432	0.414	-0.018	0.479	0.465	-0.014
Arkansas	0.413	0.428	0.015	0.456	0.442	-0.014
California	0.377	0.428	0.051	0.463	0.465	0.002
Colorado	0.470	0.446	-0.024	0.510	0.519	0.009
Connecticut	0.505	0.496	-0.009	0.539	0.526	-0.013
Delaware	0.444	0.427	-0.017	0.496	0.478	-0.018
DoDEA/DDESS	0.477	0.446	-0.031	0.477	0.506	0.029
DoDEA/DoDDS	0.460	0.456	-0.004	0.513	0.508	-0.005
District of Columbia	0.324	0.327	0.003	0.374	0.406	0.032
Florida	0.424	0.424	0.000	0.453	0.474	0.021
Georgia	0.417	0.399	-0.018	0.457	0.458	0.001
Guam	0.323	0.333	0.010	0.386	0.463	0.077
Hawaii	0.410	0.421	0.011	0.444	0.481	0.037
Indiana	0.489	0.500	0.011	0.509	0.516	0.007
Iowa	0.496	0.467	-0.029	0.559	0.557	-0.002
Kentucky	0.439	0.442	0.003	0.470	0.476	0.006
Louisiana	0.380	0.367	-0.013	0.419	0.424	0.005
Maine	0.509	0.495	-0.014	0.555	0.541	-0.014
Maryland	0.448	0.443	-0.005	0.501	0.493	-0.008
Massachusetts	0.486	0.477	-0.009	0.510	0.558	0.048
Michigan	0.470	0.465	-0.005	0.525	0.530	0.005
Minnesota	0.510	0.503	-0.007	0.563	0.547	-0.016
Mississippi	0.371	0.387	0.016	0.394	0.384	-0.010
Missouri	0.462	0.480	0.018	0.509	0.507	-0.002
Montana	0.475	0.485	0.010	0.547	0.559	0.012
Nebraska	0.484	0.485	0.001	0.552	0.552	0.000
Nevada	0.417	0.432	0.015	0.476	0.469	-0.007
New Hampshire	—	—	—	0.530	0.537	0.007
New Jersey	0.483	0.464	-0.019	0.527	0.545	0.018
New Mexico	0.391	0.424	0.033	0.445	0.481	0.036
New York	0.449	0.460	0.011	0.494	0.493	-0.001
North Carolina	0.458	0.443	-0.015	0.474	0.481	0.007
North Dakota	0.494	0.517	0.023	0.564	0.555	-0.009
Oregon	0.468	0.463	-0.005	0.524	0.527	0.003
Pennsylvania	0.473	0.473	0.000	—	—	—
Rhode Island	0.435	0.455	0.020	0.492	0.478	-0.014
South Carolina	0.387	0.402	0.015	0.453	0.437	-0.016
Tennessee	0.430	0.419	-0.011	0.457	0.442	-0.015
Texas	0.495	0.454	-0.041	0.490	0.511	0.021
Utah	0.474	0.472	-0.002	0.526	0.503	-0.023

Table 9-13 (continued)

The Effect of Monitoring Sessions by Jurisdiction:

Average Jurisdiction Item Scores for Monitored and Unmonitored Sessions (As defined after scaling)

	Grade 4			Grade 8		
	Unmonitored	Monitored	Monitored - Unmonitored	Unmonitored	Monitored	Monitored - Unmonitored
Vermont	0.465	0.484	0.019	0.529	0.535	0.006
Virginia	0.444	0.450	0.006	0.483	0.486	0.003
Washington	0.458	0.466	0.008	0.521	0.527	0.006
West Virginia	0.453	0.442	-0.011	0.457	0.464	0.007
Wisconsin	0.513	0.501	-0.012	0.551	0.566	0.015
Wyoming	0.462	0.441	-0.021	0.508	0.526	0.018
		mean:	-0.001		mean:	0.006
		median:	0.000		median:	0.005
		minimum:	-0.041		minimum:	-0.023
		maximum:	0.051		maximum:	0.077
		1st quartile:	-0.013		1st quartile:	-0.008
		3rd quartile:	0.011		3rd quartile:	0.014

The 1996 assessment was the first time in a state mathematics assessment that students from nonpublic schools were sampled. The nonpublic-school population that was sampled included students from Catholic schools, private religious schools and private non-religious schools (all referred to by the term 'nonpublic schools'). Tables 9-14 and 9-15 show the difference between public and nonpublic schools with respect to average item statistics, average r-polyserial correlation, and average proportion of students attempting the last item in a block. As with the monitored/unmonitored comparisons, results were aggregated over all participating jurisdictions.

Forty-five of the 47 jurisdictions that participated in the State Assessment had public-school samples, while 37 of the 47 jurisdictions had nonpublic-school samples.

Consistent differences are evident between the public- and nonpublic-school groups. Table 9-14 indicates that for grade 4, the difference in average item score between public- and nonpublic-school students (i.e., public block mean minus nonpublic block mean) ranged from -.04 to -.09 with an average of -.07, indicating that public-school students were generally lower in average item score. The public/nonpublic difference in average item-to-total block correlation (the average r-polyserial) ranged from .01 to .04 with an average of .02, indicating that public-school students generally had a somewhat higher item-to-total correlation. As for the proportion of students attempting the last item, public minus nonpublic differences ranged from +.01 to -.04 with an average of -.02, indicating that somewhat fewer students in public schools attempted the last item.

Comparisons between public- and nonpublic-school students were quite similar for the eighth grade. On average, for public-school students the average item score was lower by .07, the average r-polyserial correlation was greater by .03, and the proportion of students attempting the last item was lower by .02.

Tables 9-16 to 9-19 summarize the distribution over jurisdictions of the mean item scores for public- and nonpublic-school students. Across jurisdictions, the average public-school scores were quite varied with the difference between the first and third quartile (an indication of how variable scores are) as high as .07 (for *data analysis, statistics, and probability*). The spread of scores for nonpublic-school students was very comparable. The differences between public- and nonpublic-school mean item scores was smaller than the difference between jurisdictions, ranging from .05 (*geometry and spatial sense*) to .09 (*data analysis, statistics, and probability*).

A similar picture emerges for grade 8 public-school students (Tables 9-18 and 9-19) with the difference between the first and third quartile as high as .06 (for *measurement; geometry and spatial sense;* and *algebra and functions*). Nonpublic-school students were about as variable across jurisdictions as they were for the fourth grade. There were somewhat greater differences between the types of schools, however, as great as .10 for *algebra and functions*.

Table 9-14

Block-Level Descriptive Statistics for Overall Public and Nonpublic-School Sessions

Grade 4 (As defined after scaling)

Statistic	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size													
Public	24960	24892	24894	24859	24908	25005	24912	24935	25057	24879	24929	24829	25006
Nonpublic	3101	3092	3041	3042	3067	3029	3071	3052	3032	3042	3075	3081	3062
Weighted average item score													
Public	0.49	0.44	0.45	0.43	0.37	0.59	0.45	0.40	0.49	0.46	0.52	0.44	0.43
Nonpublic	0.55	0.48	0.51	0.47	0.43	0.63	0.52	0.45	0.54	0.52	0.57	0.49	0.49
Weighted average r-polyserial													
Public	0.61	0.52	0.66	0.66	0.67	0.55	0.63	0.83	0.59	0.67	0.65	0.66	0.67
Nonpublic	0.59	0.51	0.64	0.65	0.64	0.54	0.61	0.80	0.57	0.63	0.63	0.63	0.64
Weighted proportion of students attempting last item													
Public	0.84	0.94	0.89	0.85	0.85	0.84	0.98	0.88	0.91	0.85	0.96	0.69	0.90
Nonpublic	0.88	0.93	0.90	0.87	0.87	0.86	0.99	0.92	0.92	0.88	0.96	0.69	0.90

221

2^0

Table 9-15

Block-Level Descriptive Statistics for Overall Public and Nonpublic-School Sessions
Grade 8 (As defined after scaling)

Statistic	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Unweighted sample size													
Public	22765	22657	22646	22698	22744	22733	22729	22689	22664	22736	22720	22710	22614
Nonpublic	2354	2334	2393	2418	2400	2386	2400	2376	2397	2382	2357	2386	2351
Weighted average item score													
Public	0.50	0.58	0.53	0.60	0.55	0.51	0.35	0.57	0.63	0.34	0.50	0.42	0.45
Nonpublic	0.57	0.63	0.58	0.66	0.62	0.57	0.41	0.61	0.69	0.39	0.56	0.46	0.50
Weighted average r-polyserial													
Public	0.65	0.55	0.62	0.68	0.66	0.60	0.62	0.79	0.65	0.67	0.63	0.56	0.67
Nonpublic	0.62	0.53	0.61	0.65	0.61	0.57	0.58	0.76	0.61	0.63	0.61	0.56	0.65
Weighted proportion of students attempting last item													
Public	0.96	0.88	0.97	0.92	0.80	0.70	0.95	0.90	0.90	0.84	0.98	0.91	0.85
Nonpublic	0.98	0.88	0.97	0.95	0.82	0.66	0.97	0.90	0.91	0.83	0.99	0.92	0.85

Table 9-16
Distribution of Jurisdiction Mean Item Scores by Content Strand Across Jurisdictions
Public Schools, Grade 4 (As defined after scaling)

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Mean	0.468	0.493	0.404	0.431	0.375
Median	0.478	0.509	0.416	0.444	0.390
1st Quartile	0.445	0.465	0.375	0.400	0.349
3rd Quartile	0.499	0.525	0.432	0.470	0.408
Minimum	0.324	0.327	0.272	0.231	0.218
Maximum	0.530	0.570	0.489	0.539	0.444
Number of jurisdictions	47	47	47	47	47

Table 9-17
Distribution of Jurisdiction Mean Item Scores by Content Strand Across Jurisdictions
Nonpublic Schools, Grade 4 (As defined after scaling)

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Mean	0.542	0.569	0.456	0.519	0.441
Median	0.552	0.576	0.454	0.534	0.448
1st Quartile	0.526	0.540	0.431	0.477	0.405
3rd Quartile	0.570	0.604	0.482	0.554	0.481
Minimum	0.465	0.476	0.364	0.407	0.336
Maximum	0.619	0.678	0.582	0.596	0.513
Number of jurisdictions	36	36	36	36	36

Table 9-18
Distribution of Jurisdiction Mean Item Scores by Content Strand
Public Schools, Grade 8 (As defined after scaling)

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Mean	0.499	0.400	0.514	0.470	0.542
Median	0.499	0.398	0.515	0.480	0.543
1st Quartile	0.472	0.372	0.484	0.443	0.508
3rd Quartile	0.531	0.439	0.552	0.503	0.581
Minimum	0.359	0.250	0.346	0.334	0.389
Maximum	0.571	0.477	0.590	0.533	0.618
Number of jurisdictions	47	47	47	47	47

Table 9-19
Distribution of Jurisdiction Mean Item Scores by Content Strand
Nonpublic Schools, Grade 8 (As defined after scaling)

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Mean	0.586	0.473	0.592	0.544	0.640
Median	0.582	0.470	0.594	0.543	0.639
1st Quartile	0.564	0.437	0.560	0.517	0.607
3rd Quartile	0.609	0.500	0.621	0.566	0.669
Minimum	0.526	0.406	0.510	0.482	0.563
Maximum	0.656	0.569	0.670	0.612	0.728
Number of jurisdictions	33	33	33	33	33

9.3.2 Differential Item Functioning (DIF) Analyses

Before the state data were analyzed further, differential item functioning (DIF) analyses were carried out on the 1996 NAEP mathematics data from the national samples at grades 4, 8, and 12. The purpose of these analyses was to identify items that were differentially difficult for various subgroups and to reexamine such items with respect to their fairness and their appropriateness for inclusion in the scaling process. A separate DIF analysis was not conducted on the state data since the results of the national DIF analysis were assumed to hold for the state sample. The information in this section provides a brief description of the national DIF analysis, though a more thorough discussion and presentation of results based on the national assessment will appear in the forthcoming technical report for that assessment.

The DIF analyses of the dichotomous items were based on the Mantel-Haenszel chi-square procedure, as adapted by Holland and Thayer (1988). The procedure tests the statistical hypothesis that the odds of correctly answering an item are the same for two groups of examinees that have been matched on some measure of proficiency (usually referred to as the matching criterion). The DIF analyses of the polytomous items were based on the Mantel (1963) procedure and the Somes (1986) chi-square test. These procedures compare proportions of matched examinees from each group in each polytomous item response category. The groups being compared are often referred to as the focal group (usually a minority or other group of interest, such as Black examinees or female examinees) and the reference group (usually White examinees or male examinees).

For each dichotomous item in the assessment, an estimate of the Mantel-Haenszel common odds-ratio, expressed on the ETS delta scale for item difficulty was produced. The estimates indicate the difference between reference group and focal group item difficulties (measured in ETS delta scale units), and typically run between about +3 and -3. Positive values indicate items that are differentially easier for the focal group than the reference group after making an adjustment for the overall mean item score for the two groups. Similarly, negative values indicate items that are differentially harder for the focal group than the reference group. It is common practice at ETS to categorize each item into one of three categories (Petersen, 1988): "A" (items exhibiting no DIF), "B" (items exhibiting a weak indication of DIF), or "C" (items exhibiting a strong indication of DIF). Items in category A have Mantel-Haenszel common odds ratios on the delta scale that do not differ significantly from 0 at the alpha = .05 level or are less than 1.0 in absolute value. Category C items are those with Mantel-Haenszel values that are significantly greater than 1 and larger than 1.5 in absolute magnitude. Other items are categorized as B items. A plus sign (+) indicates that items are differentially easier for the focal group; a minus sign (-) indicates that items are differentially more difficult for the focal group.

The ETS/NAEP DIF procedure for polytomous items incorporates the Mantel-Haenszel ordinal procedure. Polytomous items are categorized as "AA," "BB," and "CC," generalizations of the dichotomous A, B, and C categories.

For each block of items at each grade a single set of analyses was carried out based on equal-sized random samples of data from all participating jurisdiction. Each set of analyses involved four reference group/focal group comparisons: male/female, White/Asian American, White/Black, and White/Hispanic. The first subgroup in each comparison is the reference group; the second subgroup is the focal group.

Following standard practice at ETS for DIF analyses conducted on final test forms, all C and CC items were reviewed by a committee of trained test developers and subject-matter specialists. Such committees are charged with making judgments about whether or not the differential difficulty of an item is *unfairly* related to group membership. As pointed out by Zieky (1993):

> It is important to realize that *DIF* is not a synonym for *bias*. The item response theory based methods, as well as the Mantel-Haenszel and standardization methods of DIF detection, will identify questions that are not measuring the same dimension(s) as the bulk of the items in the matching criterion....Therefore, judgement is required to determine whether or not the difference in difficulty shown by a DIF index is *unfairly* related to group membership. The judgement of fairness is based on whether or not the difference in difficulty is believed to be related to the construct being measured....The fairness of an item depends directly on the purpose for which a test is being used. For example, a science item that is differentially difficult for women may be judged to be fair in a test designed for certification of science teachers because the item measures a topic that every entry-level

science teacher should know. However, that same item, with the same DIF value, may be judged to be unfair in a test of general knowledge designed for all entry-level teachers. (p. 340)

The committee assembled to review NAEP items that were identified as C or CC items. The committee included both ETS staff and outside members with expertise in the field. It was the committee's judgment that none of the C nor CC items for the national data were functioning differentially due to factors irrelevant to test objectives. Hence, none of the items were removed from scaling due to differential item functioning.

9.4 ITEM RESPONSE THEORY (IRT) SCALING

Items at each grade were sorted into five distinct sets, one for each of the five mathematics content strands. Table 9-20 describes the mean item scores for the items comprising each of the five fourth-grade content strands. In contrast to previous item mean tables, this table describes the item means based on data aggregated across jurisdictions, for each item, rather than item means averaged over items for each jurisdiction. Table 9-21 contains corresponding results for the eighth-grade item sets. The averages are based on the entire sample of students in the State Assessment and use the final reporting weight. The mean values indicate that the fourth-grade students found the set of *algebra and functions* items to be the most difficult. The eighth-grade students found the set of *measurement* items to be the most difficult. Students at both grades found the set of items from the *number sense, properties, and operations* scale to be the easiest.

Separate IRT-based scales corresponding to each of the item sets defined above were developed using the scaling models described in Chapter 8. For each grade, five scales were produced by separately calibrating the sets of items classified in each of the five content strands. Since there were two grades and each had five scales, a total of 10 distinct calibrations were carried out.

For the reasons discussed in Mazzeo (1991), for each scale at each grade, parameters for each item were estimated for the entire data set and used for all jurisdictions. Item parameter estimation was carried out using a 25 percent random sample of the public-school students participating in the 1996 State Assessment at each grade and included equal numbers of students from each participating jurisdiction, half from monitored sessions and half from unmonitored sessions. For the fourth-grade calibrations, the sample consisted of 27,067 students, with 602 students being sampled from each of the 42 jurisdictions (excluding DDESS and DoDDS schools) included in the scaling.[4] For the eighth-grade calibrations, the sample consisted of 24,681 students, with 548 students being sampled from the 42 jurisdictions. As was done for 1992, all calibrations were carried out using the rescaled sampling weights described earlier in an effort to ensure that each jurisdiction's data contributed equally to the determination of the item parameter estimates.

The sample used for item calibration was also constrained to contain an equal number of students from the monitored and unmonitored sessions from each of the participating jurisdictions. To the extent that items may have functioned differently in monitored and unmonitored sessions, the single set of item parameters obtained define a set of item characteristic curves "averaged over" the two types of sessions. Tables 9-7 and 9-8 (shown earlier) presented block-level item statistics that suggested little, if any, differences in item functioning by session type. The item calibration was only carried out with the public-

[4]Students from DDESS and DoDDS schools were not included in the 25% subsample for scaling.

school students sampled from each jurisdiction. In order to gauge whether items functioned differentially between public and nonpublic sessions, a DIF analysis was done with public-school students defined as the reference group and nonpublic-school students defined as the focal group. The procedure was the same as that for testing DIF for minority and gender groups in the national sample (as was described in Section 9.3 above). Not a single item was identified as showing significant DIF in this analysis (i.e., there were no C nor CC items). As a result, it was concluded that items do not function differentially for public- and nonpublic-school students so item parameters based on the public-school sample were used to set the scales.

Table 9-20

Distribution Across Items of Item Mean Scores Averaged Across All Students in the State Assessment Grade 4 (As defined after scaling)

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Mean:	0.494	0.489	0.447	0.480	0.431
Median:	0.477	0.422	0.372	0.502	0.416
1st Quartile:	0.339	0.332	0.289	0.336	0.305
3rd Quartile:	0.624	0.652	0.605	0.597	0.605
Minimum:	0.128	0.060	0.066	0.229	0.157
Maximum:	0.869	0.886	0.918	0.706	0.666
Number of items:	59	25	25	17	18

Table 9-21

Distribution Across Items of Item Mean Scores Averaged Across All Students in the State Assessment Grade 8 (As defined after scaling)

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Mean:	0.554	0.462	0.552	0.496	0.538
Median:	0.593	0.441	0.506	0.543	0.530
1st Quartile:	0.371	0.226	0.365	0.214	0.411
3rd Quartile:	0.717	0.666	0.731	0.662	0.657
Minimum:	0.107	0.076	0.195	0.125	0.242
Maximum:	0.915	0.881	0.919	0.900	0.947
Number of items:	47	27	31	25	34

9.4.1 Item Parameter Estimation

For each grade and each content strand, item parameter estimates were obtained by the NAEP BILOG/PARSCALE program, which combines Mislevy and Bock's (1982) BILOG and Muraki and Bock's (1991) PARSCALE computer programs. The program uses marginal estimation procedures to estimate the parameters of the one-, two-, and three-parameter logistic models, and the generalized partial credit model described by Muraki (1992) (see Chapter 8).

All multiple-choice items were dichotomously scored (scored 0,1) and were scaled using the three-parameter logistic model. Omitted responses to multiple-choice items were treated as fractionally correct, with the fraction being set to the reciprocal of the number of response options for an item. All constructed-response items with two categories were dichotomously scored and were scaled using the two-parameter logistic model with the lower asymptote parameter set at 0. Omitted responses to these items were treated as incorrect.

A key assumption associated with IRT scales is that of conditional independence. Conditional on proficiency, examinee's item responses are assumed to be independent. When sets of items are logically dependent on each other, or are based on a single stimulus, this assumption can be violated to a degree that results in aberrant scaling results. In order to avoid possible problems with inter-item dependencies, several cluster items (one at grade 4 and three at grade 8) were created by combining examinee responses to sets of related items into a single score for each set. The cluster items, rather than their original constituent items, were used in scaling the 1996 mathematics assessment. In all cases, examinee cluster item scores were defined as the number of correct responses given to each cluster item's constituent items. Examinees omitting all constituents of the cluster item were placed in the "zero correct" category of the cluster item. Examinees classified as "not reaching" all constituent parts were treated as having not been presented the cluster item. All cluster items were scaled using the generalized partial credit model.

There was a total of 56 multiple-category constructed-response items at grades 4 and 8 (29 at grade 4 and 27 at grade 8). Each of these items was also scaled using the generalized partial credit model. These items had two, three, or four categories of partial credit. Five scoring levels were defined:

0	Wrong, off-task, or omitted
1	Minimal response
2	Partially correct
3	Satisfactory response
4	Elaborated response

Bayes modal estimates of all item parameters were obtained from the BILOG/PARSCALE program. Prior distributions were imposed on item parameters with the following starting values: thresholds (normal [0,2]); slopes (log-normal [0,.5]); and asymptotes (two-parameter beta with parameter values determined as functions of the number of response options for an item and a weight factor of 50). The locations (but not the dispersions) were updated at each program estimation cycle in accordance with provisional estimates of the item parameters.

As was done for the 1992 State Assessment, item parameter estimation proceeded in two phases. First, the subject ability distribution was assumed fixed (normal [0,1]) and a stable solution was obtained. The parameter estimates from this solution were then used as starting values for a subsequent set of runs in which the subject ability distribution was freed and estimated concurrently with item parameter estimates. After each estimation cycle, the subject ability distribution was restandardized to have a mean of zero and standard deviation of one. Correspondingly, parameter estimates for that cycle were also linearly restandardized.

During and subsequent to item parameter estimation, evaluations of the fit of the IRT models were carried out for each of the items in the grade 4 and grade 8 item pools. These evaluations were conducted to determine the final composition of the item pool making up the scales by identifying misfitting items that should not be included. Evaluations of model fit were based primarily on graphical analyses. For dichotomously-scored multiple-choice and 2-category response items, model fit was evaluated by examining plots of estimates of the expected conditional (on θ) probability of a correct response that do not assume a two-parameter or three-parameter logistic model versus the probability predicted by the estimated item characteristic curve (see Mislevy & Sheehan, 1987, p. 302). For the cluster items and multiple-category constructed-response items, similar plots were produced for each item category characteristic curve.

As with most procedures that involve evaluating plots of data versus model predictions, a certain degree of subjectivity is involved in determining the degree of fit necessary to justify use of the model. There are a number of reasons why evaluation of model fit relied primarily on analyses of plots rather than seemingly more objective procedures based on goodness-of-fit indices such as the "pseudo chi-squares" produced in BILOG (Mislevy & Bock, 1982). First, the exact sampling distributions of these indic 's when the model fits are not well understood, even for fairly long tests. Mislevy and Stocking (1987) point out that the usefulness of these indices appears particularly limited in situations like NAEP where examinees have been administered relatively short tests. A study by Stone, Mislevy, and Mazzeo (1994) using simulated data suggests that the correct reference chi-square distributions for these indices have considerably fewer degrees of freedom than the value indicated by the BILOG/PARSCALE program and require additional adjustments of scale. However, it is not yet clear how to estimate the correct number of degrees of freedom and necessary scale factor adjustment factors. Consequently, pseudo chi-square goodness-of-fit indices are used only as rough guides in interpreting the severity of model departures.

Second, as discussed in Chapter 8, it is almost certainly the case that, for most items, item-response models hold only to a certain degree of approximation. Given the large samples sizes used in NAEP and the State Assessment, there will be sets of items for which one is almost certain to reject the hypothesis that the model fits the data (since the likelihood of rejecting the null increases with sample size) even though departures are minimal in nature or involve kinds of misfit unlikely to impact on important model-based inferences about student achievement. In practice, it is always wise to temper statistical decisions with judgments about the severity of model misfit and the potential impact of such misfit on final results.

In making decisions about excluding items from the final scales, a balance was sought between being too stringent, hence deleting too many items and possibly damaging the content representativeness of the pool of scaled items, and too lenient, hence including items with model fit poor enough to invalidate the types of inferences made from NAEP results. Items that clearly did not fit the model were not included in the final scales; however, a certain degree of misfit was tolerated for a number of items included in the final scales.

For the large majority of the grade 4 and grade 8 items, the fit of the model was extremely good. Figure 9-1 provides a typical example of what the plots look like for a dichotomously-scored item in this class of items. The plot that is shown is for an item from the grade 8 scale. In the plot, the y-axis indicates the probability of a correct response and the x-axis indicates scale score level (θ). The curve comprised of circles shows estimates of the conditional (on θ) probability of a correct response that do not assume a logistic form (referred to subsequently as nonlogistic-based estimates). The sizes of the circles are proportional to the estimated density of the theta distribution at the indicated value. The solid curve shows the estimated theoretical item response function. The item response function provides estimates of the conditional probability of a correct response based on an assumed logistic form. The vertical dashed line indicates the estimated location parameter (b) for the item and the horizontal dashed line indicates the estimated lower asymptote (c). Also shown in the plot are the actual values of the item parameter estimates (lower right-hand corner). As is evident from the plot, the 'empirical' or non-logistic-based item trace is in extremely close agreement with the model-based item response function logistic.

Figure 9-2 provides an example of a plot for a 4-category extended constructed-response item exhibiting good model fit. Like the plots for the dichotomously-scored multiple-choice items, this plot shows two estimates of each item category characteristic curve, one set that does not assume the partial credit model (the 'empirical' trace shown as circles) and one that does (the theoretical trace shown as solid curves). The dashed horizontal lines show the location of the estimated category thresholds for the item (d_1 to d_4; see Chapter 8). The estimates for all parameters for the item in question are also indicated on the plot. As with Figure 9-1, the two sets of estimates agree quite well, although there is a slight tendency for the nonlogistic-based estimates for category two to be somewhat higher than the model-based estimates for theta values less than 1. An aspect of Figure 9-2 worth noting is the large proportion of examinees that responded in the two lowest response categories for this item.[5] Such results were typical for the extended constructed-response items at both grades. Substantial proportions of examinees were either unable or unwilling to provide even minimally adequate answers to such items.

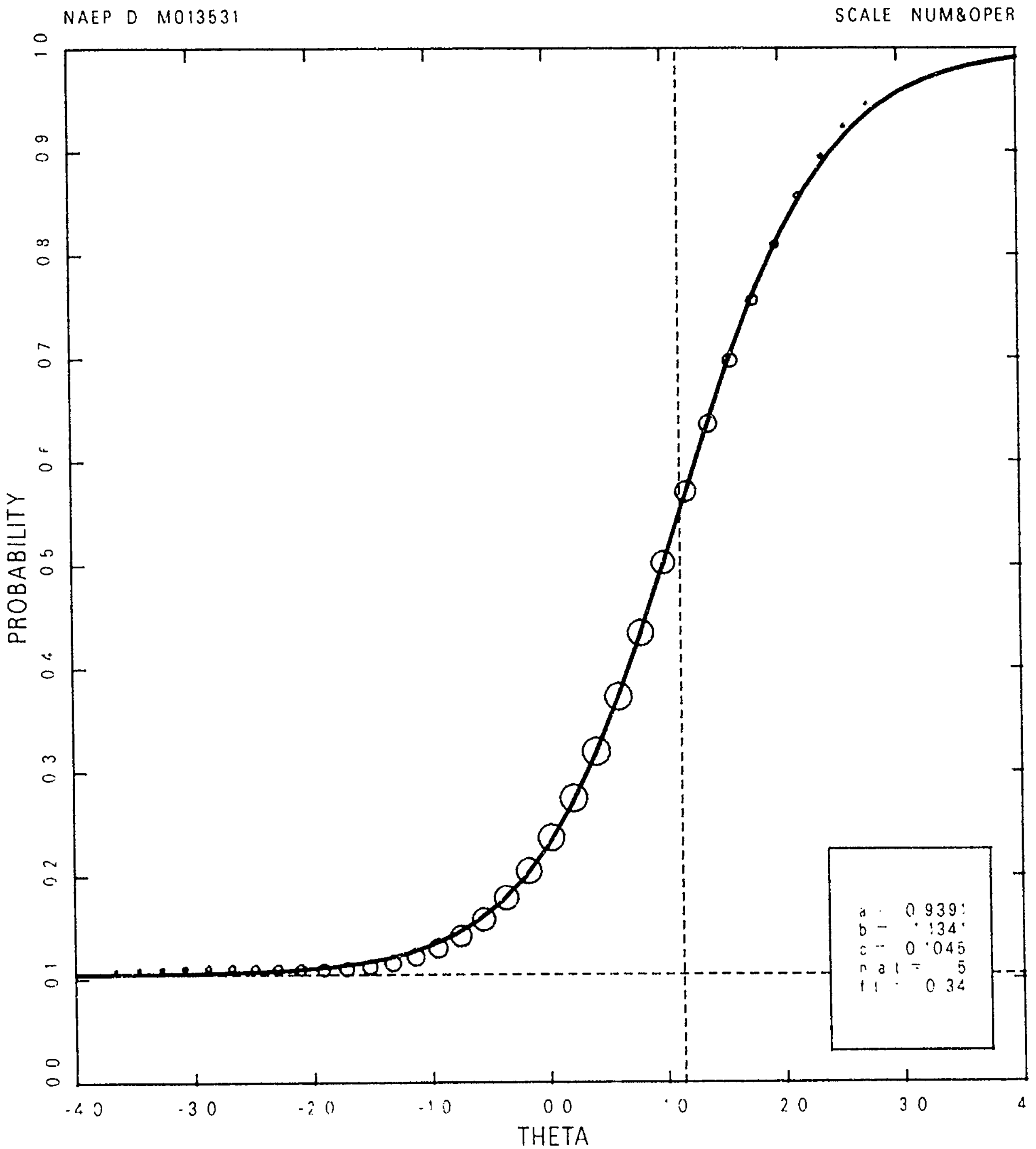
As discussed above, some of the items retained for the final scales display some degree of model misfit. Figures 9-3 (dichotomously-scored multiple-choice items) and 9-4 (extended constructed-response item) provide typical examples of such items. In general, good agreement between empirical and theoretical item traces were found for the regions of the theta scale that includes most of the examinees. Misfit was confined to conditional probabilities associated with theta values in the tails of the subject ability distributions.

Only one of the administered items (M073401 in Block M14, a polytomous item measuring *number sense, properties, and operations*) was not included in the final scales. The plot from the national scaling for this item is given in Figure 9-5. This item was never included in the state analysis. As is evident from the nonlogistic-based estimates in the plots, the item appears to have a nonlogistic item characteristic curve. Students with higher levels of proficiency exhibit lower chances of success than do students with lower proficiency. Logistic-based estimates of conditional probabilities are, by definition, monotonically increasing. Hence, the model does not fit.

[5]This is evidenced by the relatively large size of the circles indicating estimated conditional probabilities for these two categories.

Figure 9-1

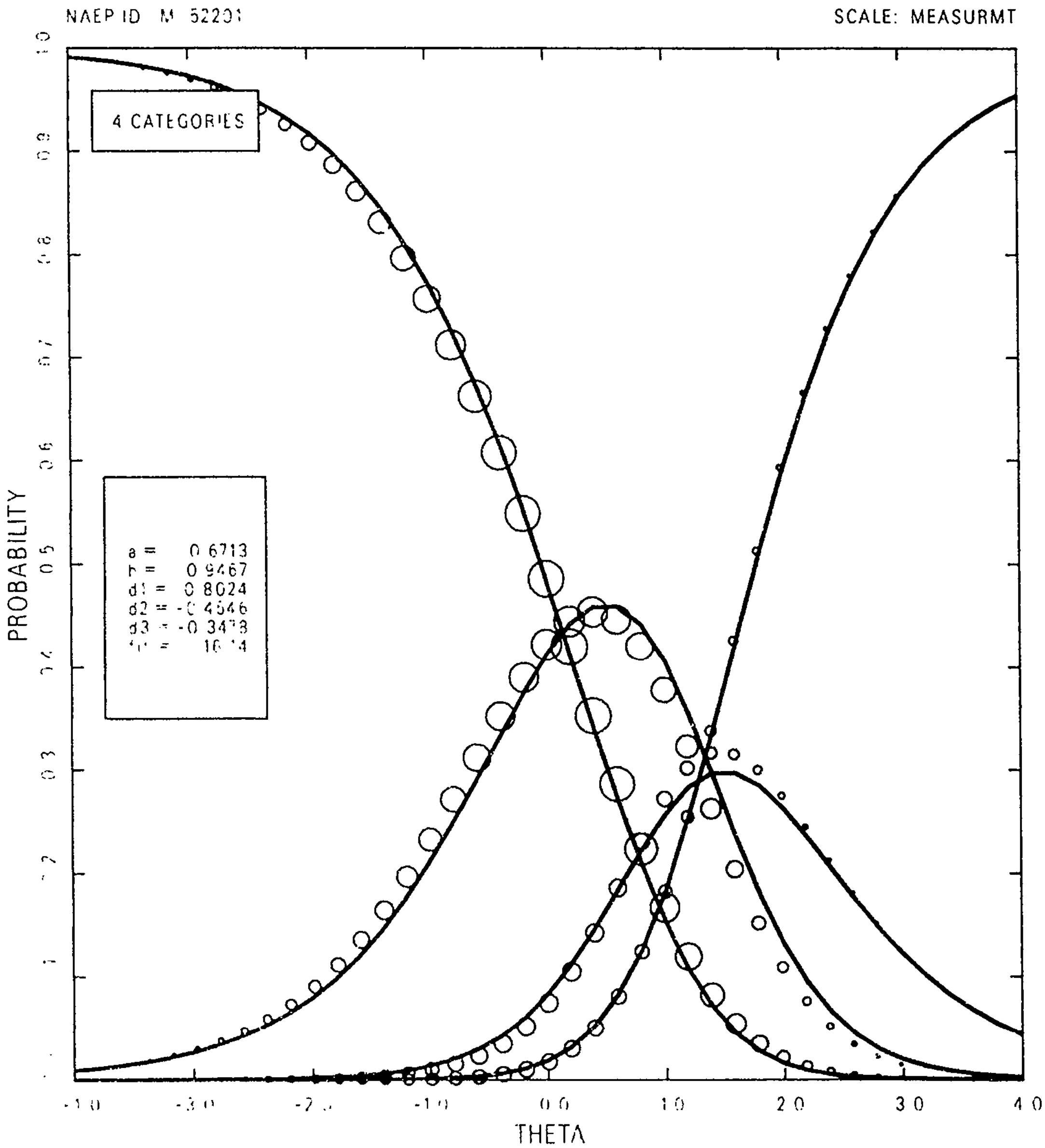
Plot Comparing Empirical and Model-Based Estimates of Item Response Functions for a Dichotomously-Scored Multiple-Choice Item Exhibiting Good Model Fit*



*Circles indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 9-2

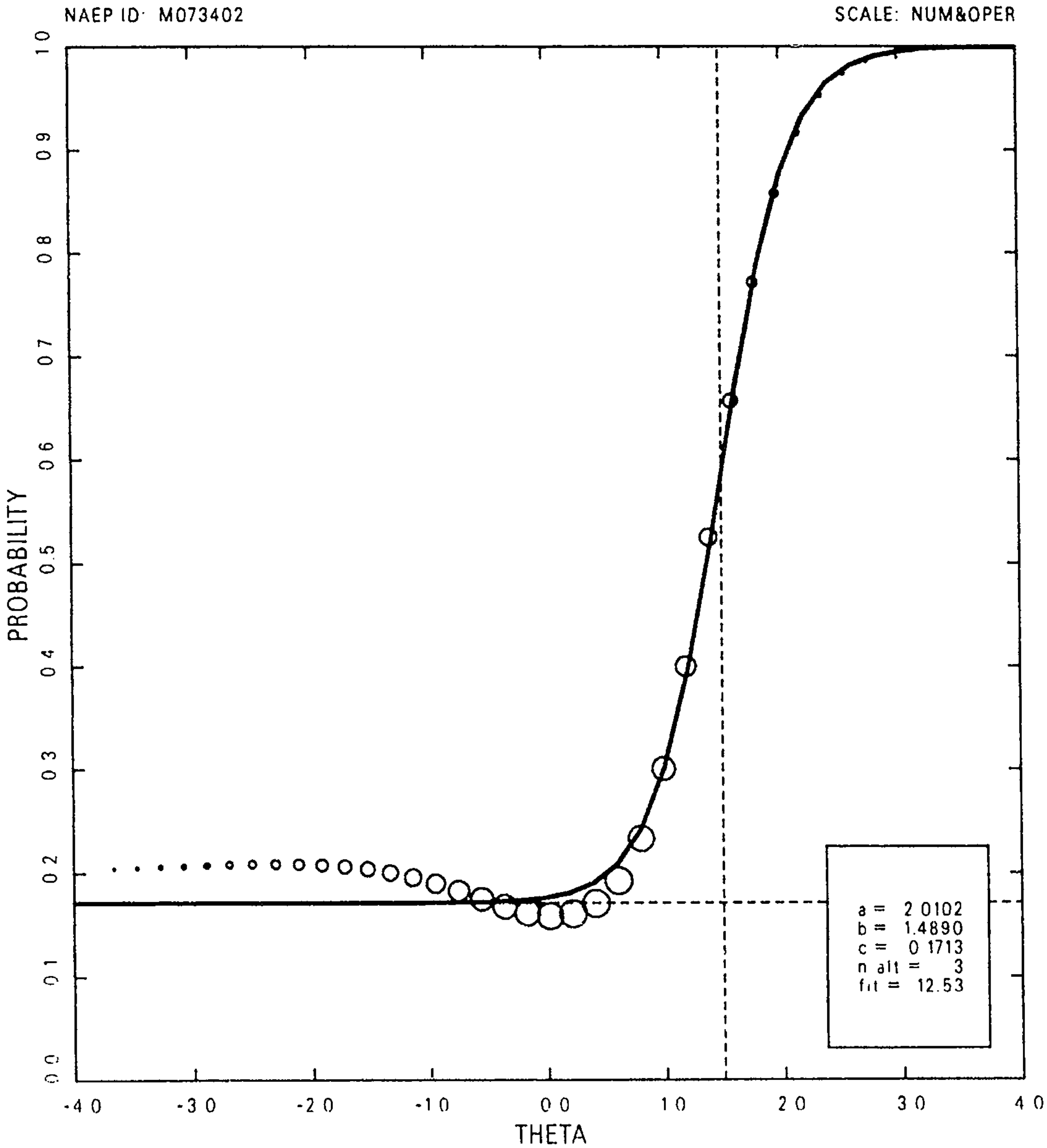
Plot Comparing Empirical and Model-Based Estimates of Item Category Characteristic Curves for a Polytomously Scored Item Exhibiting Good Model Fit*



* Circles indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curve indicates estimated item response function assuming a model-based form. The number of categories in this figure includes the zero category contrary to usage in the text of this report.

Figure 9-3

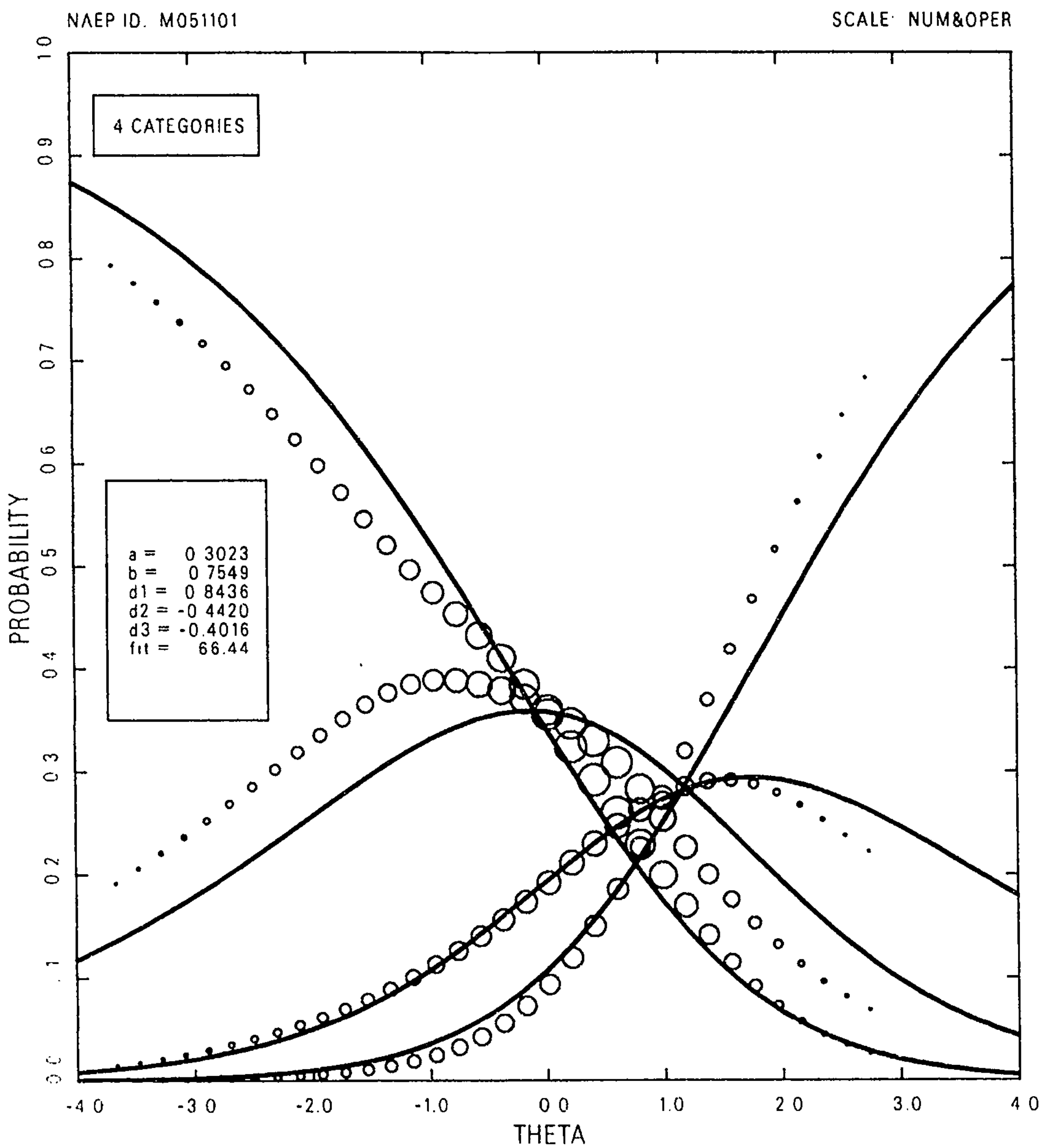
Plot Comparing Empirical and Model-Based Estimates of Item Response Functions for a Dichotomously-Scored Multiple-Choice Item Exhibiting Some Model Misfit*



* Circles indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 9-4

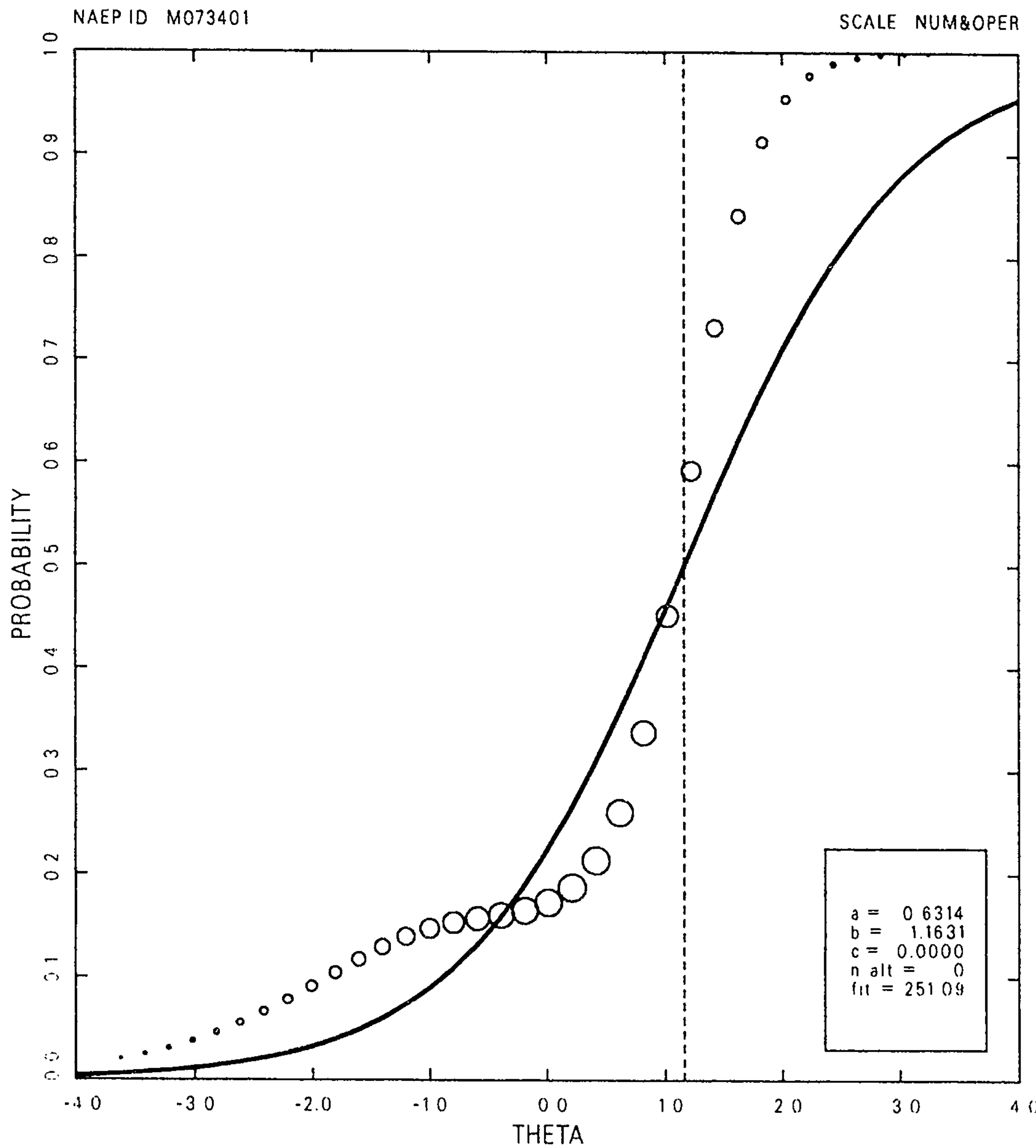
Plot Comparing Empirical and Model-Based Estimates of Item Category Characteristic Curves for a Polytomously Scored Item Exhibiting Some Model Misfit*



* Circles indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curve indicates estimated item response function assuming a model-based form. The number of categories in this figure includes the zero category contrary to usage in the text of this report.

Figure 9-5

Plot Comparing Empirical and Model-Based Estimates of Item Response Functions for Items Dropped from Scaling Due to Model Misfit*



* Circles indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Table 9-22 lists the items that received special treatment during the scaling process. Included in the table are the block locations and item numbers for the items that were combined into cluster items as well as for those that were excluded from the final scales. These items received identical special treatment in the development of the 1996 national scales. No other items in either assessment received special treatment. The IRT parameters for the items included in the State Assessment are listed in Appendix D.

9.5 ESTIMATION OF STATE AND SUBGROUP PROFICIENCY DISTRIBUTIONS

The proficiency distributions in each jurisdiction (and for important subgroups within each jurisdiction) were estimated by using the multivariate plausible values methodology and the corresponding CGROUP computer program (described in Chapter 8; also see Mislevy, 1991). The CGROUP program (Sheehan, 1985; Rogers, 1991), which was originally based on the procedures described by Mislevy and Sheehan (1987), was used in the 1990 and 1992 Trial State Assessments of mathematics. The 1996 State Assessment used an enhanced version of CGROUP, based on modifications described by Thomas (1993), to estimate the proficiency distribution for both the fourth and the eighth grades in each jurisdiction. As described in Chapter 8, the CGROUP program estimates scale score distributions using information from student item responses, measures of student background variables, and the item parameter estimates obtained from the BILOG/PARSCALE program.

The enhancements included in the 1992 version of CGROUP included the replacement of Monte Carlo integration by analytic calculations, new methods for computing student-level posterior means and variances, and the generation of values from student-level posterior distributions for the imputation of student-level scale score values. Simulation studies indicate that the enhanced CGROUP produces more accurate estimates of scale (i.e. content strand) variances and correlations (Thomas, 1993) than did the previous versions of CGROUP.

For the reasons discussed in Mazzeo (1991), separate conditioning models were estimated at each grade for each jurisdiction. This resulted in the estimation of 47 distinct conditioning models for each grade. At each grade, the student background variables included in each jurisdiction's model (denoted y in Chapter 8) were principal component scores derived from the within-state correlation matrix of selected main-effects and two-way interactions associated with a wide range of student, teacher, school, and location variables. The main-effect and interaction variables are listed in Appendix C. A set of five multivariate plausible values was drawn for each student who participated in the State Assessment.

As was the case in 1992, reporting each jurisdiction's results required analyses describing the relationships between scale scores and a large number of background variables. The background variables included student demographic characteristics (e.g., the race/ethnicity of the student, highest level of education attained by parents), students' perceptions about mathematics, student behavior both in and out of school (e.g., amount of TV watched daily, amount of mathematics homework done each day), the type of mathematics class being taken (e.g., algebra or general fourth- or eighth-grade mathematics), the amount of classroom emphasis on various topics included in the assessment provided by the students' teachers, and a variety of other aspects of the students' background and preparation, the background and preparation of their teachers, and the educational, social, and financial environment of the schools they attended.

Table 9-22
Items from the 1996 State Assessment in Mathematics Receiving Special Treatment

NAEP ID	Grade	Block	Number in Block	Content Strand[1]	Treatment
M068001	4	M7	5	1	Collapse: (0,1,2) becomes (0,0,1)
M010531		M8	6	1	1992 & 1996 responses split into items M010531Y and M010531Z
M074701		M15	6	1	Collapse: (0,1,2) becomes (0,0,1)
M040801		M9	6	2	1992 & 1996 responses split into items M040801Y & M040801Z
M041001		M9	8	2	1992 & 1996 responses split into items M041001Y & M041001Z
M068003		M7	7	3	Collapse: (0,1,2) becomes (0,0,1)
M041201		M9	10	3	1992 & 1996 responses split into items M041201Y & M041201Z Both items collapse: (0,1,2,3,4) becomes (0,1,2,3,3.)
M072701		M14	10	5	Collapse: (0,1,2,3,4) becomes (0,1,2,3,3)
M073401	8	M14	7	1	Drop
M051101		M3	13	1	1992 & 1996 responses split into items M051101Y & M051101Z Both items collapse: (0,1,2,3,4) becomes (0,1,2,3,3,)
M069601		M12	5	1	Collapse: (0,1,2) becomes (0,1,1)
M073601		M14	9	1	Collapse: (0,1,2,3,4) becomes (0,1,2,3,3)
M018201		M4	9	1	1992 & 1996 responses split into items M018201Y & M018201Z
M013531		M8	16	1	1992 & 1996 responses split into items M013531Y & M013531Z
M051201		M13	1	1	1992 & 1996 responses split into items M051201Y & M051201Z
M052201		M13	11	2	Collapse: (0,1,2,3,4) becomes (0,1,2,3,3)
M076001		M15	9	2	Collapse: (0,1,2,3,4) becomes (0,1,2,3,3)
M051001		M3	12	3	1992 & 1996 responses split into items M051001Y & M051001Z
M068201		M7	10	3	Collapse: (0,1,2,3,4) becomes (0,0,1,1,1)
M050261		M3	4	4	Collapse: (0,1,2,3,4) becomes (0,0,0,1,2)
M018901		M4	16	4	1992 & 1996 responses split into items M018901Y & M018901Z
M067501		M5	11	4	Collapse: (0,1,2,3,4) becomes (0,1,2,2,2)
M053101		M9	9	4	Collapse: (0,1,2,3,4) becomes (0,1,2,2,3)
M070001		M12	9	4	Collapse: (0,1,2,3) becomes (0,1,2,2)
M0732CL		M14	5	4	Collapse: (0,1,2,3,4) becomes (0,0,1,2,3)
M073501		M14	8	4	Collapse: (0,1,2) becomes (0,1,1)
M066301		M5	4	5	Collapse: (0,1,2) becomes (0,1,1)
M069301		M12	2	5	Collapse: (0,1,2) becomes (0,1,1)
M0757CL		M15	6	5	Collapse: (0,1,2,3) becomes (0,0,1,2)

[1]Content strands. 1 = *number sense, properties, and operations*, 2 = *measurement*, 3 = *geometry and spatial sense*; 4 = *data analysis, statistics, and probability*, and 5 = *algebra and functions*

As described in the previous chapter, to avoid biases in reporting results and to minimize biases in secondary analyses, it is desirable to incorporate measures of a large number of independent variables in the conditioning model. When expressed in terms of contrast-coded main effects and interactions, the number of variables to be included totaled 870 at grade 4 and 1,028 at grade 8. As stated earlier, Appendix C provides a listing of the full set of contrasts defined at each grade. These contrasts were the common starting point in the development of the conditioning models for each of the participating jurisdictions.

Because of the large number of these contrasts and the fact that, within each jurisdiction, some contrasts had zero variance, some involved relatively small numbers of individuals, and some were highly correlated with other contrasts or sets of contrasts, an effort was made to reduce the dimensionality of the predictor variables in each jurisdiction's CGROUP model. As was done for the 1992 Trial State Assessment, the original background variable contrasts were standardized and transformed into a set of linearly independent variables by extracting separate sets of principal components (one set for each grade for each of the 47 jurisdictions) from the within-state correlation matrices of the original contrast variables. The principal components, rather than the original variables, were used as the independent variables in the conditioning model. As was done for the 1992 Trial State Assessment, the number of principal components included for each jurisdiction was the number required to account for approximately 90 percent of the variance in the original contrast variables. Research based on data from the 1990 Trial State Assessment suggests that results obtained using such a subset of the components will differ only slightly from those obtained using the full set (Mazzeo, Johnson, Bowker, & Fong, 1992).

Tables 9-23 (for grade 4) and 9-24 (for grade 8) contain a listing of the number of principal components included in and the proportion of scale score variance accounted for by the conditioning model for each of the 47 participating jurisdictions. It is important to note that the proportion of variance accounted for by the conditioning model differs across scales within a jurisdiction, across grades within a jurisdiction, and across jurisdictions within a scale as summarized in Tables 9-23 and 9-24. Such variability is not unexpected for at least two reasons. First, there is no reason to expect the strength of the relationship between proficiency and demographics to be identical across all grades and jurisdictions. In fact, one of the reasons for fitting separate conditioning models is that the strength and nature of this relationship may differ across jurisdictions. Second, the homogeneity of the demographic profile also differs across jurisdictions. As with any correlational analysis, the restriction of the range in the predictor variables will attenuate the relationship.

Tables 9-25 (for grade 4) and 9-26 (for grade 8) provide matrices of estimated within-state correlations among the five scales averaged over the 47 jurisdictions. In parentheses underneath each average correlation are listed the lowest and highest estimated correlation among the 47 jurisdictions. The listed values, taken directly from the revised CGROUP program, are estimates of the within-state correlations *conditional on the set of principal components included in the conditioning model.*

The number and nature of the scales that were produced were consistent with the recommendations for reporting that were given by the National Assessment Planning Project (see Chapter 2). Reporting results on multiple scales is typically most informative when each of the scales provides unique information about the profile of knowledge and skills possessed by the students being assessed. In such cases, one would hope to see relatively low correlations among the scales. However, with a couple of exceptions, the correlations among the 1996 mathematics scales are high across all jurisdictions, almost always exceeding .7 and quite often exceeding .9. This is particularly noteworthy when one considers that these are correlations *conditional* on a rather large set of background variables. The *marginal* correlations between scales would be higher, particularly for those correlations in the .7 to

.8 range. In particular, the correlations among three of the scales — *number sense, properties, and operations*; *data analysis, statistics, and probability*; and *algebra and functions* — are extremely high (rarely falling below .9) at both grades. At the fourth grade, and to a somewhat lesser extent at the eighth grade, the estimated correlations between *geometry and spatial sense* and the remaining scales are noticeably lower than the correlations among the remaining scales and rarely exceed .9.

Table 9-23

Proportion of Scale Score Variance Accounted for by Grade 4 Conditioning Models

Jurisdiction	Number of Principal Components	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Alabama	240	0.71	0.76	0.62	0.76	0.75
Alaska	212	0.72	0.80	0.74	0.83	0.83
Arizona	243	0.71	0.76	0.66	0.79	0.77
Arkansas	208	0.73	0.76	0.64	0.81	0.77
California	227	0.74	0.75	0.66	0.81	0.76
Colorado	253	0.66	0.75	0.59	0.78	0.73
Connecticut	267	0.72	0.77	0.69	0.80	0.80
Delaware	239	0.79	0.84	0.78	0.87	0.87
District Of Columbia	215	0.82	0.87	0.79	0.88	0.87
DoDEA/ DDESS	170	0.76	0.90	0.83	0.88	0.88
DoDEA/ DoDDS	237	0.72	0.84	0.77	0.84	0.83
Florida	271	0.69	0.76	0.63	0.75	0.71
Georgia	265	0.69	0.76	0.68	0.80	0.74
Guam	175	0.81	0.86	0.82	0.87	0.88
Hawaii	262	0.75	0.81	0.71	0.84	0.85
Indiana	217	0.65	0.69	0.60	0.74	0.69
Iowa	199	0.63	0.70	0.63	0.71	0.70
Kentucky	227	0.65	0.71	0.61	0.75	0.69
Louisiana	257	0.69	0.73	0.67	0.74	0.69
Maine	219	0.69	0.75	0.63	0.80	0.75
Maryland	227	0.74	0.76	0.68	0.79	0.77
Massachusetts	235	0.66	0.75	0.59	0.72	0.71
Michigan	229	0.69	0.73	0.63	0.78	0.73
Minnesota	245	0.66	0.74	0.59	0.73	0.70
Mississippi	255	0.71	0.74	0.66	0.79	0.78
Missouri	252	0.69	0.75	0.61	0.75	0.72
Montana	202	0.72	0.76	0.67	0.79	0.75
Nebraska	225	0.72	0.77	0.65	0.79	0.76
Nevada	239	0.69	0.74	0.66	0.78	0.75
New Jersey	227	0.77	0.78	0.69	0.84	0.81
New Mexico	240	0.71	0.75	0.64	0.77	0.73
New York	252	0.73	0.78	0.68	0.78	0.72

Table 9-23

Proportion of Scale Score Variance Accounted for by Grade 4 Conditioning Models

Jurisdiction	Number of Principal Components	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
North Carolina	246	0.71	0.72	0.63	0.77	0.73
North Dakota	194	0.73	0.83	0.65	0.81	0.82
Oregon	223	0.67	0.75	0.64	0.76	0.74
Pennsylvania	229	0.65	0.73	0.57	0.77	0.69
Rhode Island	236	0.76	0.84	0.74	0.84	0.82
South Carolina	253	0.69	0.73	0.65	0.77	0.80
Tennessee	247	0.70	0.74	0.65	0.81	0.73
Texas	243	0.69	0.73	0.68	0.77	0.76
Utah	231	0.69	0.71	0.65	0.75	0.69
Vermont	212	0.74	0.79	0.67	0.79	0.80
Virginia	261	0.71	0.79	0.67	0.79	0.75
Washington	250	0.65	0.70	0.59	0.70	0.69
West Virginia	208	0.64	0.76	0.62	0.75	0.72
Wisconsin	229	0.65	0.68	0.54	0.76	0.68
Wyoming	213	0.73	0.81	0.71	0.82	0.84

Table 9-24

Proportion of Scale Score Variance Accounted for by Grade 8 Conditioning Models

Jurisdiction	Number of Principal Components	Numbers, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Alabama	270	0.78	0.84	0.78	0.82	0.81
Alaska	204	0.83	0.86	0.79	0.88	0.85
Arizona	271	0.75	0.78	0.73	0.80	0.78
Arkansas	245	0.79	0.82	0.75	0.82	0.81
California	302	0.75	0.82	0.75	0.78	0.78
Colorado	290	0.73	0.80	0.71	0.79	0.76
Connecticut	295	0.77	0.82	0.75	0.78	0.80
Delaware	235	0.80	0.85	0.82	0.83	0.82
District Of Columbia	205	0.86	0.89	0.88	0.89	0.87
DoDEA/ DDESS	152	0.93	0.96	0.97	0.95	0.95
DoDEA/ DoDDS	223	0.81	0.87	0.81	0.89	0.86
Florida	300	0.74	0.81	0.71	0.82	0.76
Georgia	304	0.80	0.81	0.76	0.80	0.79

Table 9-24

Proportion of Scale Score Variance Accounted for by Grade 8 Conditioning Models

Jurisdiction	Number of Principal Components	Numbers, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
Guam	182	0.87	0.93	0.91	0.93	0.90
Hawaii	250	0.81	0.84	0.82	0.82	0.82
Indiana	264	0.76	0.83	0.73	0.82	0.79
Iowa	251	0.71	0.75	0.69	0.79	0.75
Kentucky	272	0.72	0.75	0.66	0.77	0.74
Louisiana	294	0.72	0.79	0.73	0.78	0.76
Maine	248	0.76	0.81	0.77	0.83	0.82
Maryland	281	0.80	0.82	0.80	0.84	0.82
Massachusetts	287	0.73	0.82	0.70	0.77	0.76
Michigan	283	0.75	0.80	0.72	0.76	0.76
Minnesota	287	0.74	0.77	0.73	0.80	0.79
Mississippi	278	0.73	0.78	0.71	0.80	0.78
Missouri	278	0.73	0.79	0.71	0.77	0.78
Montana	223	0.79	0.81	0.77	0.86	0.79
Nebraska	277	0.78	0.81	0.73	0.83	0.78
Nevada	194	0.81	0.87	0.84	0.86	0.86
New Jersey	231	0.76	0.80	0.76	0.83	0.81
New Hampshire	265	0.81	0.83	0.73	0.80	0.79
New Mexico	272	0.77	0.80	0.74	0.83	0.80
New York	277	0.76	0.79	0.72	0.80	0.78
North Carolina	293	0.74	0.72	0.72	0.78	0.76
North Dakota	228	0.81	0.83	0.68	0.84	0.81
Oregon	273	0.77	0.77	0.76	0.80	0.81
Rhode Island	251	0.78	0.82	0.79	0.84	0.83
South Carolina	280	0.77	0.81	0.74	0.83	0.79
Tennessee	260	0.76	0.79	0.72	0.78	0.78
Texas	292	0.78	0.82	0.75	0.81	0.79
Utah	304	0.70	0.77	0.68	0.77	0.75
Vermont	236	0.85	0.87	0.83	0.89	0.84
Virginia	305	0.78	0.81	0.74	0.81	0.81
Washington	304	0.77	0.83	0.71	0.78	0.79
West Virginia	275	0.76	0.80	0.71	0.81	0.79
Wisconsin	282	0.77	0.79	0.72	0.78	0.81
Wyoming	250	0.82	0.85	0.77	0.84	0.83

Table 9-25

Average Correlations and Ranges of Scale Correlations Among the Mathematics Scales for 47 Jurisdictions, Grade 4

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability
Measurement	.95 (.83 to .97)			
Geometry and Spatial Sense	.76 (.66 to .83)	.81 (.71 to .90)		
Data Analysis, Statistics, and Probability	.96 (.87 to .98)	.93 (.83 to .97)	.79 (.67 to .88)	
Algebra and Functions	.96 (.90 to .98)	.94 (.82 to .97)	.78 (.68 to .89)	.94 (.85 to .98)

Table 9-26

Average Correlations and Ranges of Scale Correlations Among the Mathematics Scales for 47 Jurisdictions, Grade 8

	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability
Measurement	.96 (.90 to .99)			
Geometry and Spatial Sense	.88 (.76 to .97)	.93 (.87 to .96)		
Data Analysis, Statistics, and Probability	.97 (.94 to .98)	.96 (.90 to .98)	.89 (.79 to .95)	
Algebra and Functions	.97 (.94 to .98)	.97 (.93 to .98)	.91 (.81 to .96)	.97 (.94 to .98)

As discussed in Chapter 8, NAEP scales are viewed as summaries of consistencies and regularities that are present in item-level data. Such summaries should agree with other reasonable summaries of the item-level data. In order to evaluate the reasonableness of the scale score results, a variety of analyses were conducted to compare using scale scores and the average item scores for each content strand. High agreement was found in all of these analyses. One set of such analyses is presented in Figures 9-6 and 9-7. The figures contain scatterplots of the state public-school item score mean versus the state public-school scale score means, for each of the five mathematics content strands. As is evident from the figures, there is an extremely strong relationship between the estimates of state-level performance in the scale-score and item-score metrics for all five content strands.

Figure 9-6

Plot of Mean Item Score Versus Mean Scale Score for Each Jurisdiction, Grade 4

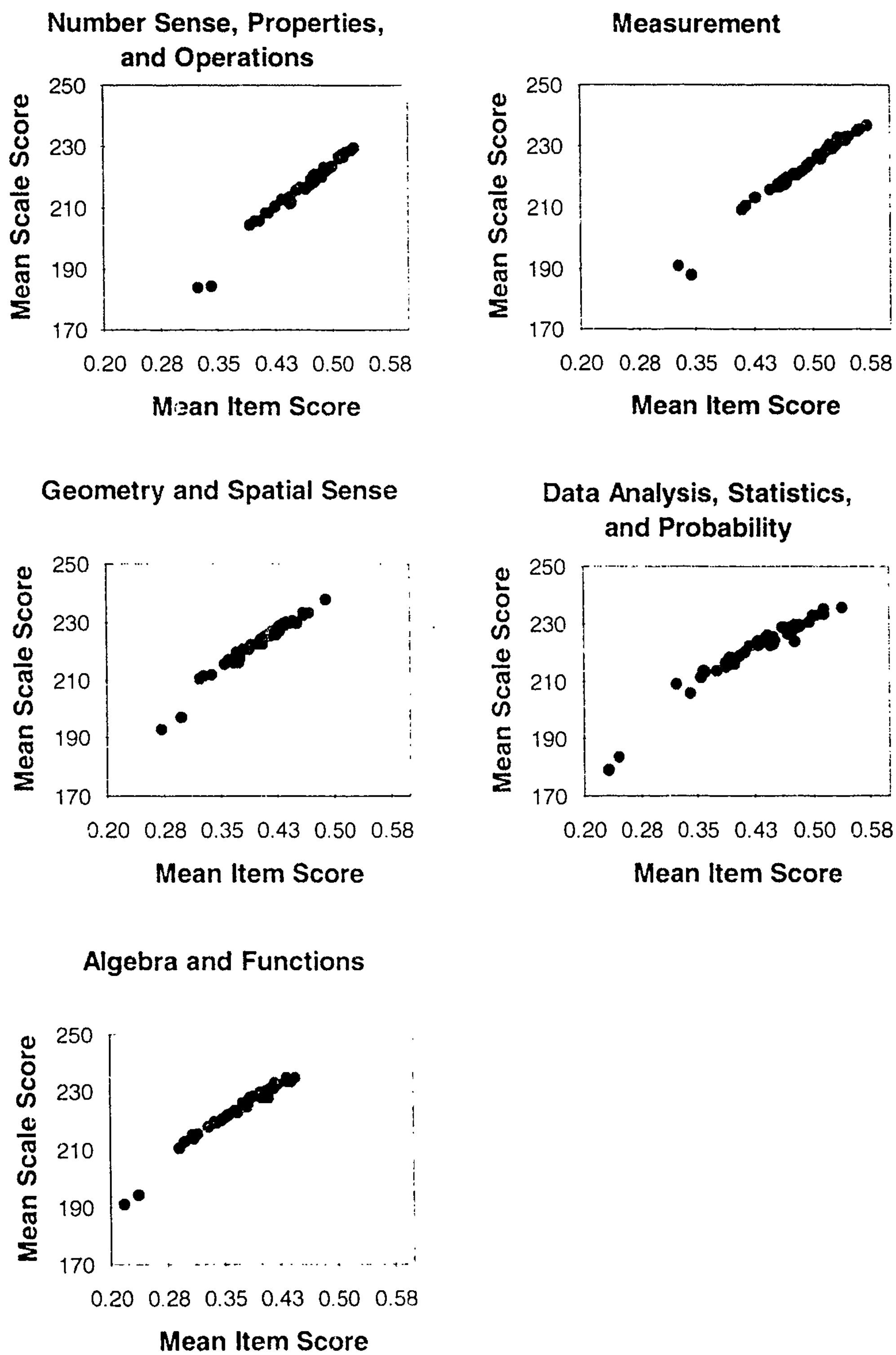
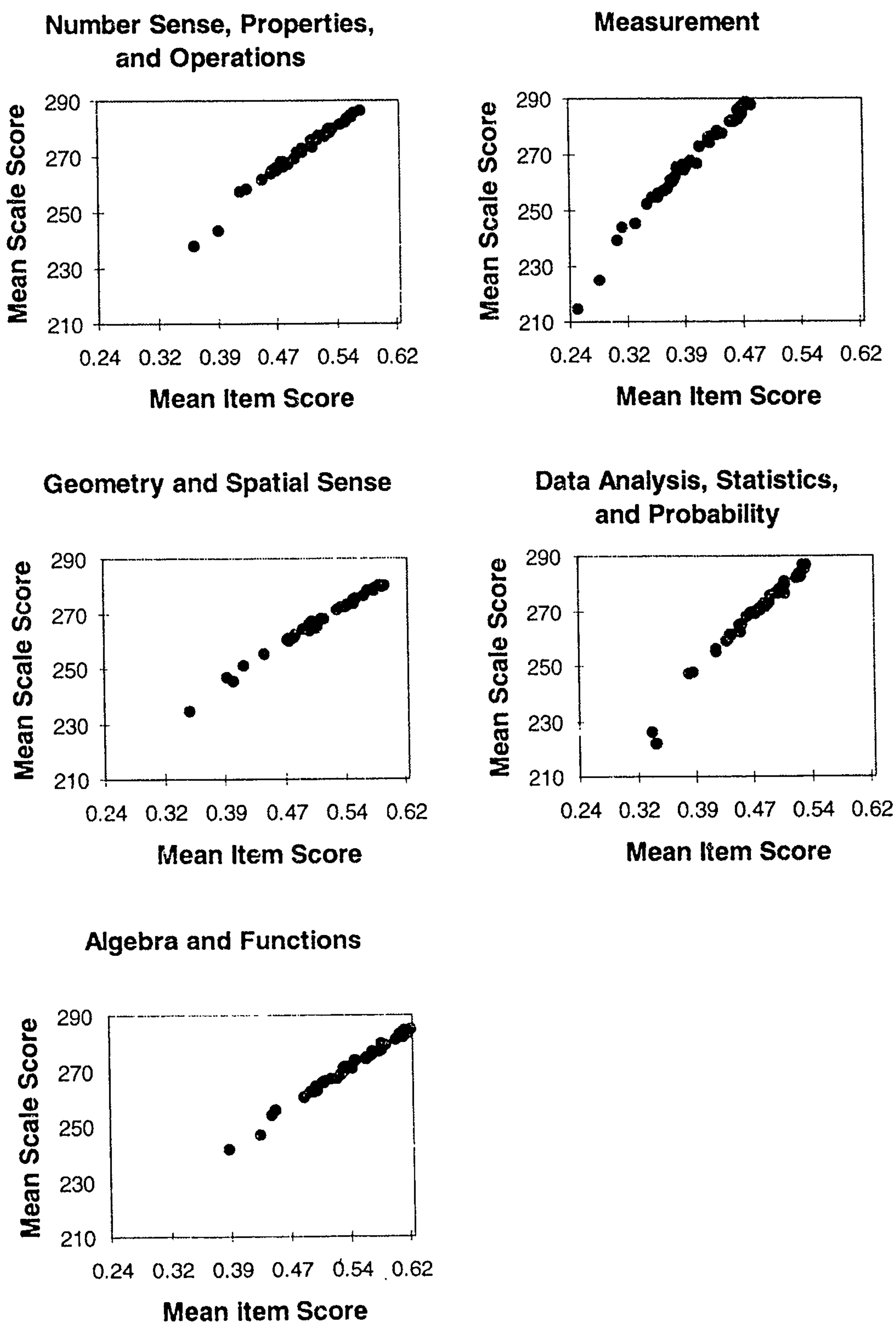


Figure 9-7

Plot of Mean Item Score Versus Mean Scale Score for Each Jurisdiction, Grade 8



9.6 LINKING STATE AND NATIONAL SCALES

A major purpose of the State Assessment program was to allow each participating jurisdiction to compare its 1996 results at each grade level with the nation as a whole and with the region of the country in which that jurisdiction is located. Because 1996 was the third round of the State Assessments, an additional goal was to provide an opportunity to compare 1996 results to those obtained in 1990 and 1992 for those jurisdictions participating in previous assessments.

Although the fourth and eighth graders in the 1996 State Assessment were administered the same test booklets as the fourth and eighth graders in the national assessment, separate state and national scalings were carried out (for reasons explained in Mazzeo, 1991, and Yamamoto & Mazzeo, 1992). Again, to ensure a similar scale unit system for the state and national metrics, the scales had to be linked. Plans for the scaling of the 1996 national assessment included procedures linking the 1996 scales to their 1990 and 1992 counterparts. These procedures were described in the technical report of the 1992 national assessment. Since the 1990 and 1992 Trial State Assessment scales had already been linked to the 1990 and 1992 national scales, respectively, linking the 1996 State Assessment scales to their 1996 national counterparts indirectly linked the 1996 State Assessment scales to the 1990 and 1992 Trial State Assessment scales.

For meaningful comparisons to be made between each of the State Assessment jurisdictions and the relevant national samples, results from these two assessments had to be expressed in terms of a similar system of scale units. In addition, to allow for valid comparisons between grades, the systems of scale units for the fourth- and eighth-grade scales needed to be aligned and properly calibrated. Furthermore, the scales needed to be comparable to those used in 1990 and 1992 to allow for meaningful assessment of changes in proficiency levels for jurisdictions participating in both assessments.

The fourth- and eighth-grade item pools did share a set of common items. However, as described in the previous section, separate scales were produced for the fourth and eighth grades in independent BILOG/PARSCALE calibrations. The units and origin of these scales were set by standardizing the within-grade scale score distributions for their respective calibration samples to have a mean of zero and standard deviation of one. These arbitrary, standard scales do not allow for comparisons across grades. Thus, without further adjustment, the corresponding grade 4 and grade 8 scales were not expressed in similar systems of units. Some form of scale linking was required.

The purpose of this section is to describe the procedures used to align the 1996 State Assessment scales with their 1996 national counterparts. The procedures that were used represent an extension of the common population equating procedures employed to link the 1990 national and state scales (Mazzeo, 1991; Yamamoto & Mazzeo, 1992).

Using the house sampling weights provided by Westat (see Section 9.8), the combined sample of students from all participating jurisdictions was used to estimate the distribution of scale scores for the population of students enrolled in public schools that participated in the State Assessment.[6] Separate estimates were obtained for grades 4 and 8, with total sample sizes of 108,269 and 98,724, respectively. Data from a subsample of the national assessment at grades 4 and 8, each consisting of grade-eligible public-school students from any of the 47 jurisdictions that participated in the 1996 State Assessment, were used to obtain estimates of the distribution of scale scores for the same target population. Special

[6] Students from Guam, DDESS, and DoDDS schools were excluded from both the State Aggregate and National Linking samples for purposes of linking at grades 4 and 8

weights for this linking subsample were used. This subsample of national data is referred to as the National Linking sample (NL).[7] Again, appropriate weights provided by Westat were used. This was done separately for grades 4 and 8.

Thus, for each of the 10 scales (five for each grade), two sets of scale score distributions were obtained and used in the linking process. One set, based on the sample of combined data from the State Assessment (referred to as the State Aggregate, or SA, sample) and using item parameter estimates and conditioning results from that assessment, was in the metric of the 1996 State Assessment. The other, based on the sample from the 1996 national assessment (NL) and obtained using item parameters and conditioning results from the national assessment, was in the reporting metric of the 1996 national assessment. The latter metric had already been linked to the 1990 national reporting metric using the procedures described in the forthcoming technical report of the 1996 national assessment. The 10 State Assessment and national scales were made comparable by constraining the mean and standard deviation of the two sets of estimates to be equal.

More specifically, the following steps were followed to linearly link the scales of the two assessments:

1) For each scale at each grade, estimates of the scale score distribution for the SA sample was obtained using the full set of plausible values generated by the CGROUP program. The weights used were the final sampling weights provided by Westat (see Section 9.8), not the rescaled versions discussed in Section 9.3. For each grade and each scale, the arithmetic mean of the five sets of plausible values was taken as the overall estimated mean and the arithmetic average of the standard deviations of the five sets of plausible values was taken as the overall estimated standard deviation.

2) For each scale at each grade, the estimated scale score distribution of the NL sample was obtained, again using the full set of plausible values generated by the CGROUP program. The weights used were specially provided by Westat to allow for the estimation of scale score distributions for the same target population of students estimated by the jurisdiction data. The means and standard deviations of the distributions (in the 1996 national reporting metric) for each scale at each grade were obtained for this sample in the same manner as described in Step 1.

3) For each scale at each grade, a set of linear transformation coefficients was obtained to link the state scale to the corresponding national scale. The linking was of the form

$$Y^* = k_1 + k_2 Y$$

[7]Note that in 1990 and 1992, the National Linking sample was called the State Aggregate Comparison, or SAC, sample. Many people thought this was easy to confuse with state data, so the term 'National Linking' or 'NL' will be used in this report.

One of the purposes of the State Assessment was to allow each participating jurisdiction to compare its results with the nation as a whole, and with the region of the country in which that jurisdiction is located. To permit such comparisons, nationally representative samples of students were tested as part of the national assessment using the same assessment booklets as were students participating in the State Assessment. The national data to which the State Assessment results were compared came from a nationally representative sample of students in the fourth- and eighth-grade. This sample was a part of the full 1996 national mathematics assessment in which nationally representative samples of students in public and nonpublic schools from three age cohorts were assessed: students who were in the fourth grade, eighth grade, or twelfth grade. In order to allow for valid state/nation comparisons, the national comparison sample of grade-level students was created from the full national assessment sample and is included with the State Assessment data files.

where

$Y =$ a scale score level in terms of the system of units of the provisional BILOG/PARSCALE scale of the State Assessment scaling

$Y^* =$ a scale score level in terms of the system of units comparable to those used for reporting the 1996 national mathematics results

$k_2 =$ [Standard-Deviation$_{NL}$]/[Standard-Deviation$_{SA}$]

$k_1 =$ Mean$_{NL}$ - k_2[Mean$_{SA}$]

where the subscripts refer to the NL sample and to the SA sample.

The final conversion parameters for transforming plausible values from the provisional BILOG/PARSCALE scales to the final State Assessment reporting scales are given in Table 9-27. All State Assessment results are reported in terms of the Y^* metric.

It is important to re-emphasize two features of the linking procedures just described. First, the 1996 national scales had already been linked to their 1990 and 1992 counterparts. Hence, the linking just described places the 1996 state scales on a metric comparable to that used for the 1990 and 1992 national scales. Since the 1990 and 1992 state metric was also made comparable to those same national scales, the 1990, 1992 and 1996 state results are in comparable metrics. Second, the 1990 national scales for each content strand were across-grade scales, spanning grades 4, 8, and 12. Each had been produced by concurrently scaling the items from all three grade levels in a single BILOG calibration (see Yamamoto & Jenkins, 1992). For each content strand, the grade 4 and grade 8 1996 state scales have been linked to the same 1990 across-grade scale. Hence, the grade 4 and grade 8 State Assessment results are also on comparable scales.

Table 9-27

Transformation Constants for the Grade 4 and Grade 8 Scales

Scale	Grade 4 k_1	Grade 4 k_2	Grade 8 k_1	Grade 8 k_2
Number Sense, Properties, and Operations	218.69	33.26	273.01	35.02
Measurement	224.81	30.85	270.38	42.64
Geometry and Spatial Sense	224.31	27.81	268.64	30.88
Data Analysis, Statistics, and Probability	223.32	28.96	270.74	40.13
Algebra and Functions	225.18	27.99	273.19	33.51

As evident from the discussion above, a linear method was used to link the scales from the state and national assessments. While these linear methods ensure equality of means and standard deviations for the SA (after transformation) and the NL samples, they do not guarantee the shapes of the estimated scale score distributions for the two samples to be the same. As these two samples are both from a common target population, estimates of the scale score distribution of that target population based on each of the samples should be quite similar in shape in order to justify strong claims of comparability for the state and national scales. Substantial differences in the shapes of the two estimated distributions would result in differing estimates of the percentages of students above achievement levels or of percentile locations depending on whether State or national scales were used—a clearly unacceptable result given claims about the comparability of the scales. In the face of such results, nonlinear linking methods would be required.

Analyses were carried out (one set of analyses for grade 4 and one set for grade 8) to verify the degree to which the linear linking process described above produced comparable scales for State and national results. Comparisons were made between two estimated scale score distributions, one based on the SA sample and one based on the NL sample, for each of the five mathematics content strand scales. The comparisons were carried out using slightly modified versions of what Wainer (1974) refers to as suspended rootograms. The final re orting scales for the State and national assessments were each divided into 10-point intervals. Two sets of estimates of the percentage of students in each interval were obtained, one based on the SA sample and one based on the NL sample. Following Tukey (1971), the square roots of these estimated percentages were compared.[8]

The comparisons are shown in Figures 9-8 through 9-12. The heights of each of the unshaded bars correspond to the square root of the percentage of students from the SA sample in each 10-point interval on the final reporting scale. The shaded bars show the differences in root percents between the SA and NL estimates. Positive differences indicate intervals in which the estimated percentages from the NL sample are lower than those obtained from the SA. Conversely, negative differences indicate intervals in which the estimated percentages from the NL sample are higher. For all five scales at both

[8]The square root transformation allows for more effective comparisons for counts (or equivalently, percentages) when the expected number of counts in each interval is likely to vary greatly over the range of intervals, as is the case for the NAEP scales where the expected counts of individuals in intervals near the extremes of the scale (e.g., below 150 and above 350) are dramatically smaller than the counts obtained near the middle of the scale.

grades, differences in root percents are quite small, suggesting that the shapes of the two estimated distributions are quite similar (i.e., unimodal with slight negative skewness). There is some evidence that the estimates produced using the SA data are slightly heavier in the extreme lower tails (below 100 for the grade 4 scales and below 150 for the grade 8 scales). However, even these differences at the extremes are small in magnitude (.2 in the root percent metric, .04 in the percent metric) and have little impact on estimates of reported statistics such as percentages of students below the achievement levels.

9.7 PRODUCING A MATHEMATICS COMPOSITE SCALE

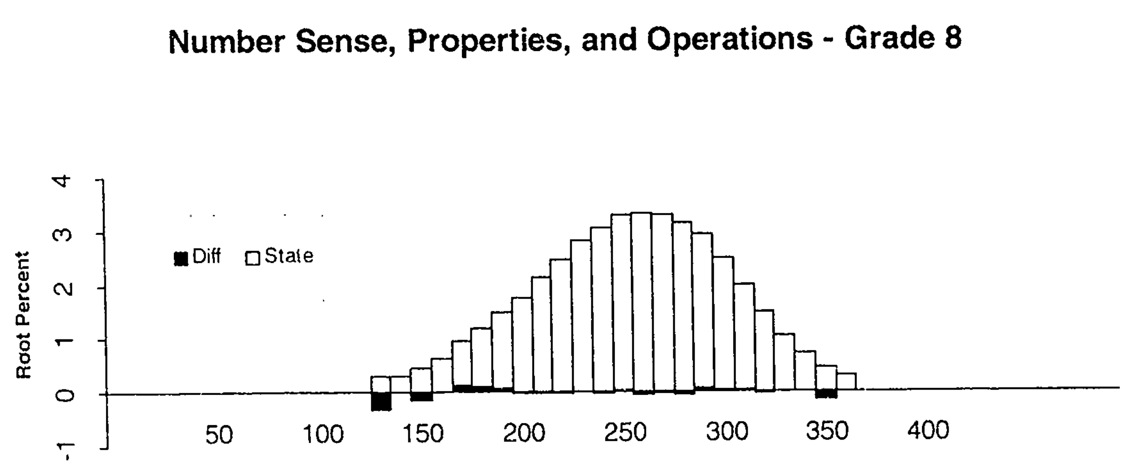
For the national assessment, composite scales were created for both fourth and eighth grade as overall measures of mathematics scale scores for students at that grade. The composite was a weighted average of plausible values on the five content strand scales (*number sense, properties, and operations*; *measurement; geometry and spatial sense; data analysis, probability, and statistics;* and *algebra and functions*). The weights for the national content strand scales were proportional to the relative importance assigned to each content strand for each grade in the assessment specifications developed by the Mathematics Objectives Panel. Consequently, the weights for each of the content strands are similar to the actual proportion of items from that content strand at each grade.

State Assessment composite scales were developed using weights identical to those used to produce the composites for the 1996 national mathematics assessment. The weights are given in Table 9-28. In developing the State Assessment composite for each grade, the weights were applied to the plausible values for each content strand scale as expressed in terms of the final State Assessment scales for each grade (i.e., after transformation from the provisional BILOG/PARSCALE scales.)

Figure 9-13 provides rootograms comparing the estimated proficiency distributions based on the SA and NL samples for the grade 4 and grade 8 composites. Consistent with the results presented separately by scale, there is some evidence that the estimates produced using the State Assessment data are slightly heavier in the extreme lower tails than the corresponding estimate based on the NL data. However, again these differences in root relative percents are small in magnitude.

Figure 9-8

Rootogram Comparing Scale Score Distributions for the State Assessment Aggregate Sample and the National Linking Sample for the Number Sense, Properties, and Operations Scale



Diff = National - State sample

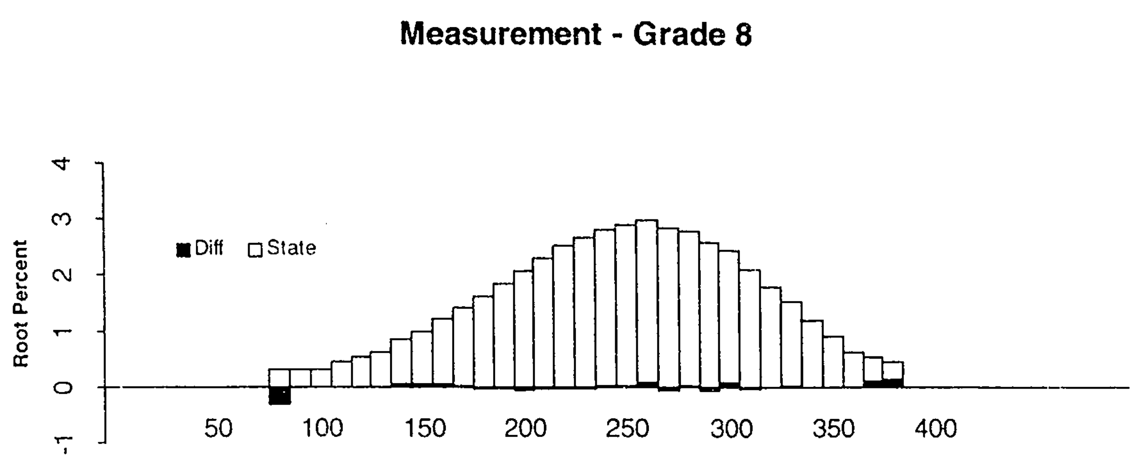
251

252

BEST COPY AVAILABLE

Figure 9-9

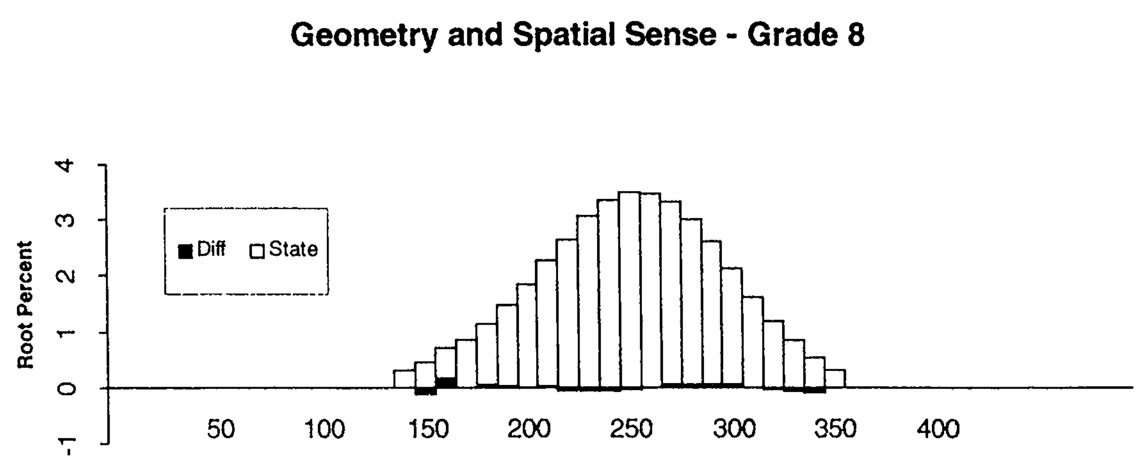
Rootogram Comparing Scale Score Distributions for the State Assessment Aggregate Sample and the National Linking Sample for the Measurement Scale



Diff - National - State sample

Figure 9-10

Rootogram Comparing Scale Score Distributions for the State Assessment Aggregate Sample and the National Linking Sample for the Geometry and Spatial Sense Scale



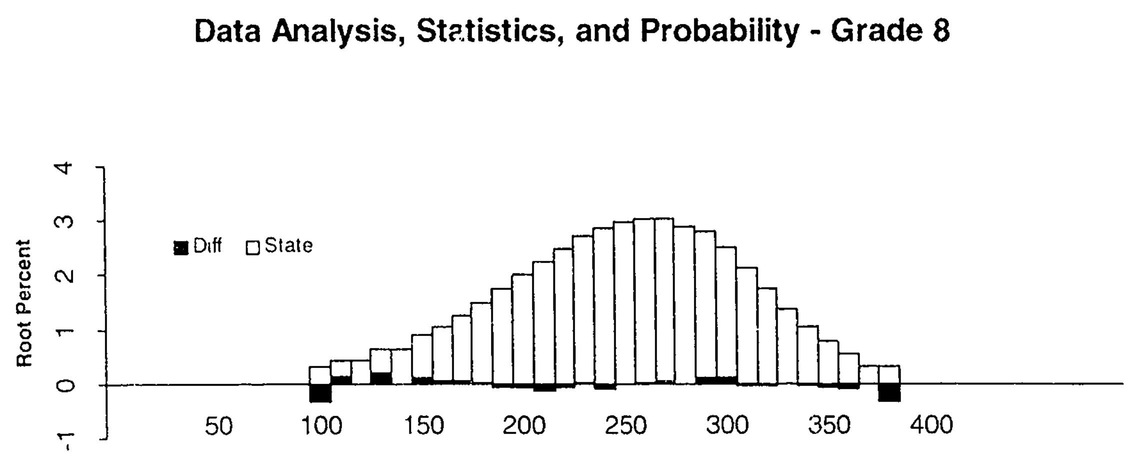
Diff = National - State sample

255

256

Figure 9-11

Rootogram Comparing Scale Score Distributions for the State Assessment Aggregate Sample and the National Linking Sample for the Data Analysis, Statistics, and Probability Scale



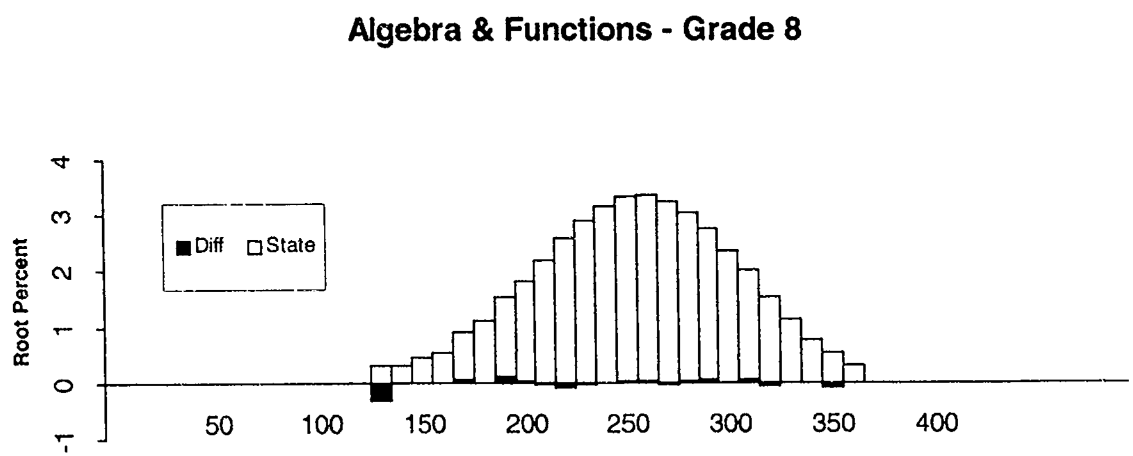
Diff = National - State sample

257

258

Figure 9-12

Rootogram Comparing Scale Score Distributions for the State Assessment Aggregate Sample and the National Linking Sample for the Algebra and Functions Scale



Diff = National - State sample

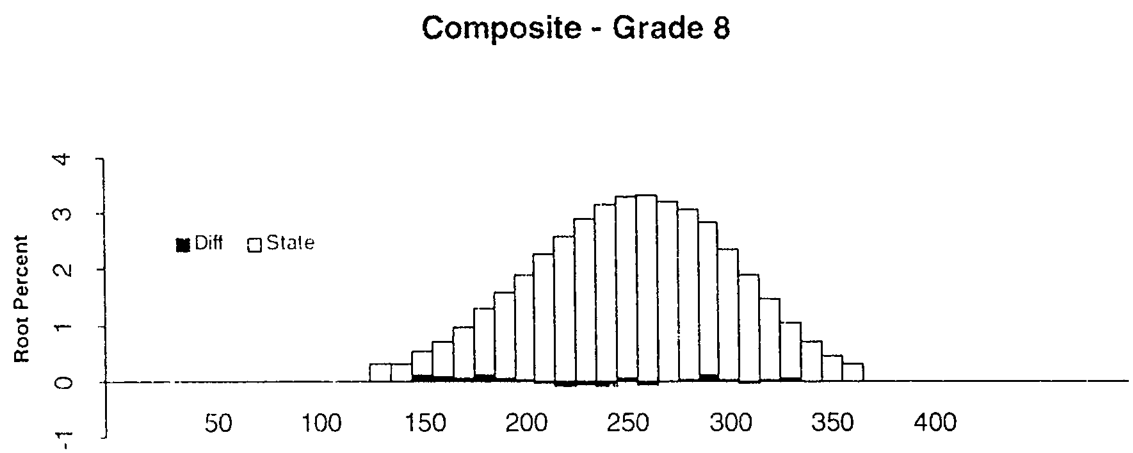
Table 9-28

Weights Used for Each Scale to Form Grade 4 and Grade 8 Composites

Scale	Grade 4	Grade 8
Number Sense, Properties, and Operations	.40	.25
Measurement	.20	.15
Geometry and Spatial Sense	.15	.20
Data Analysis, Statistics, and Probability	.10	.15
Algebra and Functions	.15	.25

Figure 9-13

Rootogram Comparing Scale Score Distributions for the State Assessment Aggregate Sample and the National Linking Sample for the Composite Scale



Diff = National - State sample

262 263

9.8 THE WEIGHT FILES

Westat produced the final student and school weights and the corresponding replicate weights for the 1996 State Assessment. Information for the creation of the weight files was supplied by NCS under the direction of ETS. Because the State Assessment sample was split into two subsamples, one using the 1992 inclusion rules (S1) and one using the 1996 inclusion rules (S2) the weighting process was more complex than in previous assessments. Westat provided a total of four files: a student and school file for each grade assessed in the 1996 State Assessment.

The student weight files contained one record for every student who was not classified as a SD or LEP; the weight files contained two records for every student who was classified as SD or LEP. Each record had a full set of weights, including replicate weights. The first set of weights for the SD and LEP students is to be used when estimating results for either S1 or S2 alone. The second set of weights provided for those students is to be used when estimating results for students from both S1 and S2 together. (See Chapters 3 and 7 for more information about the sampling and weighting procedures for the S1 and S2 samples.)

From the student weight files, ETS constructed three sets of student weights, called modular weights, reporting weights, and all-inclusive weights. The modular weights were used when examining S1 and S2 separately, or for comparing S1 to S2. The reporting weights, used for most reports, were used when reporting results for the students who were not classified as being SD or LEP in both S1 and S2 and the students classified as SD or LEP from S1 only. The reporting sample was formed so that valid comparisons with previous mathematics State Assessments could be made. (For science, only students classified as SD or LEP from S2 were included in the reporting sample.) The SD/LEP students were divided into two types, those who were assessed and those who could not be assessed (called excluded students). The all-inclusive weights were used for estimating results for both S1 and S2 together.

The reporting weights were formed from the student weight files by taking the records for students not classified as SD or LEP, the first record for students in S1 classified as SD or LEP, and a record containing a missing value code for the students in S2 classified as SD or LEP. In this way, the new inclusion rules used with the students classified as SD or LEP in S2 did not effect 1996 State Assessment of mathematics results. For the modular weights, all students not classified as SD or LEP had their final and replicate weights doubled, while the first record for each SD/LEP student was selected directly from the student weight files. It is important to note that the samples should be separated into the S1 and S2 subsamples when using weights generated in this way. To analyze data from S1 and S2 together, the all-inclusive weights should be used. They were created from the student weight files by taking the records for the students not classified as SD or LEP, and the second records for all students classified as SD or LEP.

Each set of weights (modular, reporting, house, senate, and all-inclusive weights) has replicate weights associated with it. Replicate weights are used to estimate jackknife standard errors for each statistic estimated for the State Assessments.

For the reporting sample, two other weights were created. These are called "house weights" and "senate weights." As the respective branches of Congress do, these weights represent jurisdictions in two different ways. The house weights weight the student records within a jurisdiction so that the sum of the weights for each jurisdiction is proportional to the fraction of the national in-grade enrollment in that jurisdiction. The senate weights weight the student records within a jurisdiction so that the sums of the weights for each jurisdiction are approximately equal to each other. In other words, a jurisdiction, like

California, with many eighth-grade students and a jurisdiction, like Rhode Island, with many fewer eighth-grade students would have equal weight when all of the State Assessment data are combined. Both of these sets of weights are constructed only for the reporting sample. The reporting sample and either the house or senate weights are used during scaling, conditioning and all major reporting.

The house weight is the student's reporting weight times a factor, which is the number of public school students sampled over the sum of the reporting weights of the public school students in all the jurisdictions. The senate weight is calculated for each jurisdiction separately. Within each jurisdiction a factor, which is 2,000 divided by the sum of the reporting weights of the jurisdiction's public school students, is computed. (For the 1996 State Assessment, 2,000 rather than the number of public or nonpublic school students within the jurisdiction that was used in previous State Assessments, was used because of the varying sample sizes for each jurisdiction.) The reporting weights for students in both public and nonpublic schools are multiplied by this factor to create the senate weights. For Guam and DoDEA jurisdictions, all schools were considered public in the calculation of these factors.

In addition to student weights, school weights are available for use in school level analyses. These weights are modular weights for use when examining S1 and S2 separately or for comparing S1 to S2. No other school weights are available. School level statistics should be calculated on the basis of S1 or S2 subsamples, as opposed to reporting samples. If school level statistics are calculated for the reporting sample, biases might occur.

Chapter 10

CONVENTIONS USED IN REPORTING THE RESULTS OF THE 1996 STATE ASSESSMENT PROGRAM IN MATHEMATICS[1]

Spencer S. Swinton, David S. Freund, and Clyde M. Reese
Educational Testing Service

10.1 OVERVIEW

Results for the 1996 State Assessment in mathematics were disseminated in several different reports: a *Mathematics State Report* for each jurisdiction, a brief report entitled the *NAEP 1996 Mathematics Report Card for the Nation and the States*, the *Cross-State Data Compendium for the NAEP 1996 Mathematics Assessment*, and, distributed only in electronic form, a six-section almanac of data for each jurisdiction.

The *Mathematics State Report* is a computer-generated report that provides, for each jurisdiction, mathematics results for its fourth-grade and eighth-grade students. Although national and regional results[2] are included for comparison purposes, the major focus of each of these computer-generated reports is on the results for a particular jurisdiction. Data about school and student participation rates are reported for each jurisdiction to provide information about the generalizability of the results. School participation rates are reported both in terms of the initially selected samples of schools and in terms of the finally achieved samples, including replacement schools. Several different student participation rates are reported, including the overall rate, the total percentage of students excluded from the assessment, and the exclusion rates for students who are identified as being of limited English proficiency (LEP) and for students with disabilities (SD). In addition to 1996 results, the state reports contain comparisons of 1992 fourth-grade results to the 1996 fourth-grade results for the jurisdictions that participated in both assessments, and of the 1990 and/or 1992 eighth-grade results to the 1996 eighth-grade results as applicable. Trend results are also provided for the nation and for the relevant region associated with each participating jurisdiction, for the same years as reported for that jurisdiction.

The *State Report* text and tables were produced by a computerized report generation system developed by ETS report writers, statisticians, data analysts, graphic designers, and editors. Detailed technical documentation about the NAEP computer-generated reporting system can be found in the technical documentation of *The NAEP Computer-Generated Reporting System for the 1994 Trial State Assessment* (Jerry, 1995). Additional information is provided in Sections 10.5.7 and 10.5.8. The reports contain state-level estimates of scale score means, proportions of students at or above achievement levels defined by the National Assessment

[1] Spencer S. Swinton played a role in making decisions about hypothesis testing methods and procedures and worked with David S. Freund who implemented many of the methods and procedures in computer programs. Spencer and David worked with Clyde M. Reese and others to make decisions about the rules used in generating state reports. John Mazzeo contributed significantly to previous versions of this chapter.

[2] The national and regional results included in the state reports and in the portions of the *Cross-State Data Compendium for the NAEP 1996 Mathematics Assessment* are based on data from the 1990, 1992, and 1996 national mathematics assessments and include fourth- and eighth grade students enrolled in public and nonpublic schools

Governing Board (NAGB) and selected percentiles for the state as a whole and for subgroups defined by six key reporting variables (referred to here as primary reporting variables)—gender, race/ethnicity, level of parents' education, Title 1 participation, eligibility for the free or reduced-cost school lunch component of the National School Lunch Program, and type of location. For jurisdictions that secured a sufficient level of participation (see Appendix B), means, achievement levels, and percentile results were also reported for students in nonpublic schools (Catholic schools, other religious schools, and other private schools), and for the total in-school population (public-school students, nonpublic-school students, students from the Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS) and Department of Defense Dependents Schools (DoDDS), and students attending Bureau of Indian Affairs (BIA) schools). In addition, for public-school students, scale score means were reported for a variety of other subpopulations defined by responses to items from the student, teacher, and school questionnaires and by school and location demographic variables provided by Westat.[3]

The second report, the *NAEP 1996 Mathematics Report Card for the Nation and the States* highlights key assessment results for the nation and summarizes results across the jurisdictions participating in the assessment. This report contains composite scale score results (scale score means, proportions at or above achievement levels, etc.) for the nation, for each of the four regions of the country, and each jurisdiction participating in the State Assessment, both overall and by the primary reporting variables. In addition, overall results are reported for each of the content strand scales. Additional reports, to be released after the *Report Card*, will include trend comparisons to 1990 and 1992 for grade 4 for those jurisdictions that participated in both the 1992 and 1996 State Assessments and for grade 8 for those jurisdictions that participated in the 1990, 1992, and 1996 State Assessments.

The third type of report is entitled the *Cross-State Data Compendium for the NAEP 1996 Mathematics Assessment*. Like the *Report Card*, the *Compendium* reports results for the nation and for all of the jurisdictions participating in the State Assessment. The *Compendium* contains most of the tables included in the *Report Card* and *State Report* plus additional tables that provide composite scale results for a large number of secondary reporting variables.

The fourth type of summary report is a six-section electronically-delivered almanac that contains a detailed breakdown of the mathematics scale score data according to the responses to the student, teacher, and school questionnaires for the public-school, nonpublic-school, and combined populations as a whole and for important subgroups of the public-school population. There are six sections to each almanac:

> *The Distribution Data Section* provides information about the percentages of students at or above the three composite-scale achievement levels (and below basic). For the composite scale and each mathematics scale, this almanac also provides selected percentiles for the public-school, nonpublic-school, and total populations and for the major demographic subgroups of the public-school population.

[3] Some of these variables were used by Westat, Inc., in developing the sampling frame for the assessment and in drawing the sample of participating schools.

The Student Questionnaire Section provides a breakdown of the composite scale score data according to the students' responses to questions in the three student questionnaires included in the assessment booklets.

The Teacher Questionnaire Section provides a breakdown of the composite scale score data according to the teachers' responses to questions in the mathematics teacher questionnaire.

The School Questionnaire Section provides a breakdown of the composite scale score data according to the principals' (or other administrators') responses to questions in the school characteristics and policies questionnaire.

The Scale Section provides a breakdown of the mathematics score results for the five mathematics content strand scales (*number sense, properties, and operations*; *measurement*; *geometry and spatial sense*; *data analysis, statistics, and probability*; and *algebra and functions*) according to selected items from the questionnaires.

The Mathematics Item Section provides the response data for each mathematics item in the assessment.

The production of the state reports, the *Report Card*, the *Cross-State Data Compendium*, and the almanacs required many decisions about a variety of data analysis and statistical issues. For example, given the sample sizes obtained for each jurisdiction, certain categories of the reporting variables contained limited numbers of examinees. A decision was needed as to what constituted a sufficient sample size to permit the reliable reporting of subgroup results, and which, if any, estimates were sufficiently unreliable to need to be identified (or flagged) as a caution to readers. As a second example, the state report contained computer-generated text that described the results for a particular jurisdiction and compared total and subgroup performance within the jurisdiction to that of the nation. A number of inferential rules, based on logical and statistical considerations, had to be developed to ensure that the computer-generated reports were coherent from a substantive standpoint and were based on statistical principles of significance testing. As a third example, the *Report Card* contained tables that statistically compared eighth-grade performance between 1996, 1992, and 1990 for each of the participating jurisdictions. Practical comparison procedures were required to control for Type I errors without paying too large a penalty with respect to the statistical power for detecting real and substantive differences. For sets of comparisons with very large family sizes, such as the state to all other states, a new multiple comparison criterion, False Discovery Rate or FDR (Benjamini & Hochberg, 1994), was implemented, which controls the *rate* of false rejections (e.g., five false rejections per 100 rejections), rather than controlling the probability of even one such error (Familywise Error Rate, or FWE), as does the Bonferroni procedure.

The purpose of this chapter is to document the major conventions and statistical procedures used in generating the state reports, the *Report Card*, the *Cross-State Data Compendium*, and the almanacs. The principal focus of this chapter is on conventions used in the production of the computer-generated state reports. However, Sections 10.2 to 10.4 contain material applicable to all reports. Additional details about procedures relevant to the *Report Card* and *Cross-State Data Compendium* can be found in the text and technical appendices of those reports. Specific guidelines for the publication and notation of NAEP results can be found in Appendix B.

10.2 MINIMUM SCHOOL AND STUDENT SAMPLE SIZES FOR REPORTING SUBGROUP RESULTS

In all of the reports, estimates of quantities such as composite and content strand scale score means, percentages of students at or above the achievement levels, and percentages of students indicating particular levels of background variables (as measured in the student, teacher, and school questionnaires) are reported for the population of students in each jurisdiction and grade, as well as for certain key subgroups of interest. The key subgroups were defined by six primary NAEP reporting variables. Where possible, NAEP reports results for gender, for five racial/ethnic subgroups (White, Black, Hispanic, Asian American/Pacific Islander, and American Indian/Alaskan Native), three types of locations (central cities, urban fringes/large towns, rural/small town areas), four levels of parents' education (did not finish high school, high school graduate, some college, college graduate), Title 1 participation, and eligibility for the free or reduced-cost school lunch component of the National School Lunch Program. However, in some jurisdictions, and for some regions of the country, school and/or student sample sizes were quite small for one or more of the categories of these variables. One would expect results for these subgroups to be imprecisely estimated.

It is common practice in reports generated by statistical agencies to suppress those estimates for which the sampling error is so large that it is determined that no effective use can be made of the estimate, or that the potential for misinterpretation outweighs potential benefits of presenting results. A second, and equally important, consideration is whether the standard error estimate that accompanies a statistic is sufficiently accurate to inform potential readers about the reliability of the statistic. The precision of a sample estimate (be it sample mean or standard error estimate) for a population subgroup from a two-stage sample design (such as was used to select the samples for the State Assessment) is a function of the sample size of the subgroup and of the distribution of that sample across first-stage sampling units (i.e., schools in the case of the State Assessment). Hence, both of these factors were used in establishing minimum sample sizes for reporting.

For results to be reported for any subgroup, a minimum student sample size of 62 was required. This number was obtained by determining the sample size necessary to detect an effect size of .5 with a probability of .8 or greater[4]. The effect size of .5 pertains to the "true" difference in mean scale scores between the subgroup in question and the total fourth- or eighth-grade public-school population in the jurisdiction, divided by the standard deviation of scale scores in the total population. The same convention was used in reporting the 1990, 1992, and 1996 State Assessment results. Furthermore, it was required that the students within a subgroup be adequately distributed across schools to allow for reasonably accurate estimation of standard errors. In consultation with Westat, a decision was reached to publish only those statistics that had standard errors estimates based on five or more degrees of freedom. Slightly different variance estimation procedures were used to obtain estimated standard errors for public- and nonpublic-school statistics (see Chapter 7). These different procedures implied different

---

[4] A design effect of 2 was assumed for this purpose, implying a sample design-based variance twice that of simple random sampling. This is consistent with previous NAEP experience (Johnson & Rust, 1992). In carrying out the statistical power calculations when comparing a subgroup to the total group, it was assumed that the total population sample size is large enough to make a negligible contribution to standard errors.

minimum school sample sizes for public- and nonpublic-school results in order to meet the five degrees of freedom minimum. For public-school statistics, subgroup data were required to come from a minimum of five stratification categories formed for variance estimation. For nonpublic-school statistics, a six-school minimum was required.

It should be noted that the full set of reports includes large numbers of tables that provide estimates of the proportion of the students responding to each category of a secondary reporting variable, as well as the mean scale scores of the students within each category. In several instances, the number of students in a particular category of these background variables was also less than 62 or was clustered within a small number of schools. The same minimum student and school sample size restrictions were applied in the case of proportions as were used for scale score means.

10.3 ESTIMATES OF STANDARD ERRORS WITH LARGE MEAN SQUARED ERRORS

As noted above, standard errors of mean scale scores, proportions, and percentiles play an important role in interpreting subgroup results and in comparing the performances of two or more subgroups. The jackknife standard errors reported by NAEP are statistics whose quality depends on certain features of the sample from which the estimate is obtained. As discussed in the previous section, in certain cases, typically when the number of students upon which the standard error is based is small or when this group of students come from a small number of participating schools, the mean squared error[5] associated with the estimated standard errors may be quite large. Minimum school and student sample sizes were implemented which suppressed statistics in most instances where such problems existed. However, the possibility remained that some statistics based on sample sizes that exceed the minimum requirements might still be associated with standard errors that were not well estimated. Therefore, in the reports, estimated standard errors for published statistics that are subject to large mean squared errors are followed by the symbol "!".

The magnitude of the mean squared error associated with an estimated standard error for the mean or proportion of a group depends on the coefficient of variation (*CV*) of the estimated size of the population group, denoted as $\hat{N}$ (Cochran, 1977, Section 6.3). The coefficient of variation is estimated by:

$$CV(\hat{N}) = \frac{SE(\hat{N})}{\hat{N}}$$

where $\hat{N}$ is a point estimate of N and $SE(\hat{N})$ is the jackknife standard error (described in Chapter 10 of *The NAEP 1994 Technical Report*, Allen, Kline, & Zelenak, 1996) of $\hat{N}$.

Experience with previous NAEP assessments suggests that when this coefficient exceeds .2, the mean squared error of the estimated standard errors of means and proportions based on samples of this size may be quite large. (Further discussion of this issue can be found in Johnson

[5]The mean squared error of the estimated standard error is defined as $\mathcal{E}(\hat{S} - \sigma)^2$, where $\hat{S}$ is the estimated standard error, σ is the "true" standard error, and $\mathcal{E}$ is the expectation, or expected value operator.

& Rust, 1992.) Therefore, the standard errors of means and proportions for all subgroups for which the coefficient of variation of the population size exceeds .2 are followed by "!" in the tables of all reports. These standard errors, and any confidence intervals or significance tests involving these standard errors, should be interpreted with caution. In the *Report Card*, the *Cross-State Data Compendium*, and the almanacs, statistical tests involving one or more quantities that have standard errors so flagged should be interpreted with caution.

10.4 TREATMENT OF MISSING DATA FROM THE STUDENT, TEACHER, AND SCHOOL QUESTIONNAIRES

Responses to the student, teacher, and school questionnaires played a prominent role in all reports. Although the return rate on all three types of questionnaire was high,[6] there were missing data for each type of questionnaire.

The reported estimated percentages of students in the various categories of background variables, and the estimates of the mean scale score of such groups, were based on only those students for whom data on the background variable were available. In the terminology of Little and Rubin (1987), the analyses pertaining to a particular background variable presented in the state reports and the *Cross-State Data Compendium* assume the data are missing completely at random (i.e., the mechanism generating the missing data is independent of both the response to the particular background items and the scale score).

The estimates of proportions and proficiencies based on "missing-completely-at-random" assumptions are subject to potential nonresponse bias if, as may be the case, the assumptions are not correct. The amount of missing data was small (usually, less than 2%) for most of the variables obtained from the student and school questionnaires. For analyses based on these variables, reported results are subject to little, if any, nonresponse bias. However, for particular background items from the student and school questionnaires, the level of nonresponse in certain jurisdictions was somewhat higher. As a result, the potential for nonresponse bias in the results of analyses based on this latter set of background items is also somewhat greater. Background items for which more than 10 percent of the returned questionnaires were missing are identified in background almanacs produced for each jurisdiction. Again, results for analyses involving these items should be interpreted with caution.

In order to analyze the relationships between teachers' questionnaire responses and their students' achievement, each teacher's questionnaire had to be matched to the students who were taught mathematics by that teacher. Table 10-1 provides the percentages of fourth-grade students that were matched to teacher questionnaires for each of the 47 jurisdictions that participated in the State Assessment. Table 10-2 contains similar information for the eighth-grade sample. In both tables, the first column presents match rates for public-school students and the second for nonpublic-school students. Note that these match rates do not reflect the additional missing data due to item-level nonresponse. The amount of additional item-level nonresponse in the returned teacher questionnaires can be found in the almanacs produced for each jurisdiction.

---

[6] Information about survey participation rates (both school and student), as well as proportions of students excluded by each jurisdiction from the assessment, are given in Appendix B. Adjustments intended to account for school and student nonresponse are described in Chapter [illegible]

Table 10-1
Weighted Percentage of Fourth-Grade Students Matched to Teacher Questionnaires

Jurisdiction	Public	Nonpublic
Alabama	97	100
Alaska	86	--
Arizona	89	92
Arkansas	97	100
California	93	98
Colorado	97	94
Connecticut	98	100
Delaware	95	90
District of Columbia	93	83
DoDEA/DDESS	95	--
DoDEA/DoDDS	94	--
Florida	96	96
Georgia	98	97
Guam	89	84
Hawaii	95	--
Indiana	97	91
Iowa	95	88
Kentucky	94	90
Louisiana	99	100
Maine	95	100
Maryland	97	100
Massachusetts	97	90
Michigan	97	97
Minnesota	96	92
Mississippi	96	89
Missouri	91	99
Montana	93	100
Nebraska	97	86
Nevada	97	100
New Jersey	98	89
New Mexicc	92	68
New York	97	91
North Carolina	96	--
North Dakota	95	84
Oregon	95	75
Pennsylvania	97	94
Rhode Island	99	--
South Carolina	97	--
Tennessee	97	--
Texas	92	100
Utah	94	100
Vermont	98	98
Virginia	97	--
Washington	97	--
West Virginia	95	--
Wisconsin	94	100
Wyoming	95	100

Table 10-2
Weighted Percentage of Eighth-Grade Students Matched to Teacher Questionnaires

Jurisdiction	Public	Nonpublic
Alabama	95	98
Alaska	74	--
Arizona	90	--
Arkansas	95	100
California	90	85
Colorado	89	--
Connecticut	90	94
Delaware	91	100
District of Columbia	74	92
DoDEA/DDESS	100	--
DoDEA/DoDDS	95	--
Florida	91	--
Georgia	94	100
Guam	56	82
Hawaii	88	--
Indiana	93	--
Iowa	95	99
Kentucky	86	91
Louisiana	90	94
Maine	91	--
Maryland	94	95
Massachusetts	92	92
Michigan	92	99
Minnesota	95	94
Mississippi	92	--
Missouri	92	94
Montana	88	100
Nebraska	95	88
Nevada	88	100
New Hampshire	--	92
New Jersey	96	90
New Mexico	97	100
New York	89	94
North Carolina	86	--
North Dakota	96	90
Oregon	92	100
Pennsylvania	87	--
Rhode Island	94	99
South Carolina	92	87
Tennessee	94	--
Texas	97	98
Utah	91	100
Vermont	92	100
Virginia	94	--
Washington	88	79
West Virginia	96	--
Wisconsin	88	93
Wyoming	95	100

10.5 STATISTICAL RULES USED FOR PRODUCING THE STATE REPORTS

As described earlier, the state reports contain jurisdiction-level estimates of fourth- and eighth-grade mean proficiencies, proportions of students at or above selected scale points, and percentiles for the jurisdiction as a whole and for the categories of a large number of reporting variables. Similar results are provided for the nation and, where sample sizes permitted, for the region to which each jurisdiction belongs[7]. The state reports were computer-generated. The tables and figures, as well as the text of the report, were automatically tailored for each jurisdiction based on the pattern of results obtained. The purpose of this section is to describe some of the procedures and rules used to produce these individually tailored reports. A detailed presentation is available in the technical documentation of *The NAEP Computer-Generated Reporting System for the 1994 Trial State Assessment* (Jerry, 1995). Some changes were made for the 1996 State Assessment, and the current procedures and rules for State Reports are documented in this chapter.

In the 1996 state reports, the results are presented principally through a sequence of tables containing estimated means, proportions, and percentiles, along with their standard errors, for 1996 and, where appropriate, for 1992 and 1990. In addition to the tables of results, computer-generated interpretive text is also provided. In some cases, the computer-generated interpretive text is primarily descriptive in nature and reports the total group and subgroup scale score means and proportions of interest. However, some of the interpretive text focuses on interesting and potentially important group differences in mathematics scale scores or on the percentages of students responding in particular ways to the background questions. Additional interpretive text compares state-level results with those of the nation, and discusses changes in results from 1992 and 1990 to 1996. For example, one question of interest to each jurisdiction is whether, on average, its students performed higher than, lower than, or about the same as students in the nation. Additional interpretive text focuses on patterns of achievement across the mathematics content strands or on the pattern of response to a particular background item in the jurisdiction. For example, do more students report spending 30 minutes or 15 minutes on homework each day?

Rules were developed to produce the computer-generated text for comparisons of results for subgroups and for interpretations of patterns of results. These rules were based on a variety of considerations, including a desire for 1) statistical rigor in the identification of important group differences and patterns of results, and 2) solutions that were within the limitations imposed by the availability of computational resources and the time frame for the production of the report. The following sections describe some of these procedures and rules.

[7] Because U.S. territories are not classified into NAEP regions, no regional comparisons are provided for Guam. Regional results are also not provided for the DDESS and DoDDS schools.

10.5.1 Comparing Means and Proportions for Different Groups of Students

Many of the group comparisons explicitly commented on in the state reports involved mutually exclusive sets of students. One common example of such a comparison is the contrast between the mean composite score in a particular jurisdiction and the mean composite score in the nation. Other examples include comparisons within a jurisdiction of the average scale score for male and female students; White and Hispanic students; students attending schools in central city and urban fringe/large town locations; and students who reported watching six or more hours of television each night and students who report watching less than one hour each night.

In the state reports, computer-generated text indicated that means or proportions from two groups were different only when the difference in the point estimates for the groups being compared was statistically significant at an approximate simultaneous α level of .05. An approximate procedure was used for determining statistical significance NAEP staff judged to be statistically defensible, as well as being computationally tractable. Although all pairs of levels within a variable were tested, computer-generated text was developed for only a subset of the possible comparisons. For example, text was included to compare the majority ethnic group and each minority group, but text for all possible comparisons of groups was not included, even if some unreported comparisons were significant. The procedure used to make statistical tests is described in the following paragraphs.

Let A_i be the statistic in question (i.e., a mean for group i) and let S_{A_i} be the jackknife standard error of the statistic. The computer-generated text in the state report identified the means or proportions for groups i and j as being different if and only if:

$$\frac{|A_i - A_j|}{\sqrt{S_{A_i}^2 + S_{A_j}^2}} \geq T_{\frac{.05}{2c}}$$

where T_α is the $(1 - \alpha)$ percentile of the distribution with degrees of freedom, df, as estimated below, and c is the number of related comparisons being tested. See Section 10.5.2 for a more specific description of multiple comparisons. In cases where group comparisons were treated as individual units (for example, comparing overall state results with overall national results or overall state results in 1996 with those of 1992, the value of c was taken as 1, and the test statistic was approximately equivalent to a standard two-tailed t-test for the difference between group means or proportions from large independent samples with the α level set at .05.

In some cases, it was desired to test the change in the size of the difference between two groups from one assessment time to the next. For example, suppose White students in 1992 had mean scale score A_1 with jackknife standard error S_{A_1}, and in 1996, mean scale score A_2, with jackknife standard error S_{A_2}. Further, suppose Hispanic students in 1992 had mean scale score A_3 with jackknife standard error S_{A_3}, and in 1996, mean scale score A_4, with jackknife standard error S_{A_4}. Then to test whether the difference between the two groups has increased significantly, has decreased significantly, or remains about the same, the following t-test was used:

$$t_{df} = \frac{(A_1 - A_3) - (A_2 - A_4)}{\sqrt{S_{A_1}^2 + S_{A_2}^2 + S_{A_3}^2 + S_{A_4}^2}}$$

The degrees of freedom for both t-tests of differences is defined by a Satterthwaite (Johnson & Rust, 1992) approximation as follows:

$$df = \frac{(\sum_{k=1}^{N} S_{A_k}^2)^2}{\sum_{k=1}^{N} \frac{S_{A_k}^4}{df_k}}$$

where N is the number of subgroups involved, four in this case, and df_k is as follows:

$$df_k = \left(3.16 - \frac{2.77}{\sqrt{m}}\right)\left(\frac{(\sum_{j=1}^{m}(t_{jk} - t_k)^2)^2}{\sum_{j=1}^{m}(t_{jk} - t_k)^4}\right)$$

where m is the number of nonempty PSU pairs for statistic k, t_{jk} is the jth replicate estimate (pseudo value) for the mean of subgroup k, and t is the estimate of the subgroup mean using the overall weight and the first plausible value for subgroup k. The number of nonempty PSU pairs is m, so m is less than or equal to n, the total number of PSU pairs. The first factor in the expression df_k is an empirically based adjustment for the downward bias of the degrees of freedom estimate. The degrees of freedom will be bounded as not to be greater than the number of PSU pairs.

The procedures in this section assume that the data being compared are from independent samples. Because of the sampling design used for the State Assessment, in which both schools and students within schools are randomly sampled, the data from mutually exclusive sets of students within a jurisdiction may not be strictly independent. Therefore, the significance tests employed are, in many cases, only approximate. As described in the Section 10.5.4, another procedure, one that does not assume independence, could have been conducted. However, that procedure is computationally burdensome and resources precluded its application for all the comparisons in the state reports. It was the judgment of NAEP staff that if the data were correlated across groups, in most cases the correlation was likely to be positive. Since, in such instances, significance tests based on assumptions of independent samples are conservative (because the estimated standard error of the difference based on independence assumptions is larger than the more complicated estimate based on correlated groups), the approximate procedure was used for most comparisons.

The procedures described above were used for testing differences of both means *and* nonextreme percents. The approximation for the test for percentages works best when sample sizes are large, and the percentages being tested have magnitude relatively close to 50 percent. Statements about group differences should be interpreted with caution if at least one of the groups being compared is small in size and/or if "extreme" percentages are being compared. Percentages, P, were treated as "extreme" if

$P < P_{\lim} = \dfrac{200}{N_{EFF}+2}$, where the effective sample size, $N_{EFF} = \dfrac{P(100-P)}{(SE)^2}$, and SE is the jackknife standard error of P. This "rule of thumb" cutoff leads to flagging a large proportion of confidence intervals that would otherwise include values < 0 or > 1. Similarly, at the other end of the 0 - 100 scale, a percentage is deemed extreme if $100 - P < P_{lim}$. In either extreme case, the normal approximation to the distribution is a poor approximation, and the value of P was reported, but no standard error was estimated and hence no tests were conducted.

10.5.2 Multiple Comparison Procedures

Frequently, groups (or families) of comparisons were made and were presented as a single set. The appropriate text, usually a set of sentences or a paragraph, was selected for inclusion in the report based on the results for the entire set of comparisons. For example, Chapter 2 of the state report contains a section that compared average scale scores for a predetermined group, generally the majority group (in the case of race/ethnicity, for example, White students) to those obtained by other minority groups. For families of comparisons like these, a Bonferroni procedure (Miller, 1966), controlling the Familywise Error (FWE) Rate, was used for determining the value of T_α, where c was the number of contrasts in the set. In this example, c was taken to be the number of minority groups meeting minimum sample size requirements, and each statistical test was consequently carried out at an α level of $.05/c$.

However, in an attempt to gain greater power, two separate definitions of family size were employed for comparisons in two-way tables. For n levels of a control variable (e.g., ethnicity) and m levels of a comparison variable (e.g., number of hours of homework), the standard Bonferroni family size of $n \times m \times (m-1)/2$ was used. In addition, when the $m \times (m-1)/2$ marginal tests yielded a significant difference for a pair of categories of the comparison variable, the n levels of the control variable corresponding to that pair of categories were tested with a family size of n. Significance was reported if either definition of family size met the criterion. Further, 2 x 2 interactions were tested for a $m \times n$ table with t-tests using a family size $n \times (n-1) \times m \times (m-1)/4$. In these cases, a modification due to Hochberg of the standard Bonferroni procedure was employed, in which probabilities associated with outcomes are ordered, and α is divided by an integer which increases from 1 to the family size as successively smaller probabilities are tested. More formally, the Hochberg Stagewise Procedure (Hochberg, 1988) is defined:

Let m be the number of significance tests made (the family size) and let $P_1 < P_2 < \ldots < P_m$ be the ordered significance levels for the m tests. Let α be the combined significance level. The Hochberg procedure compares P_m with α, P_{m-1} with $\alpha/2$, ..., P_j with $\alpha/(m-j+1)$, stopping comparisons with the first j such that $P_j < \alpha/(m-j+1)$. All tests associated with $P_1, \ldots, P_j$ are declared significant, all tests associated with $P_{j+1}, \ldots, P_m$ are declared nonsignificant.

To compare the jurisdiction in a State Assessment report with the nation and all other participating jurisdictions, as is done in the comparisons of overall scale score maps in the State Assessment reports, as many as 46 different comparisons need to be computed. In this case, the multiple comparison procedure (Benjamini and Hochberg, 1994) was used to judge significance. Unlike the Bonferroni procedure that controls the FWE, the procedure controls the expected proportion of falsely rejected hypotheses among all rejections. For example, at the .05 level, for every 100 rejections of the null hypothesis, the procedure ensures that no more than five will be expected to be false.

The Benjamini and Hochberg application of the False Discovery Rate (FDR) criterion can be described as follows. Let m be the number of significance tests made and let $P_1 \preceq P_2 \preceq \ldots \preceq P_m$ be the ordered significance levels of the m tests, from lowest to highest probability. Let α be the combined significance level desired, usually .05. The procedure will compare P_m with α, P_{m-1} with $\alpha(m-1)/m, \ldots, P_j$ with $\alpha j/m$, stopping the comparisons with the first j such that $P_j \preceq \alpha j/m$. All tests associated with $P_1, \ldots, P_j$ are declared significant; all tests associated with $P_{j+1}, \ldots, P_m$ are declared nonsignificant.

10.5.3 Comparisons of 1996, 1992, and 1990 Results in the *Mathematics Report Card* and the *Cross-State Data Compendium*

The *Mathematics Report Card* and the *Cross-State Data Compendium* contain many tables that compare fourth-and eighth-grade public-school results for 1996 with those obtained in 1990 for grade 8 and 1992 for grades 4 and 8. Comparisons are also made of results for the nation as a whole, for each of the four regions of the country, and for each of the 40 grade 4 and 37 grade 8 jurisdictions assessing public-school students that participated in both the 1996 and 1992 State Assessments. For the three-point trend, from 1990 through 1992 to 1996, seven fewer jurisdictions had participated in the full series, but one additional state appeared in 1990 and 1996 assessments only. The national and regional results are based on the 1990, 1992, and 1996 national NAEP public-school samples. The results for the jurisdictions are based on the 1996, 1992, and 1990 State Assessment samples. Each jurisdiction's overall results are compared, as well as the results for both primary and secondary NAEP reporting subgroups. The following statistics are compared:

- the proportions of examinees in the various primary and secondary reporting subgroups;
- average scale scores, overall and for the primary reporting subgroups, on the composite scale, and the mathematics content strand scales;
- selected percentiles (10th, 25th, 50th, 75th, 90th) overall, for the NAEP composite scale and for the mathematics contents strand scales; and
- proportions of students at or above the achievement levels, overall and within the primary reporting subgroups, on the composite scale.

A number of different types of tables are included in these reports. For example, one type of table shows the average composite scale score and the percentage of students at or above each of the achievement levels. A second type of table shows the percentage of students at or above achievement levels on the composite scales for each of the primary reporting subgroups. A third type of table shows average mathematics scale score and five percentile locations for each of the mathematics content strand scales. A fourth type of table shows average composite proficiencies for a particular set of primary or secondary reporting subgroups.

Because of the large volume of tables in the *Mathematics Report Card* and the *Cross-State Data Compendium*, most were computer-generated. To help readers focus on important outcomes, each of the tables containing results for 1996, 1992, and 1990 are annotated with symbols indicating which 1996-to-1992 or 1996-to-1990 jurisdiction comparisons represent statistically significant changes[8]. The annotations to these tables were made automatically by the computer programs that produced them and were based on tests of statistical significance and FWE or FDR criteria like those described in Sections 10.1 and 10.5.2. This section describes the rules and conventions used by the computer programs in annotating the tables. These rules and conventions were chosen based on feasibility considerations and a desire to balance statistical power with Type I error control within these feasibility constraints.

Two types of annotations were made. The first type of annotation "*" was used for the FWE criterion to indicate a gain or loss that was statistically significantly different from 1990, considering each jurisdiction as a separate entity and controlling for the number of tests conducted in a particular table within that jurisdiction. Similarly, the annotation "†" was used to indicate a gain or loss that was statistically significantly different from 1992, considering each jurisdiction as a separate entity and controlling for the number of tests conducted in a particular table within that jurisdiction. Since all tables were set up with jurisdictions as the row variable, the first type of annotation was used on significance tests that *separately controlled the Type I error rate within each row of the table using the Bonferroni procedure*. The second type of annotation "**" was used to indicate a gain or loss that was statistically significantly different from 1990 after *simultaneously controlling the Type I false discovery rate for the large family of tests conducted across all jurisdictions within a table, using the FDR criterion*. The annotation "††" was used to indicate a gain or loss that was statistically significantly different from 1992 after *simultaneously controlling the Type I false discovery rate for the number of tests conducted across all jurisdictions within a table, using the FDR criterion* In this second type of table, the annotations "*" and "†" were also used as above to indicate a gain or loss that would have been significantly different from 1990 or 1992, respectively, if only that jurisdiction had been examined.

Many of the tables contain two or more types of statistics. For example, a very common table in the *Cross-State Data Compendium* contains, for 1996, 1992, and 1990, the proportion of examinees in a given grade in each of a particular set of reporting subgroups (e.g., males and females, or each of the race/ethnicity groups) *and* the average composite scale score for each subgroup. In a table of this nature, two distinct families of significance tests were distinguished. The first family consisted of the comparisons of 1996, 1992, and 1990 proportions within each of the subgroups; the second consisted of the comparisons of 1996, 1992, and 1990 subgroup mean scale scores. For each of these families, Type I error rates were controlled separately within-row (for determining the first type of annotation) and simultaneously across jurisdictions (for the second type of annotation).

As a second example, a different table contained the percentage of students reporting that one parent had some college education, the average composite scale score of these students, and the percentage of these students at or above each of the achievement levels. In this example,

[8] Fourth- and eighth-grade public-school results from the national assessment for the nation as a whole and for each region of the country are also shown in these tables. However, significance testing and table annotation was not carried out for these results. Statistical tests and annotations of differences for the national assessment were included in tables from the *Mathematics Report Card* that contain only national results.

three families of significance tests were distinguished—tests comparing percentages in the some college education category, tests comparing the average scale scores of these students, and tests comparing the percentages exceeding the achievement levels. Again, Type I error rates were controlled separately within-row (for determining the first type of annotation) and simultaneously across jurisdictions (for the second type of annotation) for each of these three families.

10.5.4 Comparing 1996 Results to Previous Assessments

Since its inception, one of NAEP's central purposes has been the monitoring of trends in achievement. The 1996 State Assessment provided an opportunity to report on short-term trends (from 1990 and/or 1992 to 1996) in fourth- and eighth-grade mathematics achievement on a state-by-state basis, as well as for the nation and the relevant region of the country. Comparisons were also made in trends of percentages of students in specific subgroups across the years. As a result, one of the prominent features of the 1996 state report was the inclusion of a large number of trend comparisons in both the text and tables of the reports for those jurisdictions that participated in the 1996 State Assessment and either the 1990 or the 1992 Trial State Assessment.

The samples for the 1990, 1992, and 1996 State Assessments were drawn approximately independent but consisted of mutually exclusive groups of students, so that the sampling plan led to a slight negative correlation between successive years. Although slightly negative, the correlations were small, and therefore, the selections of text describing comparisons of 1990, 1992, and 1996 results were based on the types of significance testing procedures described in Section 10.5.1 and 10.5.2. In sections of the report where trend comparisons were carried out for a number of subgroups (e.g., where 1996 results were compared to 1992 results for each race/ethnicity group within the jurisdiction, or for each of the mathematics content strand scales), the significance testing procedures incorporated Bonferroni adjustments, like those described in Section 10.5.2, which were based on the number of comparisons being made.

In addition, a large number of state report tables provided 1990, 1992, and 1996 percentages of students and scale score means for the subgroups of students defined by primary and secondary reporting variables. In most of these tables, three sets of trend results were reported, one set for the jurisdiction in question, one set for relevant region of the country, and one set for the nation. For each of these sets of results, symbols were included next to the 1996 results for each jurisdiction indicating which, if any, of the reported statistics represented a significant change from the 1990 or 1992 results. A ">" sign was used to indicate 1996 results that were significantly higher than their corresponding 1992 levels; a "<" was used to indicate 1996 results that were significantly lower than their corresponding 1992 levels; and a "<<" or ">>" were placed next to 1996 and 1992 numbers to indicate a difference from 1990. No symbol appeared after results that did not differ significantly from their 1990 or 1992 levels.

As was done for text selection, statistical tests were carried out using Bonferroni adjustments to significance levels when results for multiple groups were included in a table. For example, in a table containing 1992 and 1996 mean proficiencies for White, Black, and Hispanic students, statistical tests for differences were carried out at an α level of .05/3. It should be noted that national, regional, and jurisdiction comparisons were treated as separate families for the purposes of obtaining Bonferroni adjustments. Continuing with the race/ethnicity example, jurisdiction, national, and regional comparisons were treated as three separate families, each consisting of three comparisons and each of the required statistical tests was carried out at an α level of .05/3.

In an attempt to gain greater power, two separate definitions of family size were employed for comparisons with large family sizes. For n levels of a control variable (e.g., ethnicity) and m levels of a comparison variable (e.g., number of hours of homework), the standard Bonferroni family size of $n \times m\ (m-1)/2$ was used. In addition, when the $m \times (m-1)/2$ marginal tests yielded a significant difference for a pair of categories of the comparison variable, the n levels of the control variable corresponding to that pair of categories were tested with a family size of n. Significance was reported if either definition of family size met the criterion. Interactions were tested for a $m \times n$ table with t-tests using a family size $n \times (n-1) \times m \times (m-1)/4$.

10.5.5 Comparing Proportions Within a Group

Certain analyses in the state report involved the comparison of proportions. One example was the comparison of the proportion of students who reported that a parent graduated from college to the proportion of students who indicated that their parents did not finish high school to determine which proportion was larger. There are other such proportions of interest in this example such as the proportion of students with at least one parent graduating from high school but neither parent graduating from college. For these types of analyses, NAEP staff determined that the dependencies in the data could not be ignored.

Unlike the case for analyses of the type described in Section 10.5.1, the correlation between the proportion of students reporting a parent graduated from college and the proportion reporting that their parents did not finish high school is likely to be negative and large. For a particular sample of students, it is likely that the higher the proportion of students reporting "at least one parent graduated from college" is, the lower the proportion of students reporting "neither parent graduated from high school" will be. A negative dependence will result in underestimates of the standard error if the estimation is based on independence assumptions (as is the case for the procedures described in Section 10.5.1). Such underestimation can result in an unacceptably large number of "nonsignificant" differences being identified as significant.

The procedures of Section 10.5.1 were modified for the state report analyses that involved comparisons of proportions within a group. The modification involved using a jackknife method for obtaining the standard error of the difference in dependent proportions. The standard error of the difference in proportions was obtained by first obtaining a separate estimate of the difference in question for each jackknife replicate, using the first plausible value only, then taking the standard deviation of the set of replicate estimates as the estimate. The procedures used for proportions within a group differed from the procedures of Section 10.5.1 only with respect to estimating the standard error of the difference; all other aspects of the procedures were identical.

10.5.6 Statistical Significance and Estimated Effect Sizes

Whenever comparisons were made between groups, an attempt was made to distinguish between group differences that were statistically significant but rather small in a practical sense and differences that were both statistically and practically significant. In order to make such distinctions, a procedure based on estimated effect sizes was used. The estimated effect size for comparing means from two groups was defined as:

$$\textit{estimated effect size} = \frac{|A_i - A_j|}{\sqrt{\dfrac{S_{A_i}^2 + S_{A_j}^2}{2}}}$$

where A_i refers to the estimated mean for group i, and S_{A_i} refers to the estimated standard deviation within group i. The within-group estimated standard deviations were taken to be the square root of the average of the variances of the set of five plausible values taken over students for each imputation. They were calculated using Westat overall sampling weights.

The estimated effect size for comparing proportions was defined as:

$|f_i - f_j|$, where $f_i = 2 \arcsin \sqrt{p_i}$, and p_i is the estimated proportion in group i (Cohen, 1977).

For both means and proportions, no qualifying language was used in describing significant group differences when the estimated effect size exceeded .1. However, when a significant difference was found but the estimated effect size was less than .1, the qualifier *somewhat* was used. For example, if the mean scale score for females was significantly higher than that for males but the estimated effect size of the difference was less than .1, females were described as performing *somewhat higher* than males.

10.5.7 Descriptions of the Magnitude of Percentages

Percentages reported in the text of the state reports are sometimes described using quantitative words or phrases. For example, the number of students being taught by teachers with master's degrees in English might be described as "relatively few" or "almost all," depending on the size of the percentage in question. Any convention for choosing descriptive terms for the magnitude of percentages is to some degree arbitrary. The rules used to select the descriptive phrases in the report are given in Table 10-3.

10.5.8 Descriptions of Differences Between Differences

When comparing differences between subgroups across two assessment years, descriptive text was generated as shown in Table 10-4, where a ">"means significantly greater than 0, a "=" means not significantly different than 0, and a ">" means significantly less than 0. Patterns other than the six shown in the table did not result in text in the report.

Table 10-3
Rules for Descriptive Terms for the Magnitude of Percentages Used in State Reports

Percentage	Description of Text in Report
$p = 0$	None
$0 < p \leq 8$	A small percentage
$8 < p \leq 12$	Relatively few
$12 < p \leq 18$	Less than one fifth
$18 < p \leq 22$	About one fifth
$22 < p \leq 27$	About one quarter
$27 < p \leq 30$	Less than a third
$30 < p \leq 36$	About one third
$36 < p \leq 47$	Less than half
$47 < p \leq 53$	About half
$53 < p \leq 64$	More than half
$64 < p \leq 70$	About two thirds
$70 < p \leq 79$	About three quarters
$79 < p \leq 89$	A large majority
$89 < p < 100$	Almost all
$p = 100$	All

Table 10-4
Difference of Differences (Gaps)

A_1-B_1[1]	A_2-B_2[2]	(A_1-B_1) - (A_2-B_2)	Text
>	>	>	The gap between *A* and *B* is larger in 1996 than in 1992.
>	>	=	The gap between *A* and *B* is not significantly different in 1996 than in 1992.
>	>	<	The gap between *A* and *B* is smaller in 1996 than in 1992.
<	<	>	The gap between *A* and *B* is smaller in 1996 than in 1992.
<	<	=	The gap between *A* and *B* is not significantly different in 1996 than in 1992.
<	<	<	The gap between *A* and *B* is larger in 1996 than in 1992.

[1]A_1 and B_1 are the majority and largest minority subgroups in 1996.
[2]A_2 and B_2 are the corresponding subgroups in 1992.

Appendix A

PARTICIPANTS IN THE OBJECTIVES AND ITEM DEVELOPMENT PROCESS

The National Assessment of Educational Progress extends its deep appreciation to all those individuals who participated in the development of the framework, objectives, and items for the 1996 State Assessment program in mathematics.

Project Steering Committee

Frank Betts	Director, Curriculum Technology Center, Association for Supervision and Curriculum Development, Alexandria, Virginia
Ed Esty	Senior Staff Officer, Mathematical Sciences Education Board, Washington, DC
James Gates	Executive Director, National Council of Teachers of Mathematics, Reston, Virginia
Alice Gill	Coordinator, Thinking Mathematics Dissemination, American Federation of Teachers, Cleveland, Ohio
Joyce McCray	Executive Director, Council for American Private Education, Washington, DC
Henry Pollack	Visiting Professor, Teachers College, Columbia (formerly with Bell Labs), New York, New York
John Porter	Director, Education and University Relations, IBM, Armonk, New York
Rodney Riffel	Senior Professional Associate, National Education Association, Washington, DC
Ramsay Selden	Director, State Education Assessment Center, Council of Chief State School Officers, Washington, DC
Charles Watson	President, Association of State Supervisors of Mathematics, Arkansas Director of Mathematics, Little Rock, Arkansas
Michael Webb	National Education Director, National Urban League, New York, New York
Gene Wilhoit	Executive Director, National Association of State Boards of Education, Alexandria, Virginia

Project Planning Committee

Martha Baca	Supervisor, K—12 Public Schools, Roosevelt School District #66, Phoenix, Arizona
Glen Blume	Associate Professor, Penn State University, University Park, Pennsylvania
Dave Heckman	Private School Teacher and Presidential Award Recipient, 1987, Monmouth, Maine
Audrey Jackson	Middle School Mathematics Supervisor and Teacher, St. Louis, Missouri
Pat Kenney	Researcher, Learning Research and Development Center, University of Pittsburgh, Pennsylvania
Donna Long	Indiana State Supervisor of Mathematics, Indianpolis, Indiana
Larry Wiley	New Jersey State Supervisor of Mathematics, Trenton, New Jersey

Mathematics Project Staff

The College Board

Robert Orrill	Executive Director, Office of Academic Affairs
Valarie French	Director of Curriculum and Instructional Development, Office of Academic Affairs
Bruce Kennedy	Office Manager, Office of Academic Affairs

Consultants to the College Board

John Dossey	Project Director, Distinguished University Professor of Mathematics, Illinois State University, Normal, Illinois
Cathy Seeley	Project Coordinator, Mathematics Consultant, Former Texas Director of Mathematics, Austin, Texas

Appendix B

SUMMARY OF PARTICIPATION RATES

Guidelines for Sample Participation and Explanation of the Derivation of Weighted Participation Rates for the 1996 State Assessment Program in Mathematics

Keith F. Rust
Westat, Inc.

and

Eugene G. Johnson and Nada Ballator
Educational Testing Services

Introduction

Since 1989, state representatives, the National Assessment Governing Board (NAGB), several committees of advisors external to the National Assessment of Educational Progress (NAEP), and the National Center for Education Statistics (NCES) have engaged in numerous discussions about the procedures for reporting the NAEP state assessment results. From the outset of these discussions, it was recognized that sample participation rates across the jurisdictions have to be uniformly high to permit fair and valid comparisons. Therefore, NCES established guidelines for school and student participation for the first two Trial State Assessment programs in 1990 and 1992.

The 1994 Trial State Assessment program used an expanded set of participation guidelines. The guidelines were expanded in two ways. First, new guidelines were designed to preempt publication of results from jurisdictions for which participation rates were low enough to suggest the possibility of appreciable nonresponse bias. The new guidelines were congruent both with NAGB policies as well as the resolutions of the Education Information Advisory Committee (EIAC). Second, existing guidelines were extended to cover the presence of separate public and nonpublic school samples in the 1994 Trial State Assessment.

For the NAEP 1996 State Assessment program, the participation guidelines implemented in 1994 were again applied. This appendix provides:

- **Participation rate information for the NAEP 1996 State Assessment of mathematics at grades 4 and 8 for both public and nonpublic school samples.** This information will also appear in appendices in the *NAEP 1996 Mathematics Report Card* and the *NAEP 1996 Mathematics State Report.*

- **An explanation of the guidelines and notations used in 1996**. In brief, the guidelines cover levels of school and student participation, both overall and for particular population classes, separately for both public and nonpublic school samples. Consistent with the NCES standards, weighted data are used to calculate all participation rates for sample surveys, and weighted rates are provided in the reports. The procedures used to derive the weighted school and student participation rates are provided immediately after the discussion of the guidelines and notations.

- **A set of tables that provides the 1996 participation rate information for the NAEP 1996 State Assessment of Mathematics.** Separate information is provided for the public and nonpublic school samples. The sample for nonpublic schools includes schools not directed by traditional local or state government agencies, such as those administered by Catholic dioceses, other religious and nonsectarian schools, schools administered by the Bureau of Indian Affairs (BIA), and schools administered by the Department of Defense in the United States. Because the aggregate sample across all participating jurisdictions (public or nonpublic) is not necessarily representative of the nation, the weighted participation rates across participating jurisdictions have not been analyzed. However, the counts from the national assessment have been included to provide some context for interpreting the summary of activities in each individual state and territory and for each type of school. Please note that in the NAEP 1996 state assessment, Department of Defense Domestic Dependent Elementary and Secondary (DDESS) and Department of Defense Dependents Schools (DoDDS) schools were included as two separate jurisdictions; for this report and any future reports including 1996 State Assessment data, the two Department of Defense Education Activity (DoDEA) jurisdictions will be reported as jurisdictions having only public schools.

Notations for Use in Reporting School and Student Participation Rates

Unless the overall participation rate is sufficiently high for a jurisdiction, there is a risk that the assessment results for that jurisdiction are subject to appreciable nonresponse bias. Moreover, even if the overall participation rate is high, there may be significant nonresponse bias if the nonparticipation that does occur is heavily concentrated among certain types of schools or students. The following guidelines concerning school and student participation rates in the NAEP state assessment program were established to address four significant ways in which nonresponse bias could be introduced into the jurisdiction sample estimates. The conditions that will result in the publication of a jurisdiction's results are presented below. Also presented below are the conditions that will result in a jurisdiction receiving a notation in the 1996 reports. Note that in order for a jurisdiction's results to be published with no notations, that jurisdiction must satisfy all guidelines. The guidelines are applied separately to the fourth- and eighth-grade mathematics samples.

Guidelines on the Publication of NAEP Results

Guideline 1 - Publication of Public School Results. A jurisdiction will have its public school results published in the *1996 NAEP Mathematics Report Card* (or in other reports that include all state-level results) if and only if its weighted participation rate for the initial sample of public schools is greater than or equal to 70 percent. Similarly, a jurisdiction will receive a separate *NAEP 1996 Mathematics State Report* if and only if its weighted participation rate for the initial sample of public schools is greater than or equal to 70 percent.

Guideline 2 - Publication of Nonpublic School Results. A jurisdiction will have its nonpublic school results published in the *1996 NAEP Mathematics Report Card* (or in other reports that include all state-level results) if and only if its weighted participation rate for the initial sample of nonpublic schools is greater than or equal to 70 percent and meets minimum sample size requirements.[1] A jurisdiction eligible to receive a separate *NAEP 1996 Mathematics State Report* under Guideline 1 will have its nonpublic school results included in that report if and only if that jurisdiction's weighted participation rate for the initial sample of nonpublic schools is greater than or equal to 70 percent and meets minimum sample size requirements. If a jurisdiction meets Guideline 2 but fails to meet Guideline 1, a separate State Report will be produced containing only nonpublic school results.

Guideline 3 - Publication of Combined Public and Nonpublic School Results. A jurisdiction will have its combined results published in the *1996 NAEP Mathematics Report Card* (or in other reports that include all state-level results) if and only if both Guidelines 1 and 2 are satisfied. Similarly, a jurisdiction eligible to receive a separate *NAEP 1996 Mathematics State Report* under Guideline 1 will have its combined results included in that report if and only if Guideline 2 is also met.

Discussion. If a jurisdiction's public or nonpublic school participation rate for the initial sample of schools is below 70 percent there is a substantial possibility that bias will be introduced into the assessment results. This possibility remains even after making statistical adjustments to compensate for school nonparticipation. There remains the likelihood that, in aggregate, the substitute schools are sufficiently dissimilar from the originals that they are replacing and represent too great a proportion of the population to discount such a difference. Similarly, the assumptions underlying the use of statistical adjustments to compensate for nonparticipation are likely to be significantly violated if the initial response rate falls below the 70 percent level. Guidelines 1, 2, and 3 take this into consideration. These guidelines are congruent with current NAGB policy, which requires that data for jurisdictions that do not have a 70 percent before-substitution participation rate be reported "in a different format," and with the Education Information Advisory Committee (EIAC) resolution, which calls for data from such jurisdictions not to be published.

Guidelines on Notations of NAEP Results

Guideline 4 - Notation for Overall Public School Participation Rate. A jurisdiction that meets Guideline 1 will receive a notation if its weighted participation rate for the initial sample of public schools was below 85 percent and the weighted public school participation rate after substitution was below 90 percent.

[1]Minimum sample size requirements for reporting nonpublic school data consist of two components: (1) a school sample size of six or more participating schools and (2) an assessed student sample size of at least 62.

Guideline 5 - Notation for Overall Nonpublic School Participation Rate. A jurisdiction that meets Guideline 2 will receive a notation if its weighted participation rate for the initial sample of nonpublic schools was below 85 percent and the weighted nonpublic school participation rate after substitution was below 90 percent.

Discussion. For jurisdictions that did not use substitute schools, the participation rates are based on participating schools from the original sample. In these situations, the NCES standards specify weighted school participation rates of at least 85 percent to guard against potential bias due to school nonresponse. Thus the first part of these guidelines, referring to the weighted school participation rate for the initial sample of schools, is in direct accordance with NCES standards.

To help ensure adequate sample representation for each jurisdiction participating in the NAEP 1996 state assessments, NAEP provided substitutes for nonparticipating public and nonpublic schools. For jurisdictions that used substitute schools, the assessment results will be based on the student data from all schools participating from both the original sample and the list of substitutes (unless both an initial school and its substitute eventually participated, in which case only the data from the initial school will be used).

The NCES standards do not explicitly address the use of substitute schools to replace initially selected schools that decide not to participate in the assessment. However, considerable technical consideration was given to this issue. Even though the characteristics of the substitute schools were matched as closely as possible to the characteristics of the initially selected schools, substitution does not entirely eliminate bias due to the nonparticipation of initially selected schools. Thus, for the weighted school participation rates including substitute schools, the guidelines were set at 90 percent.

If a jurisdiction meets either standard (i.e., 85 percent or higher prior to substitution or 90 percent or higher after substitution), there will be no notation for the relevant overall school participation rate.

Guideline 6 - Notation for Strata-Specific Public School Participation Rates. A jurisdiction that is not already receiving a notation under Guideline 4 will receive a notation if the sample of public schools included a class of schools with similar characteristics that had a weighted participation rate (after substitution) of below 80 percent, and from which the nonparticipating schools together accounted for more than five percent of the jurisdiction's total weighted sample of public schools. The classes of schools from each of which a jurisdiction needed minimum school participation levels were determined by degree of urbanization, minority enrollment, and median household income of the area in which the school is located.

Guideline 7 - Notation for Strata-Specific Nonpublic School Participation Rates. A jurisdiction that is not already receiving a notation under Guideline 5 will receive a notation if the sample of nonpublic schools included a class of schools with similar characteristics that had a weighted participation rate (after substitution) of below 80 percent, and from which the nonparticipating schools together accounted for more than five percent of the jurisdiction's total weighted sample of nonpublic schools. The classes of schools from each of which a jurisdiction needed minimum school participation levels were determined by type of nonpublic school (Catholic versus non-Catholic) and location (metropolitan versus nonmetropolitan).

Discussion. The NCES standards specify that attention should be given to the representativeness of the sample coverage. Thus, if some important segment of the jurisdiction's population is not adequately represented, it is of concern, regardless of the overall participation rate.

If nonparticipating schools are concentrated within a particular class of schools, the potential for substantial bias remains, even if the overall level of school participation appears to be satisfactory. Nonresponse adjustment cells for public schools have been formed within each jurisdiction, and the schools within each cell are similar with respect to minority enrollment, degree of urbanization, and/or median household income, as appropriate for each jurisdiction. For nonpublic schools, nonresponse adjustment cells are determined by type and location of school.

If the weighted response rate, after substitution, for a single adjustment cell falls below 80 percent, and more than five percent (weighted) of the sampled schools are nonparticipants from such a cell, the potential for nonresponse bias is too great. These guidelines are based on the NCES standard for stratum-specific school response rates. This criterion, that the nonparticipating schools in a class constitute more than five percent of the jurisdiction's population (i.e., the total weighted samples of public or nonpublic schools), is included to insure that the notation is triggered only if the subgroup having a response below 80 percent makes up at least one quarter of the jurisdiction's student population (separately by public and nonpublic schools). This means that a notation is triggered only in cases where a substantial subgroup has experienced an unsatisfactory response. Without this criterion, it is possible that a response rate of just below 80 percent in a small population subgroup could trigger a notation inappropriately. These guidelines are based on the NCES standard for stratum-specific school response rates.

Guideline 8 - Notation for Overall Student Participation Rate in Public Schools. A jurisdiction that meets Guideline 1 will receive a notation if the weighted student response rate within participating public schools was below 85 percent.

Guideline 9 - Notation for Overall Student Participation Rate in Nonpublic Schools. A jurisdiction that meets Guideline 2 will receive a notation if the weighted student response rate within participating nonpublic schools was below 85 percent.

Discussion. These guidelines follow the NCES standard of 85 percent for overall student participation rates. The weighted student participation rate is based on all eligible students from initially selected or substitute schools who participated in the assessment in either an initial session or a make-up session. If the rate falls below 85 percent, the potential for bias due to students' nonresponse is too great.

Guideline 10 - Notation for Strata-Specific Student Participation Rates in Public Schools. A jurisdiction that is not already receiving a notation under Guideline 8 will receive a notation if the sampled students within participating public schools included a class of students with similar characteristics that had a weighted student response rate of below 80 percent, and from which the nonresponding students together accounted for more than five percent of the jurisdiction's weighted assessable public school student sample. Student groups from which a jurisdiction needed minimum levels of participation were determined by the age of the student, whether or not the student was classified as a student with a disability (SD) or of limited English proficiency (LEP), and the type of assessment session (monitored or unmonitored), as well as school level of urbanization, minority enrollment, and median household income of the area in which the school is located.

Guideline 11 - Notation for Strata-Specific Student Participation Rates in Nonpublic Schools. A jurisdiction that is not already receiving a notation under Guideline 9 will receive a notation if the sampled students within participating nonpublic schools included a class of students with similar characteristics that had a weighted student response rate of below 80 percent, and from which the nonresponding students together accounted for more than five percent of the jurisdiction's weighted assessable nonpublic school student sample. Student groups from which a jurisdiction needed minimum levels of participation were determined by the age of the student, whether or not the student was classified as a student with a disability (SD) or of limited English proficiency (LEP), and the type of assessment session (monitored or unmonitored), as well as type and location of school.

Discussion. These guidelines address the fact that if nonparticipating students are concentrated within a particular class of students, the potential for substantial bias remains, even if the overall student participation level appears to be satisfactory. Student nonresponse adjustment cells have been formed using the school-level nonresponse adjustment cells, together with the student's age and the nature of the assessment session (unmonitored or monitored).

If the weighted response rate for a single adjustment cell falls below 80 percent, and more than five percent (weighted) of the invited students who do not participate in the assessment are from such a cell, the potential for nonresponse bias is too great. These guidelines are based on the NCES standard for stratum-specific student response rates.

Derivation of Weighted Participation Rates

Weighted School Participation Rates. The weighted school participation rates within each jurisdiction provide the percentages of fourth- or eighth-grade students in public (or nonpublic) schools who are represented by the schools participating in the assessment, prior to statistical adjustments for school nonresponse.

Two sets of weighted school participation rates are computed for each jurisdiction, one for public schools and one for nonpublic schools. Each set consists of two weighted participation rates. The first is the weighted participation rate for the initial sample of schools. This rate is based only on those schools that were initially selected for the assessment. The numerator of this rate is the sum of the number of students represented by each initially selected school that participated in the assessment. The denominator is the sum of the number of students represented by each of the initially selected schools found to have eligible students enrolled. This includes both participating and nonparticipating schools.

The second is the weighted participation rate after substitution. The numerator of this rate is the sum of the number of students represented by each of the participating schools, whether originally selected or a substitute. The denominator is the same as that for the weighted participation rate for the initial sample. This means that, for a given jurisdiction and type of school, the weighted participation rate after substitution is always at least as great as the weighted participation rate for the initial sample of schools.

In general, different schools in the sample can represent different numbers of students in the jurisdiction's population. The number of students represented by an initially selected school (the school weight) is the fourth- or eighth-grade enrollment of the school divided by the probability that the school was included in the sample. For instance, a selected school with a eighth-grade enrollment of 150 and a selection probability of 0.2 represents 750 students from that jurisdiction. The number of students represented by a substitute school is the number of students represented by the replaced nonparticipating school.

Because each selected school represents different numbers of students in the population, the weighted school participation rates may differ somewhat from the simple unweighted rates. (The unweighted rates are calculated from the counts of schools by dividing the number of participating schools by the number of schools in the sample with eligible students enrolled.) The difference between the weighted and the unweighted rates is potentially largest in smaller jurisdictions where all schools with fourth- or eighth-grade students were included in the sample (that is, where no substitutes are available). In those jurisdictions, each school represents only its own students. Therefore, the nonparticipation of a large school reduces the weighted school participation rate by a greater amount than does the nonparticipation of a small school.

The nonparticipation of larger schools also has greater impact than that of smaller schools on reducing weighted school participation rates in larger jurisdictions where fewer than all of the schools were included in the sample. However, since the number of students represented by each school is more nearly constant in larger states, the difference between the impact of nonparticipation by either large or small schools is less marked than in jurisdictions where all schools were selected.

In general, the greater the population in the jurisdiction, the smaller the difference between the weighted and unweighted school participation rates. However, even in the less populous jurisdictions, the differences tend to be small.

Weighted Student Participation Rate. The weighted student participation rate provides the percentage of the eligible student population from participating schools within the jurisdiction that are represented by the students who participated in the assessment (in either an initial session or a make-up session). Separate weighted student participation rates were calculated for public and nonpublic school students. The eligible student population from participating schools (public or nonpublic) within a jurisdiction consists of all students who were in the fourth or eighth grade, who attended a school that, if selected, would have participated and who, if selected, would not have been excluded from the assessment. The numerator of this rate is the sum, across all assessed students, of the number of students represented by each assessed student (prior to adjustment for student nonparticipation). The denominator is the sum of the number of students represented by each selected student who was invited and eligible to participate (i.e., not excluded), including students who did not participate. Thus, the denominator is an estimate of the total number of assessable students in the group of schools within the jurisdiction that would have participated if selected.

The number of students represented by a single selected student (the student weight) is 1.0 divided by the overall probability that the student was selected for assessment. In general, the number of students from a jurisdiction's population represented by a sampled student is approximately constant across students. Consequently, there is little difference between the weighted student participation rate and the unweighted student participation rate.

Weighted Overall School and Student Participation Rate. An overall indicator of the effect of nonparticipation by both students and schools is given by the overall participation rate. Separate overall rates were calculated for public and nonpublic school samples. For each school type (public or nonpublic), these weights were calculated as the product of the weighted school participation rate (after substitution), and the weighted student participation rate. For jurisdictions having a high overall participation rate, the potential is low for bias to be introduced through either school nonparticipation or student nonparticipation. This rate provides a summary measure that indicates the proportion of the jurisdiction's fourth- or eighth-grade public or nonpublic school student population that is directly represented by the final student sample. When the overall rate is high, the adjustments for nonresponse that are used in deriving the final survey weights are likely to be effective in maintaining nonresponse bias at a negligible level. Conversely, when the overall rate is relatively low there is a greater chance that a non-negligible bias remains even after making such adjustments.

The overall rate is not used in establishing the guidelines/notations for school and student participation, since guidelines already exist covering school and student participation separately.

Derivation of Weighted Percentages for Excluded Students

Weighted Percentage of Excluded Students. The weighted percentage of excluded students estimates the percentage of the fourth- or eighth-grade population in the jurisdiction's schools that is represented by the students who were excluded from the assessment, after accounting for school nonparticipation. The numerator is the sum, across all excluded students, of the number of students represented by each excluded student. The denominator is the sum of the number of students represented by each of the students who was sampled (and had not withdrawn from the school at the time of the assessment).

Weighted Percentage of Students with Disabilities (SD). The weighted percentage of SD students estimates the percentage of the fourth- or eighth-grade population in the jurisdiction's schools represented by the students who were classified as SD, after accounting for school nonparticipation. The numerator is the sum, across all students classified as SD, of the number of students represented by each SD student. The denominator is the sum of the number of students represented by each of the students who was sampled (and had not withdrawn from the school at the time of the assessment).

Weighted Percentage of Excluded SD Students. The weighted percentage of excluded SD students estimates the percentage of students in the jurisdiction who are represented by those SD students excluded from the assessment, after accounting for school nonparticipation. The numerator is the sum, across all students classified as SD and excluded from the assessment, of the number of students represented by each excluded SD student. The denominator is the sum of the number of students represented by each of the students who was sampled (and had not withdrawn from the school at the time of the assessment).

Weighted Percentage of Limited English Proficiency (LEP) Students. The weighted percentage of LEP students estimates the percentage of the fourth- or eighth-grade population in the jurisdiction's schools represented by the students who were classified as LEP, after accounting for school nonparticipation. The numerator is the sum, across all students classified as LEP, of the number of students represented by each LEP student. The denominator is the sum of the number of students represented by each of the students who was sampled (and had not withdrawn from the school at the time of the assessment).

Weighted Percentage of Excluded LEP Students. The weighted percentage of LEP students who were excluded estimates the percentage of students in the jurisdiction represented by those LEP students excluded from the assessment, after accounting for school nonparticipation. The numerator is the sum, across all students classified as LEP and excluded from the assessment, of the number of students represented by each excluded LEP student. The denominator is the sum of the number of students represented by each student who was sampled (and had not withdrawn from the school at the time of the assessment).

Note: All percentages are based on student weights that have been adjusted for school-level nonresponse. All weighted percentages were calculated separately for public and nonpublic school samples.

Table B-1

School Participation Rates, Grade 4, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage School Participation Before Substitution	Weighted Percentage School Participation After Substitution	Number of Schools in Original Sample	Number of Schools not Eligible	Number of Schools in Original Sample that Participated	Number of Substituted Schools Provided	Number of Substituted Schools that Participated	Total Number of Schools that Participated
NATION	83	83	246	3	209	5	0	209
JURISDICTIONS								
Alabama	79	93	107	1	84	22	15	99
Alaska	91	91	138	5	113	17	0	113
Arizona	87	87	106	1	91	14	0	91
Arkansas	76	78	107	2	79	21	2	81
California	80	94	106	0	84	22	15	99
Colorado	99	99	107	0	107	0	0	107
Connecticut	100	100	105	0	105	0	0	105
Delaware	100	100	53	2	51	0	0	51
District of Columbia	100	100	109	1	108	0	0	108
DoDEA/DDESS	100	100	38	0	38	0	0	38
DoDEA/DoDDS	100	100	95	2	93	0	0	93
Florida	100	100	106	0	106	0	0	106
Georgia	98	98	106	2	103	1	0	103
Guam	100	100	22	0	22	0	0	22
Hawaii	100	100	106	0	106	0	0	106
Indiana	87	91	106	0	92	14	4	96
Iowa	79	87	108	0	87	20	8	95
Kentucky	88	96	107	1	93	12	9	102
Louisiana	100	100	109	1	108	0	0	108
Maine	87	87	[illegible]	5	97	14	0	97
Maryland	93	93	107	0	99	8	0	99
Massachusetts	97	97	105	2	103	3	0	103
Michigan	[illegible]	85	106	[illegible]	81	25	13	94
Minnesota	[illegible]	[illegible]	[illegible]	1	91	9	2	99
Mississippi	92	97	109	3	97	7	6	103
Missouri	96	99	105	0	103	5	4	107
Montana	70	[illegible]	133	10	83	36	16	99
Nebraska	100	100	[illegible]	[illegible]	132	[illegible]	0	132
Nevada	94	96		1	93	13	2	95
New Jersey	[illegible]	[illegible]	[illegible]	1	75	24	0	78
New Mexico	100	100	108	1	107	0	0	107
New York	73	86	[illegible]	2	77	26	13	90
North Carolina	97	97	109	1	106	3	0	106
North Dakota	75	96	130	5	94	30	26	120
Oregon	84	97	[illegible]	4	91	15	4	95
Pennsylvania	73	86	102	1	77	24	13	90
Rhode Island	84	99	104	3	93	12	11	104
South Carolina	87	88	106	1	93	14	1	92
Tennessee	94	94	108	4	98	6	0	98
Texas	97	97	[illegible]	0	102	5	2	104
Utah	100	100	107	1	106	0	0	106
Vermont	74	87	127	6	95	12	5	100
Virginia	[illegible]	100	105	1	104	0	0	104
Washington	96	96	106	0	105	1	0	105
West Virginia	100	100	112	3	109	0	0	109
Wisconsin	92	94	107	2	97	8	2	99
Wyoming	100	100	[illegible]	1	[illegible]	0	0	115

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation. For Delaware, the District of Columbia, DDESS, and Guam, the State Assessment was based on all eligible public schools (i.e., there was no sampling of public schools).

[1] The state's public school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%.

[2] The nonparticipating public schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of public schools.

In Colorado, Georgia, Iowa, and New Jersey, the materials from one school that conducted an assessment were lost in shipping. The school is included in the counts of participating schools, both before and after substitution. However, in the weighted results, the school is treated in the same manner as a nonparticipating school because no student responses were available for analysis and reporting.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment

Table B-2

School Participation Rates, Grade 4, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage School Participation Before Substitution	Weighted Percentage School Participation After Substitution	Number of Schools in Original Sample	Number of Schools not Eligible	Number of Schools in Original Sample that Participated	Number of Substituted Schools Provided	Number of Substituted Schools that Participated	Total Number of Schools that Participated
NATION	79	79	105	5	77	0	0	77
JURISDICTIONS								
Alabama`	72	72	15	0	10	5	0	10
Arizona'	78	87	13	1	9	1	1	10
Arkansas	86	86	12	2	8	1	0	8
California5	73	73	19	4	11	4	0	11
Colorado'	76	76	15	2	10	3	0	10
Connecticut`	75	75	19	2	13	4	0	13
Delaware'	41	43	44	11	12	9	1	13
District of Columbia'	63	66	34	5	17	4	1	18
Florida'	66	73	19	3	11	4	1	12
Georgia	99	99	14	0	13	1	0	13
Guam`	78	78	14	1	9	0	0	9
Indiana'	79	86	24	5	14	5	1	15
Iowa'	82	82	19	0	15	3	0	15
Kentucky	87	87	19	3	13	3	0	13
Louisiana	86	86	24	2	19	3	0	19
Maine'	71	74	16	5	7	4	1	8
Maryland'	57	57	24	5	11	7	0	11
Massachusetts`	84	84	19	1	15	2	0	15
Michigan	86	74	22	3	16	2	2	18
Minnesota`	78	73	23	4	15	4	0	15
Mississippi`	79	79	15	0	11	4	0	11
Missouri	99	100	23	0	22	1	1	23
Montana	94	94	19	6	10	3	0	10
Nebraska	91	91	27	2	22	3	0	22
Nevada	91	100	11	2	8	1	1	9
New Jersey'	64	75	26	4	14	8	2	16
New Mexico	90	90	20	5	13	1	0	13
New York`	83	91	27	2	21	4	2	23
North Dakota'	68	68	21	2	12	7	0	12
Oregon'	34	34	15	3	4	7	0	4
Pennsylvania'	66	66	35	1	19	15	0	19
Texas'	64	64	10	4	4	2	0	4
Utah`	81	81	10	1	7	2	0	7
Vermont`	74	74	19	6	9	3	0	9
Wisconsin'	68	73	38	3	23	12	2	25
Wyoming	82	95	11	3	6	2	1	7

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation. For Guam, the State Assessment was based on all eligible schools (i.e., there was no sampling of nonpublic schools).

[2]The state's nonpublic school weighted participation rate for the initial sample was less than 70%.

[5]The state's nonpublic school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%.

[7]The nonparticipating nonpublic schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of nonpublic schools.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-3

Student Participation Rates, Grade 4, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage Student Participation After Make-Ups	Number of Students in Original Sample	Number of Students in Supplemental Sample	Number of Students Withdrawn	Number of Students Excluded	Number of Students To Be Assessed	Number of Students Assessed Initial Sessions	Number of Students Assessed Makeups	Total Number of Students Assessed
NATION	95	5,758		68	197	5,493	5,148	67	5,215
JURISDICTIONS									
Alabama	96	2,739	72	85	80	2,646	2,479	62	2,541
Alaska	91	2,634	38	88	56	2,528	2,299	5	2,304
Arizona	95	2,467	87	132	182	2,240	2,095	18	2,113
Arkansas	96	2,237	58	93	72	2,130	2,039	8	2,047
California	94	2,464	41	73	245	2,187	2,060	3	2,063
Colorado	95	2,923	92	124	138	2,753	2,599	10	2,609
Connecticut	96	2,853	53	99	123	2,684	2,560	5	2,565
Delaware	94	2,215	93	124	85	2,099	1,972	12	1,984
District of Columbia	95	2,949	71	143	155	2,722	2,539	35	2,574
DoDEA/DDESS	95	1,438	84	111	27	1,384	1,307	6	1,313
DoDEA/DoDDS	94	3,010	172	354	73	2,755	2,583	21	2,604
Florida	94	2,891	118	132	168	2,709	2,543	6	2,549
Georgia	95	2,836	96	146	107	2,679	2,530	12	2,542
Guam	94	1,676	15	67	104	1,520	1,415	16	1,431
Hawaii	95	2,925	72	214	82	2,701	2,569	9	2,578
Indiana	96	2,665	68	92	75	2,566	2,469	1	2,470
Iowa	97	2,517	34	47	67	2,437	2,357	2	2,359
Kentucky	95	2,849	67	125	89	2,702	2,561	18	2,579
Louisiana	95	2,964	71	112	118	2,805	2,666	5	2,671
Maine	94	2,365	36	44	104	2,253	2,109	6	2,115
Maryland	96	2,761	60	139	107	2,575	2,452	13	2,465
Massachusetts	95	2,753	44	58	128	2,611	2,488	9	2,497
Michigan	94	2,653	59	80	88	2,544	2,364	18	2,382
Minnesota	94	2,686	31	73	85	2,559	2,392	33	2,425
Mississippi	96	2,927	91	106	76	2,836	2,705	11	2,716
Missouri	95	2,857	77	74	83	2,777	2,595	48	2,643
Montana	96	2,415	35	52	58	2,340	2,235	16	2,251
Nebraska	95	2,923	49	73	78	2,821	2,676	2	2,678
Nevada	92	2,539	39	81	120	2,377	2,177	16	2,193
New Jersey	95	2,154	38	58	66	2,068	1,943	18	1,961
New Mexico	94	2,779	69	115	191	2,542	2,379	10	2,389
New York	94	2,517	27	37	121	2,386	2,234	14	2,248
North Carolina	96	2,922	62	91	114	2,779	2,629	29	2,658
North Dakota	96	2,842	30	42	58	2,772	2,643	23	2,666
Oregon	95	2,495	81	106	121	2,349	2,223	10	2,233
Pennsylvania	95	2,568	38	67	70	2,469	2,315	32	2,347
Rhode Island	95	2,746	46	93	98	2,601	2,461	0	2,461
South Carolina	95	2,584	70	95	77	2,482	2,349	15	2,364
Tennessee	96	2,716	55	98	96	2,577	2,440	33	2,473
Texas	96	2,740	90	125	178	2,527	2,384	29	2,413
Utah	95	2,860	75	116	86	2,751	2,566	59	2,625
Vermont	96	2,318	49	47	80	2,240	2,112	24	2,136
Virginia	95	2,866	85	131	102	2,718	2,583	3	2,586
Washington	94	2,888	73	72	81	2,808	2,630	10	2,640
West Virginia	95	2,784	76	95	118	2,647	2,522	8	2,530
Wisconsin	95	2,685	31	43	109	2,564	2,424	13	2,437
Wyoming	96	2,963	73	94	67	2,875	2,708	50	2,758

See preceding text for explanations of the guidelines about sample representativeness and for the derivation of weighted participation. For the national sample, Column 3 is not applicable.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-4

Student Participation Rates, Grade 4, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage Student Participation After Make-Ups	Number of Students in Original Sample	Number of Students in Supplemental Sample	Number of Students Withdrawn	Number of Students Excluded	Number of Students To Be Assessed	Number of Students Assessed Initial Sessions	Number of Students Assessed Make-Ups	Total Number of Students Assessed
NATION	97	1,470		8	7	1,455	1,394	18	1,412
JURISDICTIONS									
Alabama	97	248	1	2	0	247	239	0	239
Arizona	99	196	0	5	3	188	185	0	185
Arkansas	97	184	2	4	2	180	174	0	174
California	98	263	3	3	0	263	256	0	256
Colorado	96	186	2	1	4	183	164	10	174
Connecticut	96	258	1	0	2	257	245	0	245
Delaware	95	356	3	3	2	354	334	3	337
District of Columbia	96	413	1	2	0	412	391	4	395
Florida	96	245	5	6	2	242	230	2	232
Georgia	94	260	22	14	1	267	247	4	251
Guam	94	345	1	6	4	336	317	0	317
Indiana	96	312	2	4	1	309	297	0	297
Iowa	96	297	0	0	1	296	269	15	284
Kentucky	97	316	5	10	2	309	300	0	300
Louisiana	97	460	8	3	5	460	444	0	444
Maine	97	105	0	0	0	105	101	0	101
Maryland	98	276	1	2	0	275	269	0	269
Massachusetts	96	322	0	1	2	319	305	0	305
Michigan	97	353	3	3	0	353	342	0	342
Minnesota	96	291	0	0	1	290	277	0	277
Mississippi	96	276	7	3	0	280	268	0	268
Missouri	95	472	3	5	1	469	444	5	449
Montana	95	178	4	0	0	182	173	0	173
Nebraska	99	443	3	5	1	440	433	0	433
Nevada	96	181	1	2	0	180	173	0	173
New Jersey	94	349	4	0	0	353	334	0	334
New Mexico	94	225	18	13	7	223	212	0	212
New York	96	523	2	6	1	518	495	0	495
North Dakota	95	158	4	1	1	160	152	0	152
Oregon	96	74	1	3	0	72	69	0	69
Pennsylvania	96	423	1	4	3	417	401	0	401
Texas	96	107	2	1	2	106	101	0	101
Utah	95	154	2	3	0	153	146	0	146
Vermont	97	148	2	0	0	150	145	0	145
Wisconsin	97	496	2	4	0	494	480	0	480
Wyoming	96	91	1	3	1	88	84	0	84

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation. For the national sample, Column 3 is not applicable.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-5

Summary of School and Student Participation, Grade 4
1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage School Participation Before Substitution	Notation Number 1	Weighted Percentage School Participation After Substitution	Notation Number 4	Notation Number 6	Weighted Percentage Student Participation After Make-Ups	Notation Number 8	Weighted Overall Rate
NATION	83		83			95		79
JURISDICTION								
Alabama	79		93			96		90
Alaska	91		91		•	91		83
Arizona	87		87			95		82
Arkansas	76		78	•		96		74
California	80		94			94		89
Colorado	99		99			95		94
Connecticut	100		100			96		96
Delaware	100		100			94		94
District of Columbia	100		100			95		95
DoDEA/DDESS	100		100			95		95
DoDEA/DoDDS	100		100			94		94
Florida	100		100			94		94
Georgia	98		98			95		93
Guam	100		100			94		94
Hawaii	100		100			95		95
Indiana	87		91			96		87
Iowa	79		87	•		97		84
Kentucky	88		96			95		92
Louisiana	100		100			95		95
Maine	87		87			94		81
Maryland	93		93			96		89
Massachusets	97		97			95		92
Michigan	76		88	•		94		82
Minnesota	91		93			94		88
Mississippi	92		97			96		93
Missouri	96		99			95		95
Montana	70		81	•		96		79
Nebraska	100		100			95		95
Nevada	84		86	•		92		79
New Jersey	73		73	•		95		69
New Mexico	100		100			94		94
New York	73		86	•		94		80
North Carolina	97		97			96		93
North Dakota	75		96			96		92
Oregon	86		90			95		85
Pennsylvania	73		86	•		95		81
Rhode Island	89		99			95		94
South Carolina	87		88		•	95		84
Tennessee	94		94			96		90
Texas	95		97			96		93
Utah	100		100			95		95
Vermont	78		81	•		96		77
Virginia	100		100			95		95
Washington	99		99			94		93
West Virginia	100		100			95		95
Wisconsin	92		94			95		90
Wyoming	100		100			96		96

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation.

Notation Number 1: The state's public school weighted participation rate for the initial sample was less than 70%.

Notation Number 4: The state's public school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%.

Notation Number 6: The nonparticipating public schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of public schools.

Notation Number 8: The weighted student response rate within participating public schools was below 85%.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment

Table B-6

Summary of School and Student Participation, Grade 4
1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage School Participation Before Substitution	Notation Number 2	Weighted Percentage School Participation After Substitution	Notation Number 5	Notation Number 7	Weighted Percentage Student Participation Ater Make-Ups	Notation Number 9	Weighted Overall Rate
NATION	79		79			97		77
JURISDICTIONS								
Alabama	72		72	•		97		69
Arizona	78		87	•		99		86
Arkansas	86		86			97		83
California	73		73	•		98		72
Colorado	76		76	•		96		73
Connecticut	75		75	•		96		71
Delaware	41	•	43			95		41
District of Columbia	63	•	66			96		63
Florida	66	•	73			96		69
Georgia	99		99			94		92
Guam	78		78	•		94		74
Indiana	79		86	•		96		83
Iowa	82		82	•		96		79
Kentucky	87		87			97		84
Louisiana	86		86			97		83
Maine	71		74	•		97		72
Maryland	57	•	57			98		56
Massachusetts	84		84	•		96		81
Michigan	86		94			97		91
Minnesota	78		78	•		96		75
Mississippi	79		79	•		96		76
Missouri	99		100			95		95
Montana	94		94			95		89
Nebraska	91		91			99		90
Nevada	91		100			96		96
New Jersey	64	•	75			94		70
New Mexico	90		90			94		85
New York	83		91		•	96		87
North Dakota	68	•	68			95		64
Oregon	34	•	34			96		33
Pennsylvania	66	•	66			96		63
Texas	64	•	64			96		61
Utah	81		81	•		95		77
Vermont	74		74	•		97		72
Wisconsin	68	•	73			97		71
Wyoming	82		95			96		92

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation.

Notation Number 2: The state's nonpublic school weighted participation rate for the initial sample was less than 70%.

Notation Number 5: The state's nonpublic school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%.

Notation Number 7: The nonparticipating nonpublic schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of nonpublic schools.

Notation Number 9: The weighted student response rate within participating nonpublic schools was below 85%.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-7

Weighted Percentages of Students Excluded (SD and LEP) from Student Sample, Grade 4
1996 Mathematics Assessment, Public Schools

Public Schools	Total Percentage Students Identified SD and LEP	Total Percentage Students Excluded	Percentage Students Identified SD	Percentage Students Excluded SD	Percentage Students Identified LEP	Percentage Students Excluded LEP
NATION	15	6	11	5	4	2
JURISDICTIONS						
Alabama	11	6	11	6	0	0
Alaska	21	4	13	3	9	1
Arizona	22	13	10	7	13	7
Arkansas	9	7	9	6	0	0
California	33	16	9	6	26	13
Colorado	16	9	13	7	4	2
Connecticut	15	8	12	6	3	2
Delaware	14	7	11	5	2	2
District of Columbia	14	11	9	7	6	5
DoDEA/DDESS	9	4	8	3	1	1
DoDEA/DoDDS	10	5	9	4	2	1
Florida	19	10	14	7	6	3
Georgia	13	7	12	6	2	1
Guam	16	13	7	6	9	7
Hawaii	14	6	9	4	5	1
Indiana	11	5	11	5	1	0
Iowa	12	5	10	4	2	1
Kentucky	10	6	10	6	0	0
Louisiana	13	7	13	7	1	0
Maine	16	8	15	8	0	0
Maryland	14	8	13	7	1	1
Massachusets	16	8	14	7	2	2
Michigan	12	7	10	6	2	1
Minnesota	13	6	10	4	3	1
Mississippi	7	5	7	5	0	0
Missouri	15	5	14	5	1	0
Montana	10	5	10	5	0	0
Nebraska	16	5	14	5	2	1
Nevada	15	8	10	6	6	3
New Jersey	10	6	9	5	2	1
New Mexico	22	12	14	8	10	5
New York	17	9	10	6	7	4
North Carolina	15	7	13	7	2	1
North Dakota	11	4	10	3	0	0
Oregon	20	9	13	6	7	3
Pennsylvania	10	5	9	4	1	1
Rhode Island	13	6	13	5	5	2
South Carolina	13	6	12	6	0	0
Tennessee	14	7	12	6	1	1
Texas	25	11	13	8	14	5
Utah	13	6	11	5	2	[illegible]
Vermont	14	6	14	6	1	0
Virginia	14	7	12	6	2	1
Washington	14	6	11	5	3	1
West Virginia	13	8	13	8	0	0
Wisconsin	12	8	11	8	2	1
Wyoming	12	4	12	4	1	0

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.
To be excluded, a student was supposed to be classified as SD or as LEP and judged incapable of participating in the assessment. A student reported as belonging to both SD and LEP classifications is counted once in the overall rate (first column), once in the overall excluded rate (second column), and separately in the remaining columns.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-8

Weighted Percentages of Students Excluded (SD and LEP) from Student Sample, Grade 4 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Total Percentage Students Identified SD and LEP	Total Percentage Students Excluded	Percentage Students Identified SD	Percentage Students Excluded SD	Percentage Students Identified LEP	Percentage Students Excluded LEP
NATION	2	1	2	1	0	0
JURISDICTIONS						
Alabama	0	0	0	0	0	0
Arizona	43	3	3	3	43	3
Arkansas	4	2	2	1	1	1
California	0	0	0	0	0	0
Colorado	5	5	5	5	0	0
Connecticut	7	1	5	0	3	1
Delaware	1	1	1	1	0	0
District of Columbia	1	0	0	0	1	0
Florida	1	1	1	1	0	0
Georgia	5	2	5	2	0	0
Guam	3	2	0	0	3	2
Indiana	3	1	2	0	1	1
Iowa	2	1	2	1	0	0
Kentucky	2	1	2	1	0	0
Louisiana	7	2	7	1	0	0
Maine	3	0	3	0	0	0
Maryland	0	0	0	0	0	0
Massachusetts	6	1	6	1	0	0
Michigan	3	0	2	0	0	0
Minnesota	5	1	5	1	0	0
Mississippi	8	0	8	0	0	0
Missouri	3	0	3	0	0	0
Montana	0	0	0	0	0	0
Nebraska	2	0	1	0	1	0
Nevada	0	0	0	0	0	0
New Jersey	3	0	3	0	0	0
New Mexico	15	7	7	7	12	4
New York	14	1	1	1	14	1
North Dakota	4	2	4	2	0	0
Oregon	0	0	0	0	0	0
Pennsylvania	2	1	2	1	0	0
Texas	3	3	3	3	0	0
Utah	0	0	0	0	0	0
Vermont	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0
Wyoming	4	4	4	4	0	0

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.
To be excluded, a student was supposed to be classified as SD or as LEP and judged incapable of participating in the assessment. A student reported as belonging to both SD and LEP classifications is counted once in the overall rate (first column), once in the overall excluded rate (second column), and separately in the remaining columns.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-9

Weighted Percentages of Absent, SD, and LEP Students Based on Those Invited to Participate
Grade 4, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage Student Participation After Make-Ups	Weighted Percentage Absent	Weighted Percentage Assessed SD	Weighted Percentage Absent SD	Weighted Percentage Assessed LEP	Weighted Percentage Absent LEP
NATION	95	5	94	6	96	4
JURISDICTIONS						
Alabama	96	4	93	7	100	0
Alaska	91	9	93	7	92	8
Arizona	95	5	94	6	96	4
Arkansas	96	4	98	2	0	100
California	94	6	92	8	97	3
Colorado	95	5	93	7	92	8
Connecticut	96	4	95	5	95	5
Delaware	94	6	93	7	88	12
District of Columbia	95	5	95	5	97	3
DoDEA/DDESS	95	5	94	6	100	0
DoDEA/DoDDS	94	6	95	5	100	0
Florida	94	6	90	10	93	7
Georgia	95	5	90	10	91	9
Guam	94	6	100	0	93	7
Hawaii	95	5	92	8	94	6
Indiana	96	4	94	6	0	100
Iowa	97	3	96	4	100	0
Kentucky	95	5	98	2	0	100
Louisiana	95	5	95	5	100	0
Maine	94	6	91	9	100	0
Maryland	96	4	96	4	100	0
Massachusetts	95	5	91	9	100	0
Michigan	94	6	90	10	81	19
Minnesota	94	6	87	13	97	3
Mississippi	96	4	97	3	0	100
Missouri	95	5	97	3	100	0
Montana	96	4	97	3	100	0
Nebraska	95	5	93	7	83	17
Nevada	92	8	92	8	87	13
New Jersey	95	5	92	8	100	0
New Mexico	94	6	96	4	98	2
New York	94	6	86	14	91	9
North Carolina	96	4	97	3	100	0
North Dakota	96	4	94	6	100	0
Oregon	95	5	95	5	95	5
Pennsylvania	95	5	93	7	48	52
Rhode Island	95	5	97	3	94	6
South Carolina	95	5	96	4	100	0
Tennessee	96	4	91	9	80	20
Texas	96	4	98	2	97	3
Utah	95	5	90	10	100	0
Vermont	96	4	93	7	100	0
Virginia	95	5	93	7	100	0
Washington	94	6	87	13	98	2
West Virginia	95	5	89	11	100	0
Wisconsin	95	5	94	6	96	4
Wyoming	96	4	93	7	100	0

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-10

Weighted Percentages of Absent, SD, and LEP Students Based on Those Invited to Participate Grade 4, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage Student Participation After Make-Ups	Weighted Percentage Absent	Weighted Percentage Assessed SD	Weighted Percentage Absent SD	Weighted Percentage Assessed LEP	Weighted Percentage Absent LEP
NATION	97	3	86	14	-	-
JURISDICTIONS						
Alabama	97	3	0	100	0	100
Arizona	99	1	0	100	100	0
Arkansas	97	3	100	0	0	100
California	98	2	0	100	0	100
Colorado	96	4	0	100	0	100
Connecticut	96	4	100	0	100	0
Delaware	95	5	0	100	0	100
District of Columbia	96	4	0	100	100	0
Florida	96	4	0	100	0	100
Georgia	94	6	100	0	0	100
Guam	94	6	0	100	100	0
Indiana	96	4	100	0	0	100
Iowa	96	4	100	0	0	100
Kentucky	97	3	50	50	0	100
Louisiana	97	3	92	8	0	100
Maine	97	3	100	0	0	100
Maryland	98	2	0	100	0	100
Massachusetts	96	4	100	0	0	100
Michigan	97	3	100	0	100	0
Minnesota	96	4	100	0	0	100
Mississippi	96	4	100	0	0	100
Missouri	95	5	84	16	0	100
Montana	95	5	0	100	0	100
Nebraska	99	1	100	0	100	0
Nevada	96	4	0	100	0	100
New Jersey	94	6	67	33	0	100
New Mexico	94	6	0	100	88	13
New York	96	4	0	100	100	0
North Dakota	95	5	100	0	0	100
Oregon	96	4	0	100	0	100
Pennsylvania	96	4	100	0	0	100
Texas	96	4	0	100	0	100
Utah	95	5	0	100	0	100
Vermont	97	3	0	100	0	100
Wisconsin	97	3	0	100	0	100
Wyoming	96	4	0	100	0	100

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.
The dash (-) indicates that there were no students in that category.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-11

Questionnaire Response Rates, Grade 4, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage of Students Matched to Mathematics Teacher Questionnaires	Weighted Percentage of Students Matched to School Characteristics/ Policies Questionnarie	Percentage of School Characteristics/ Policies Questionnaires Returned	Percentage of SD/LEP Student[1] Questionnaires Returned
NATION	95	96	96	85
JURISDICTIONS				
Alabama	97	92	93	95
Alaska	86	67	88	83
Arizona	89	95	95	87
Arkansas	97	88	89	93
California	93	84	86	83
Colorado	97	93	93	93
Connecticut	98	91	90	95
Delaware	95	98	96	95
District of Columbia	93	88	89	87
DoDEA/DDESS	95	87	84	94
DoDEA/DoDDS	94	97	96	92
Florida	96	86	87	89
Georgia	98	92	92	92
Guam	89	90	95	77
Hawaii	95	89	89	93
Indiana	97	92	93	90
Iowa	95	93	93	93
Kentucky	94	91	92	94
Louisiana	99	88	90	85
Maine	95	96	95	90
Maryland	97	89	90	90
Massachusetts	97	86	85	90
Michigan	97	88	88	93
Minnesota	96	87	89	89
Mississippi	96	92	92	92
Missouri	91	88	87	94
Montana	93	92	93	91
Nebraska	97	92	92	94
Nevada	97	90	92	91
New Jersey	98	94	94	93
New Mexico	92	90	90	85
New York	97	96	96	90
North Carolina	96	95	95	91
North Dakota	95	96	95	90
Oregon	95	92	94	88
Pennsylvania	97	90	90	90
Rhode Island	99	92	91	94
South Carolina	97	89	89	91
Tennessee	97	94	94	89
Texas	92	89	88	87
Utah	94	92	92	90
Vermont	98	92	91	90
Virginia	97	95	96	97
Washington	97	93	94	92
West Virginia	95	90	89	93
Wisconsin	94	88	88	88
Wyoming	95	95	92	91

[1] This percentage is unweighted, and computed over all students, whereas all other numbers in this report are based on the reporting sample only.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-12

Questionnaire Response Rates, Grade 4, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage of Students Matched to Mathematics Teacher Questionnaires	Weighted Percentage of Students Matched to School Characteristics/ Policies Questionnarie	Percentage of School Characteristics/ Policies Questionnaires Returned	Percentage of SD/LEP Student[1] Questionnaires Returned
NATION	89	95	94	90
JURISDICTIONS				
Alabama	100	100	100	0
Arizona	92	98	90	13
Arkansas	100	100	100	75
California	98	100	100	0
Colorado	94	89	90	89
Connecticut	100	82	85	95
Delaware	90	85	85	100
District of Columbia	83	74	72	100
Florida	96	88	92	100
Georgia	97	92	92	6
Guam	84	90	89	80
Indiana	91	91	93	80
Iowa	88	84	80	89
Kentucky	90	71	77	0
Louisiana	100	94	95	100
Maine	100	82	88	100
Maryland	100	76	82	100
Massachusetts	90	100	100	100
Michigan	97	81	78	89
Minnesota	92	100	100	75
Mississippi	89	88	91	100
Missouri	99	90	91	100
Montana	100	100	100	83
Nebraska	86	91	91	78
Nevada	100	100	100	0
New Jersey	89	96	94	95
New Mexico	68	87	85	48
New York	91	79	82	24
North Dakota	84	77	82	97
Oregon	75	100	100	0
Pennsylvania	94	96	95	100
Texas	100	87	75	0
Utah	100	95	86	0
Vermont	98	66	67	80
Wisconsin	100	93	92	0
Wyoming	100	100	100	67

[1]This percentage is unweighted, and computed over all students, whereas all other numbers in this report are based on the reporting sample only.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-13

Participation Rates, Grade 8, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentages School Participation Before Substitution	Weighted Percentage School Participation After Substitution	Number of Schools in Original Sample	Number of Schools not Eligible	Number of Schools in Original Sample that Participated	Number of Substituted Schools Provided	Number of Substituted Schools that Participated	Total Number of Schools that Participated
NATION	81	82	228	0	191	5	1	192
JURISDICTIONS								
Alabama	84	90	110	2	91	15	6	97
Alaska' '	92	92	80	8	53	17	0	53
Arizona	87	87	107	1	93	9	0	93
Arkansas'	70	71	112	1	76	25	1	77
California	83	94	108	0	89	19	12	101
Colorado	100	100	109	1	108	0	0	108
Connecticut	100	100	103	1	102	0	0	102
Delaware	100	100	31	1	30	0	0	30
District of Columbia	100	100	35	3	32	0	0	32
DoDEA/DDESS	100	100	12	0	12	0	0	12
DoDEA/DoDDS	100	100	59	2	57	0	0	57
Florida	100	100	109	5	104	0	0	104
Georgia	99	99	108	7	100	1	0	100
Guam	100	100	6	0	6	0	0	6
Hawaii	100	100	53	1	51	0	0	51
Indiana	88	91	107	1	93	12	3	96
Iowa4	74	84	114	3	82	27	11	93
Kentucky	88	92	110	1	96	9	5	101
Louisiana	100	100	114	2	112	0	0	112
Maine	90	90	110	6	93	6	0	93
Maryland'	86	86	106	2	89	10	0	89
Massachusetts	92	92	108	3	98	7	0	98
Michigan'	70	86	106	0	74	31	16	90
Minnesota	86	88	108	0	94	8	2	96
Mississippi	89	95	109	3	96	9	7	103
Missouri	93	96	117	7	102	7	3	105
Montana'	72	75	112	10	69	22	6	75
Nebraska	99	100	132	14	115	3	1	116
Nevada	38	38	59	2	28	2	0	28
New Hampshire	66	69	87	0	59	11	3	62
New Jersey	64	65	109	2	68	34	1	69
New Mexico	100	100	90	0	90	0	0	90
New York'	71	80	106	0	75	29	9	84
North Carolina	100	100	108	1	107	0	0	107
North Dakota	83	95	124	7	96	17	12	108
Oregon	86	92	111	4	92	13	6	98
Rhode Island	90	90	51	1	42	4	0	42
South Carolina	86	87	107	2	90	10	1	91
Tennessee	92	92	112	5	98	6	0	98
Texas	90	95	110	5	95	10	5	100
Utah	100	100	97	2	95	0	0	95
Vermont'	74	74	105	6	75	1	0	75
Virginia	100	100	106	0	106	0	0	106
Washington	94	95	110	1	102	7	1	103
West Virginia	100	100	107	1	106	0	0	106
Wisconsin'	78	78	114	0	90	23	0	90
Wyoming	100	100	74	4	70	0	0	70

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation. For Delaware, the District of Columbia, DDESS, DoDDS, Guam, Hawaii, and Rhode Island, the State Assessment was based on all eligible public schools (i.e., there was no sampling of public schools).

[1] The state's public school weighted participation rate for the initial sample was less than 70%.

[2] The state's public school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%.

[3] The nonparticipating public schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of public schools.

[4] The weighted student response rate within participating public schools was below 85%.

In Alaska, Massachusetts, Oregon, and Washington, the materials from one school that conducted an assessment were lost in shipping. The school is included in the counts of participating schools, both before and after substitution. However, in the weighted results, the school is treated in the same manner as a nonparticipating school because no student responses were available for analysis and reporting.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment

Table B-14

School Participation Rates, Grade 8, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage School Participation Before Substitution	Weighted Percentage School Participation After Substitution	Number of Schools in Original Sample	Number of Schools not Eligible	Number of Schools in Original Sample that Participated	Number of Substituted Schools Provided	Number of Substituted Schools that Participated	Total Number of Schools that Participated
NATION	81	81	105	9	78	0	0	78
JURISDICTIONS								
Alabama[7]	64	64	18	3	9	5	0	9
Arkansas[7]	51	60	11	4	4	2	1	5
California[5]	75	75	24	5	13	6	0	13
Connecticut[7]	63	65	35	7	18	9	1	19
Delaware[7]	38	40	50	12	11	8	1	12
District of Columbia[7]	47	47	42	10	16	0	0	16
Georgia	88	88	16	3	10	3	0	10
Guam[5]	76	76	11	0	8	0	0	8
Iowa	88	88	22	4	15	3	0	15
Kentucky[7]	67	67	21	4	11	5	0	11
Louisiana[5]	73	73	34	2	22	7	0	22
Maryland[7]	60	64	34	5	17	12	1	18
Massachusetts[5]	70	74	34	9	17	8	1	18
Michigan[5]	80	88	27	6	16	5	2	18
Minnesota[5]	75	75	25	5	15	5	0	15
Missouri	94	100	32	10	21	1	1	22
Montana[5]	78	78	19	7	9	3	0	9
Nebraska[5]	83	85	31	5	20	5	0	20
Nevada5	78	78	11	3	6	2	0	6
New Hampshire[7]	85	85	19	4	12	2	0	12
New Jersey[7]	68	71	42	10	21	9	1	22
New Mexico[7]	87	87	22	6	12	4	0	12
New York[7]	88	90	39	6	29	3	1	30
North Dakota	86	86	20	4	12	4	0	12
Oregon[7]	22	22	18	3	3	10	0	3
Rhode Island[5]	81	81	39	6	26	3	0	26
South Carolina[5]	76	76	16	2	10	4	0	10
Texas	93	93	12	1	9	2	0	9
Utah[7]	43	43	[illegible]	3	2	4	0	2
Vermont[5]	73	73	[illegible]	11	9	2	0	9
Washington	86	86	19	7	9	2	0	9
Wisconsin[7]	68	73	50	8	26	14	2	28
Wyoming[7]	74	74	12	5	5	2	0	5

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation.

For the District of Columbia and Guam, the State Assessment was based on all eligible nonpublic schools (i.e., there was no sampling of nonpublic schools).

[2] The state's nonpublic school weighted participation rate for the initial sample was less than 70%.

[5] The state's nonpublic school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%.

[7] The nonparticipating nonpublic schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of nonpublic schools.

In Arkansas, the District of Columbia, and Kentucky, the materials from one school that conducted an assessment were lost in shipping. The school is included in the counts of participating schools, both before and after substitution. However, in the weighted results, the school is treated in the same manner as a nonparticipating school because no student responses were available for analysis and reporting.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-15

Student Participation Rates, Grade 8, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage Student Participation After Make-Ups	Number of Students in Original Sample	Number of Students in Supplemental Sample	Number of Students Withdrawn	Number of Students Excluded	Number of Students To Be Assessed	Number of Students Assessed Initial Sessions	Number of Students Assessed Make-Ups	Total Number of Students Assessed
NATION	92	6.345		133	162	6 050	5 389	201	5.590
JURISDICTIONS									
Alabama	93	2.605	61	126	106	2.434	2.209	52	2 261
Alaska	80	1.885	32	81	54	1.782	1.452	10	1.462
Arizona	91	2.508	93	144	111	2.346	2.086	50	2.136
Arkansas	92	2.149	58	126	86	1 995	1.833	12	1.845
California	90	2.688	65	87	161	2.505	2.260	30	2.290
Colorado	91	2.939	96	191	62	2.782	2.500	30	2.530
Connecticut	91	2.916	43	80	144	2.735	2.417	68	2.485
Delaware	90	2.160	76	130	102	2.004	1.725	73	1.798
District of Columbia	85	2.148	56	104	102	1.998	1.585	108	1.693
DoDEA/DDESS	95	690	32	56	16	650	620	0	620
DoDEA/DoDDS	94	2.460	121	246	27	2.308	2.156	4	2.160
Florida	91	2.831	123	163	144	2.647	2.360	41	2.401
Georgia	90	2 788	88	159	88	2.629	2.315	49	2.364
Guam	86	1.121	15	36	24	1.076	909	19	928
Hawaii	91	2.615	65	196	75	2.409	2.127	62	2.189
Indiana	93	2.650	49	96	75	2.528	2.323	24	2.347
Iowa	93	2.417	45	90	57	2.315	2.138	31	2.169
Kentucky	94	2 744	67	118	75	2.618	2.391	70	2.461
Louisiana	89	3.070	77	149	89	2.909	2.558	41	2.599
Maine	92	2.538	21	41	53	2.465	2.244	14	2.258
Maryland	91	2.479	59	108	80	2.350	2.104	33	2.137
Massachusetts	92	2.579	43	63	91	2.468	2.275	5	2.280
Michigan	90	2 497	34	84	60	2.387	2.127	28	2.155
Minnesota	92	2.719	36	76	42	2.637	2.408	17	2.425
Mississippi	93	2.850	62	126	98	2.688	2.467	20	2.487
Missouri	91	2 789	58	122	110	2.615	2 370	16	2.386
Montana	92	2 143	39	73	38	2.071	1.894	18	1.912
Nebraska	91	2 954	61	71	56	2.888	2.575	35	2.610
Nevada	90	1.156	51	69	55	1 083	972	11	983
New Hampshire	89	1 990	26	49	45	1.922	1.720	3	1.723
New Jersey	93	1 873	33	56	64	1.786	1.653	2	1.655
New Mexico	90	2.854	74	174	118	2.636	2.361	10	2.371
New York	91	2 275	20	52	87	2.156	1.935	27	1.962
North Carolina	91	2.995	86	118	64	2 899	2.616	22	2.638
North Dakota	94	2.824	28	50	58	2.744	2.596	6	2.602
Oregon	90	2.684	81	127	53	2.585	2.287	36	2.323
Rhode Island	89	2.445	36	102	88	2.291	2.049	6	2.055
South Carolina	89	2.534	58	121	74	2.397	2.109	34	2.143
Tennessee	91	2 644	42	93	55	2.538	2.240	60	2.300
Texas	92	2.636	83	174	118	2.427	2.219	26	2.245
Utah	91	3 112	97	138	103	2.968	2.618	79	2.697
Vermont	93	2.216	29	42	58	2.145	1.973	28	2.001
Virginia	91	2.952	67	113	114	2.792	2.534	11	2.545
Washington	90	2.827	60	95	84	2.708	2 400	34	2.434
West Virginia	92	2 972	64	113	128	2.795	2.558	20	2 578
Wisconsin	92	2 463	29	49	92	2 351	2.143	22	2.165
Wyoming	93	2.970	69	131	22	2.886	2 648	48	2.696

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation. For the national sample, Column 3 is not applicable.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-16

Student Participation Rates, Grade 8, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage Student Participation After Make-Ups	Number of Students in Original Sample	Number of Students in Supplemental Sample	Number of Students Withdrawn	Number of Students Excluded	Number of Students To Be Assessed	Number of Students Assessed Initial Sessions	Number of Students Assessed Make-Ups	Total Number of Students Assessed
NATION	97	1,622		7	4	1,611	1,542	14	1,556
JURISDICTIONS									
Alabama	92	130	1	3	0	128	118	1	119
Arkansas	98	66	0	2	0	64	62	0	62
California	97	237	1	0	0	238	232	0	232
Connecticut	94	282	0	2	0	280	265	0	265
Delaware	96	294	0	0	0	294	281	0	281
District of Columbia	95	237	1	4	0	234	222	0	222
Georgia	97	291	8	10	6	283	267	0	267
Guam	95	212	1	1	0	212	199	3	202
Iowa	96	295	0	0	0	295	282	0	282
Kentucky	98	228	1	5	0	224	216	0	218
Louisiana	96	455	3	7	5	446	426	0	426
Maryland	97	311	0	2	1	308	296	5	301
Massachusetts	95	314	4	2	1	315	297	4	301
Michigan	96	310	1	3	0	308	293	0	293
Minnesota	96	264	2	3	0	263	250	0	250
Missouri	96	371	0	3	1	367	353	0	353
Montana	95	125	5	1	1	128	121	0	121
Nebraska	95	376	1	2	0	375	358	0	358
Nevada	95	107	1	1	0	107	101	0	101
New Hampshire	96	222	2	4	1	219	212	0	212
New Jersey	94	353	0	5	6	342	318	2	320
New Mexico	89	248	5	5	0	248	228	0	228
New York	95	567	4	4	0	567	539	0	539
North Dakota	96	199	4	1	0	202	194	0	194
Oregon	93	45	1	0	0	46	43	0	43
Rhode Island	96	441	2	4	0	439	423	0	423
South Carolina	96	168	5	3	0	170	164	0	164
Texas	92	180	1	1	1	179	166	0	166
Utah	93	44	0	0	1	43	40	0	40
Vermont	95	123	0	3	0	120	114	0	114
Washington	97	193	0	5	0	188	182	0	182
Wisconsin	94	384	4	3	1	384	362	0	362
Wyoming	97	53	1	1	0	53	51	0	51

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation. In the rows for national sample, the dash (-) means "not applicable." For the national sample, Column 3 is not applicable.

SOURCE: National Center for Education Statistics. National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-17

Summary of School and Student Participation, Grade 8
1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage School Participation Before Substitution	Notation Number 1	Weighted Percentage School Participation After Substitution	Notation Number 4	Notation Number 6	Weighted Percentage Student Participation After Make-Ups	Notation Number 8	Weighted Overall Rate
NATION	81		82			92		76
JURISDICTIONS								
Alabama	84		90			93		83
Alaska	92		92		•	80	•	74
Arizona	87		87			91		79
Arkansas	70		71	•		92		65
California	83		94			90		85
Colorado	100		100			91		91
Connecticut	100		100			91		91
Delaware	100		100			90		90
District of Columbia	100		100			85		85
DoDEA/DDESS	100		100			95		95
DoDEA/DoDDS	100		100			94		94
Florida	100		100			91		91
Georgia	99		99			90		89
Guam	100		100			86		86
Hawaii	100		100			91		91
Indiana	88		91			93		84
Iowa	74		84	•		93		79
Kentucky	88		92			94		87
Louisiana	100		100			89		89
Maine	90		90			92		83
Maryland	86		86		•	91		78
Massachusetts	92		92			92		85
Michigan	70		86	•		90		77
Minnesota	86		88			92		81
Mississippi	89		95			93		88
Missouri	93		96			91		88
Montana	72		75	•		92		69
Nebraska	99		100			91		91
Nevada	38	•	38			90		34
New Hampshire	66	•	69			89		62
New Jersey	64	•	65			93		60
New Mexico	100		100			90		90
New York	71		80	•		91		72
North Carolina	100		100			91		91
North Dakota	83		95			94		89
Oregon	86		92			90		83
Rhode Island	90		90			89		80
South Carolina	86		87		•	89		77
Tennessee	92		92			91		83
Texas	90		95			92		88
Utah	100		100			91		91
Vermont	74		74	•		93		69
Virginia	100		100			91		91
Washington	94		95			90		86
West Virginia	100		100			92		92
Wisconsin	78		78	•		92		72
Wyoming	100		100			93		93

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation

Notation Number 1 · The state's public school weighted participation rate for the initial sample was less than 70%

Notation Number 4 The state's public school weighted participation rate for the initial sample of schools was below 85% and the weighted school participation rate after substitution was below 90%

Notation Number 6. The nonparticipating public schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of public schools

Notation Number 8 The weighted student response rate within participating public schools was below 85%

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment

Table B-18

Summary of School and Student Participation, Grade 8
1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage School Participation Before Substitution	Notation Number 2	Weighted Percentage School Participation After Substitution	Notation Number 5	Notation Number 7	Weighted Percentage Student Participation After Make-Ups	Notation Number 9	Weighted Overall Rate
NATION	81		81			97		78
JURISDICTIONS								
Alabama	64	•	64	•		92		59
Arkansas	51	•	60	•		98		58
California	75		75	•		97		73
Connecticut	63	•	65	•		94		61
Delaware	38	•	40	•		96		38
District of Columbia	47	•	47	•		95		45
Georgia	88		88			97		86
Guam	76		76	•		95		72
Iowa	88		88			96		85
Kentucky	67	•	67	•		98		66
Louisiana	73		73	•		96		70
Maryland	60	•	64	•		97		62
Massachusetts	70		74	•		95		70
Michigan	80		88	•		96		85
Minnesota	75		75	•		96		72
Missouri	94		100			96		96
Montana	78		78	•		95		75
Nebraska	83		85	•		95		81
Nevada	78		78	•		95		73
New Hampshire	85		85		•	96		82
New Jersey	68	•	71	•		94		67
New Mexico	87		87		•	89		78
New York	88		90		•	95		66
North Dakota	86		86			96		82
Oregon	22	•	22	•		93		21
Rhode Island	81		81	•		96		78
South Carolina	76		76	•		96		73
Texas	93		93			92		86
Utah	43	•	43	•		93		40
Vermont	73		73	•		95		69
Washington	86		86			97		83
Wisconsin	68	•	73	•		94		69
Wyoming	74	•	74	•		97		72

See preceding text for explanations of the notations and guidelines about sample representativeness and for the derivation of weighted participation.

Notation Number 2: The state's nonpublic school weighted participation rate for the initial sample was less than 70%.

Notation Number 5: The state's nonpublic school weighted participation rate for the initial sample of schools was below 85% <u>and</u> the weighted school participation rate after substitution was below 90%.

Notation Number 7: The nonparticipating nonpublic schools included a class of schools with similar characteristics, which together accounted for more than 5% of the state's total fourth-grade weighted sample of nonpublic schools.

Notation Number 9: The weighted student response rate within participating nonpublic schools was below 85%.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

BEST COPY AVAILABLE

Table B-19

Weighted Percentages of Students Excluded (SD and LEP) from Student Sample, Grade 8
1996 Mathematics Assessment, Public Schools

Public Schools	Total Percentage Students Identified SD and LEP	Total Percentage Students Excluded	Percentage Students Identified SD	Percentage Students Excluded SD	Percentage Students Identified LEP	Percentage Students Excluded LEP
NATION	11	5	9	4	3	1
Northeast	10	5	10	5	0	0
Southeast	11	4	11	4	2	2
Central	10	5	9	4	1	1
West	13	5	8	4	6	1
JURISDICTIONS						
Alabama	15	8	15	8	0	0
Alaska	15	5	10	5	5	1
Arizona	17	9	9	5	9	4
Arkansas	12	7	11	7	1	1
California	20	10	8	4	13	6
Colorado	11	4	10	4	2	1
Connecticut	16	9	14	7	3	2
Delaware	12	8	11	8	1	0
District of Columbia	12	9	9	7	3	2
DoDEA/DDESS	12	4	11	3	1	1
DoDEA/DoDDS	6	2	6	2	1	1
Florida	15	9	12	7	3	2
Georgia	9	6	8	5	1	1
Guam	9	4	6	2	3	2
Hawaii	13	6	10	5	4	2
Indiana	12	5	11	5	1	0
Iowa	11	4	10	4	0	0
Kentucky	10	5	10	5	0	0
Louisiana	9	5	8	5	1	0
Maine	10	4	9	4	0	0
Maryland	12	6	10	5	1	1
Massachusetts	15	7	14	6	1	1
Michigan	9	5	8	4	1	0
Minnesota	11	3	10	3	1	0
Mississippi	11	7	11	7	0	0
Missouri	12	8	12	7	1	1
Montana	10	3	9	3	0	0
Nebraska	11	4	10	4	1	1
Nevada	21	10	13	7	9	4
New Hampshire	15	4	15	4	0	0
New Jersey	12	6	9	5	3	2
New Mexico	18	8	12	4	7	4
New York	13	7	11	6	3	2
North Carolina	9	4	8	4	1	1
North Dakota	11	4	11	4	1	0
Oregon	12	4	11	4	1	1
Rhode Island	16	7	13	5	3	2
South Carolina	10	6	9	5	0	0
Tennessee	11	4	11	4	0	0
Texas	16	8	11	6	6	3
Utah	12	6	10	5	2	2
Vermont	13	5	12	4	1	0
Virginia	13	7	11	6	1	1
Washington	12	5	10	5	2	1
West Virginia	12	8	12	8	0	0
Wisconsin	12	7	11	7	1	1
Wyoming	8	1	8	1	0	0

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.
To be excluded, a student was supposed to be classified as SD or as LEP and judged incapable of participating in the assessment. A student reported as belonging to both SD and LEP classifications is counted once in the overall rate (first column), once in the overall excluded rate (second column), and separately in the remaining columns.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-20

Weighted Percentages of Students Excluded (SD and LEP) from Student Sample, Grade 8
1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Total Percentage Students Identified SD and LEP	Total Percentage Students Excluded	Percentage Students Identified SD	Percentage Students Excluded SD	Percentage Students Identified LEP	Percentage Students Excluded LEP
NATION	3	0	2	0	1	0
JURISDICTIONS						
Alabama	1	0	1	0	0	0
Arkansas	0	0	0	0	0	0
California	1	0	1	0	0	0
Connecticut	5	0	4	0	1	0
Delaware	2	0	2	0	0	0
District of Columbia	1	0	0	0	1	0
Georgia	3	1	3	1	0	0
Guam	1	0	0	0	1	0
Iowa	2	0	2	0	0	0
Kentucky	2	0	2	0	0	0
Louisiana	4	2	4	2	0	0
Maryland	1	1	1	1	0	0
Massachusetts	2	1	2	1	0	0
Michigan	2	0	2	0	0	0
Minnesota	2	0	1	0	1	0
Missouri	3	1	3	1	0	0
Montana	7	1	6	1	1	0
Nebraska	1	0	1	0	0	0
Nevada	0	0	0	0	0	0
New Hampshire	4	1	3	0	1	1
New Jersey	7	3	5	1	2	2
New Mexico	0	0	0	0	0	0
New York	0	0	0	0	0	0
North Dakota	2	0	2	0	0	0
Oregon	0	0	0	0	0	0
Rhode Island	1	0	1	0	0	0
South Carolina	0	0	0	0	0	0
Texas	1	1	1	1	0	0
Utah	4	4	4	4	0	0
Vermont	3	0	3	0	0	0
Washington	0	0	0	0	0	0
Wisconsin	1	0	1	0	0	0
Wyoming	6	0	6	0	0	0

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.
To be excluded, a student was supposed to be classified as SD or as LEP and judged incapable of participating in the assessment. A student reported as belonging to both SD and LEP classifications is counted once in the overall rate (first column), once in the overall excluded rate (second column), and separately in the remaining columns.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-21

Weighted Percentages of Absent, SD, and LEP Students Based on Those Invited to Participate Grade 8, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage Student Participation After Make-Ups	Weighted Percentage Absent	Weighted Percentage Assessed SD	Weighted Percentage Absent SD	Weighted Percentage Assessed LEP	Weighted Percentage Absent LEP
NATION	92	8	84	16	96	4
JURISDICTIONS						
Alabama	93	7	88	12	0	100
Alaska	80	20	75	25	68	32
Arizona	91	9	85	15	89	11
Arkansas	92	8	86	14	100	0
California	90	10	89	11	86	14
Colorado	91	9	86	14	88	12
Connecticut	91	9	84	16	75	25
Delaware	90	10	81	19	65	35
District of Columbia	85	15	76	24	86	14
DoDEA/DDESS	95	5	92	8	0	100
DoDEA/DoDDS	94	6	91	9	100	0
Florida	91	9	86	14	100	0
Georgia	90	10	89	11	82	18
Guam	86	14	88	12	75	25
Hawaii	91	9	78	22	92	8
Indiana	93	7	85	15	100	0
Iowa	93	7	85	15	100	0
Kentucky	94	6	93	7	100	0
Louisiana	89	11	82	18	100	0
Maine	92	8	91	9	100	0
Maryland	91	9	88	12	65	35
Massachusetts	92	8	91	9	67	33
Michigan	90	10	78	22	84	16
Minnesota	92	8	89	11	87	13
Mississippi	93	7	86	14	0	100
Missouri	91	9	90	10	50	50
Montana	92	8	91	9	28	72
Nebraska	91	9	88	12	100	0
Nevada	90	10	79	21	90	10
New Hampshire	89	11	84	16	100	0
New Jersey	93	7	86	14	87	13
New Mexico	90	10	80	20	96	4
New York	91	9	81	19	96	4
North Carolina	91	9	90	10	100	0
North Dakota	94	6	90	10	78	22
Oregon	90	10	87	13	100	0
Rhode Island	89	11	86	14	95	5
South Carolina	89	11	85	15	100	0
Tennessee	91	9	87	13	0	100
Texas	92	8	82	18	92	8
Utah	91	9	89	11	100	0
Vermont	93	7	90	10	100	0
Virginia	91	9	92	8	100	0
Washington	90	10	87	13	95	5
West Virginia	92	8	87	13	0	100
Wisconsin	92	8	91	9	78	22
Wyoming	93	7	85	15	100	0

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-22

Weighted Percentage of Absent, SD, and LEP Students Based on Those Invited to Participate Grade 8, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage Student Participation After Make-Ups	Weighted Percentage Absent	Weighted Percentage Assessed SD	Weighted Percentage Absent SD	Weighted Percentage Assessed LEP	Weighted Percentage Absent LEP
NATION	97	3	100	0	100	0
JURISDICTIONS						
Alabama	92	8	100	0	0	100
Arkansas	98	2	0	100	0	100
California	97	3	100	0	0	100
Connecticut	94	6	100	0	100	0
Delaware	96	4	100	0	0	100
District of Columbia	95	5	0	100	100	0
Georgia	97	3	89	11	0	100
Guam	95	5	0	100	0	100
Iowa	96	4	100	0	0	100
Kentucky	98	2	100	0	0	100
Louisiana	96	4	80	20	0	100
Maryland	97	3	100	0	0	100
Massachusetts	95	5	50	50	0	100
Michigan	96	4	100	0	0	100
Minnesota	96	4	100	0	100	0
Missouri	96	4	100	0	0	100
Montana	95	5	100	0	100	0
Nebraska	95	5	100	0	0	100
Nevada	95	5	0	100	0	100
New Hampshire	96	4	66	34	0	100
New Jersey	94	6	100	0	0	100
New Mexico	89	11	0	100	0	100
New York	95	5	0	100	0	100
North Dakota	96	4	100	0	0	100
Oregon	93	7	0	100	0	100
Rhode Island	96	4	100	0	0	100
South Carolina	96	4	0	100	0	100
Texas	92	8	0	100	0	100
Utah	93	7	0	100	0	100
Vermont	95	5	100	0	0	100
Washington	97	3	0	100	0	100
Wisconsin	94	6	100	0	0	100
Wyoming	97	3	100	0	0	100

SD = Students with Disabilities (the term previously used was IEP).
LEP = Limited English Proficiency.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-23

Questionnaire Response Rates, Grade 8, 1996 Mathematics Assessment, Public Schools

Public Schools	Weighted Percentage of Students Matched to Mathematics Teacher Questionnaires	Weighted Percentage of Students Matched to School Characteristics/ Policies Questionnarie	Percentage of School Characteristics/ Policies Questionnaires Returned	Percentage of SD/LEP Student[1] Questionnaires Returned
NATION	86	93	89	84
JURISDICTIONS				
Alabama	95	90	91	88
Alaska	74	76	84	64
Arizona	90	89	88	84
Arkansas	95	87	86	94
California	90	92	93	79
Colorado	89	94	94	85
Connecticut	90	81	79	89
Delaware	91	94	93	92
District of Columbia	74	77	75	66
DoDEA/DDESS	100	83	83	96
DoDEA/DoDDS	95	92	95	91
Florida	91	96	96	86
Georgia	94	88	88	91
Guam	56	81	83	35
Hawaii	88	97	94	87
Indiana	93	93	91	87
Iowa	95	97	98	88
Kentucky	86	93	93	91
Louisiana	90	92	90	88
Maine	91	93	94	88
Maryland	94	82	82	88
Massachusets	92	86	85	91
Michigan	92	84	84	86
Minnesota	95	85	84	91
Mississippi	92	91	91	90
Missouri	92	92	92	87
Montana	88	89	89	90
Nebraska	95	86	90	89
Nevada	88	97	95	94
New Jersey	96	87	87	92
New Mexico	97	91	88	85
New York	89	81	80	62
North Carolina	86	76	77	79
North Dakota	96	91	91	89
Oregon	92	94	92	84
Pennsylvania	87	92	92	79
Rhode Island	94	90	88	84
South Carolina	92	92	91	89
Tennessee	94	95	95	92
Texas	97	86	86	84
Utah	91	91	92	83
Vermont	92	92	93	89
Virginia	94	97	97	82
Washington	88	87	87	88
West Virginia	96	89	90	91
Wisconsin	88	92	91	87
Wyoming	95	94	93	88

[1] This percentage is unweighted, and computed over all students, whereas all other numbers in this report are based on the reporting sample only.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Table B-24

Questionnaire Response Rates, Grade 8, 1996 Mathematics Assessment, Nonpublic Schools

Nonpublic Schools	Weighted Percentage of Students Matched to Mathematics Teacher Questionnaires	Weighted Percentage of Students Matched to School Characteristics/ Policies Questionnarie	Percentage of School Characteristics/ Policies Questionnaires Returned	Percentage of SD/LEP Student[1] Questionnaires Returned
NATION	91	96	93	97
JURISDICTIONS				
Alabama	98	93	89	100
Arkansas	100	100	100	0
California	85	84	85	100
Connecticut	94	80	79	100
Delaware	100	81	83	100
District of Columbia	92	81	80	86
Georgia	100	100	100	0
Guam	82	76	88	100
Iowa	99	89	87	100
Kentucky	91	93	90	0
Louisiana	94	86	82	100
Maryland	95	95	94	67
Massachusetts	92	90	88	100
Michigan	99	89	89	100
Minnesota	94	100	100	100
Missouri	94	70	77	100
Montana	100	86	89	88
Nebraska	88	95	95	100
Nevada	100	73	83	0
New Hampshire	92	100	100	100
New Jersey	90	89	91	88
New Mexico	100	100	100	100
New York	94	69	67	100
North Dakota	90	90	91	90
Oregon	100	100	100	0
Rhode Island	99	86	88	100
South Carolina	87	92	90	100
Texas	98	100	100	100
Utah	100	100	100	100
Vermont	100	95	89	67
Washington	79	100	100	0
Wisconsin	93	98	96	100
Wyoming	100	100	100	100

[1] This percentage is unweighted, and computed over all students, whereas all other numbers in this report are based on the reporting sample only.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 Mathematics Assessment.

Appendix C

CONDITIONING VARIABLES AND CONTRAST CODINGS

This appendix contains information about the conditioning variables used in scaling/plausible value estimation for the 1996 State Assessment program. The initial step in construction of conditioning variables involves forming primary student-based vectors of response data from answers to student, teacher, and school questionnaires, demographic and background data such as supplied by Westat, Inc., and other student information known prior to scaling. The initial conditioning vectors concatenate this student background information into a series of identifying "contrasts" comprising:

1. Categorical variables derived by expanding the response options of a questionnaire variable into a binary series of one-degree-of-freedom "dummy" variables or contrasts, (these form the majority of each student conditioning vector);

2. Questionnaire or demographic variables that possess ordinal response options, such as number of hours spent watching television, which are included as linear and/or quadratic multi-degree-of-freedom contrasts;

3. Continuous variables, such as student logit scores based on percent correct values, included as contrasts in their original form or a transformation of their original form, and;

4. Interactions of two or more categorical variables forming a set of orthogonal one-degree-of-freedom dummy variables or contrasts.

This appendix gives the specifications used for constructing the conditioning variables. Table C-1 defines the information provided for each main sample variable. Table C-2 provides a summary of the conditioning variables specifications that are contained in the remainder of this appendix.

As described in Chapter 9, the linear conditioning model employed for the estimation of plausible values did not directly use the conditioning variable specifications listed in this appendix. To eliminate inherent instabilities in estimation encountered when using a large number of correlated variables, a principal component transformation of the correlation matrix obtained from the conditioning variable contrasts derived according to these primary specifications was performed. The principal components scores based on this transformation were used as the predictor variables in estimating the linear conditioning model.

Table C-1
Description of Specifications Provided for Each Conditioning Variable

Title	Description
CONDITIONING ID	A unique eight-character ID assigned to identify each conditioning variable corresponding to a particular background or subject area question within the entire pool of conditioning variables. The first four characters identify the origin of the variable: BACK (background questionnaire), SUBJ (subject specific questionnaire) SCHL (school questionnaire), TCHR (background part of teacher questionnaire), and TSUB (subject classroom part of teacher questionnaire). The second four digits represent the sequential position within each origin group.
DESCRIPTION	A short description of the conditioning variable.
GRADES/ASSESSMENTS	Three characters identifying assessment ("S" for state, "N" for national) and grade (04, 08, and 12) in which the conditioning variable was used.
CONDITIONING VAR LABEL	A descriptive eight-character label identifying the conditioning variable.
NAEP ID	The seven-character NAEP database identification for the conditioning variable.
TYPE OF CONTRAST	The type of conditioning variable. "CLASS" identifies a categorical conditioning variable and "SCALE" identifies continuous or quasi-continuous conditioning variables. "INTERACTION" identifies a set of orthogonal contrasts formed from two or more "CLASS" variables. "OTHER" conditioning variables do not fall into any of the above types.
TOTAL NUMBER OF SPECIFIED CONTRASTS	Each conditioning variable forms a set of one or more contrasts. For each valid response value of conditioning variable a contrast must be defined. One or more response values may be collapsed together to form one contrast. The number of response value "sets" of a conditioning variable forming a unique contrast is the value given in this field.
NUMBER OF INDEPENDENT CONTRASTS	The number of degree of freedom in a set of contrasts formed from a conditioning variable. For a categorical conditioning variable this number would be the number of response options minus one if each response option formed its own unique contrast.

Table C-2

Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
BKSER	BACK0001	GRAND MEAN (BOOK COVER)	X	X
DSEX	BACK0002	DERIVED SEX (WESTAT)	X	X
DRACE	BACK0003	DERIVED RACE (WESTAT)	X	X
B003101	BACK0004	IF HISPANIC, WHAT IS YOUR HISPANIC BACKGROUND	X	X
TOL8	BACK0005	TYPE OF LOCATION (WESTAT) (WESTAT)	X	X
TOL5	BACK0006	TYPE OF LOCATION (COLLAPSED) (WESTAT)	X	X
DOC	BACK0007	DESCRIPTION OF COMMUNITY (WESTAT)	X	X
PARED	BACK0008	PARENTS' EDUCATION (ETS)	X	X
SCHTYPE	BACK0010	SCHOOL TYPE (PQ)	X	X
IEP	BACK0011	INDIVIDUALIZED EDUCATION PLAN (BOOK COVER)	X	X
LEP	BACK0012	LIMITED ENGLISH PROFICIENCY (BOOK COVER)	X	X
CHAP1	BACK0013		X	X
SLUNCH	BACK0014	SCHOOL LUNCH (WESTAT)	X	X
B003201	BACK0015	HOW OFTEN OTHER THAN ENGLISH SPOKEN IN HOME	X	X
B008901	BACK0016	DO YOU HAVE YOUR OWN STUDY DESK OR TABLE AT	X	X
B001801	BACK0017	HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH	X	X
B001801	BACK0018	HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH	X	X
B006601	BACK0019	TIME SPENT ON HOMEWORK	X	X
B006601	BACK0020	TIME SPENT ON HOMEWORK	X	X
B006601	BACK0021	TIME SPENT ON HOMEWORK	X	X
HOMEEN2	BACK0022	HOME ENVIRONMENT - ARTICLES (OF 4) IN HOME (ETS)	X	X
B005601	BACK0023	DOES MOTHER OR STEPMOTHER LIVE AT HOME WITH	X	X
B005701	BACK0024	DOES FATHER OR STEPFATHER LIVE AT HOME WITH YOU	X	X
S004001	BACK0025	HOW MANY DAYS OF SCHOOL MISSED LAST MONTH	X	X
B008001	BACK0026	HOW LONG LIVED IN THE UNITED STATES	X	X
B007601	BACK0027	HOW MANY GRADES IN THIS STATE (4)	X	-
SCHNORM	SCHL0001	SCHOOL-LEVEL NORMIT GAUSSIAN SCORE (STUDENT)	X	X
SCHNORM	SCHL0002	SCHOOL-LEVEL NORMIT GAUSSIAN SCORE (STUDENT)	X	X
B007301	BACK0029	TIMES CHANGED SCHOOL PAST TWO YEARS	X	X
B007401	BACK0030	DISCUSS STUDIES AT HOME	X	X
B001101	BACK0031	HOW MANY PAGES READ IN SCHOOL AND FOR	X	X
B001101	BACK0032	HOW MANY PAGES READ IN SCHOOL AND FOR	X	X
MA93FLG	BACK0068	METRO STAT AREA (MSA) 6/30/93 DEF. (WESTAT)	X	X
MONSTUD	BACK0069	ACTUAL MONITOR STATUS (STUDENT LEVEL)	X	X
SUBSAMP	BACK0071	SAMPLE TYPE (S1,S2,S3) (ETS)	X	X
RPTSAMP	BACK0073	REPORTING SAMPLE (1=YES,2=NO,0=EXCL STUDENT)	X	X
B009301	BACK0074	HOW OFTEN USE A HOME COMPUTER FOR	X	X
B009401	BACK0075	HOW SAFE DO YOU FEEL AT SCHOOL?	X	X
B009501	BACK0076	DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?	X	-
B009502	BACK0077	DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?	X	-
M812701	SUBJ0002	HOW OFTEN DO YOU DO MATH PROBLEMS FROM	X	X
M812702	SUBJ0003	HOW OFTEN DO YOU DO MATH PROBLEMS ON WORK	X	X
M812703	SUBJ0004	HOW OFTEN SOLVE MATH PROBLEMS WITH	X	X
M812704	SUBJ0005	HOW OFTEN IN MATH WORK W/ RULERS, GEOM SHAPES?	X	-
M812705	SUBJ0006	HOW OFTEN WRITE ABOUT SOLVING A MATH PROBLEM?	X	X

Table C-2 (continued)

Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
M812706	SUBJ0007	HOW OFTEN DO YOU TAKE MATHEMATICS TESTS?	X	X
M812707	SUBJ0008	HOW OFTEN DO YOU TALK TO THE CLASS RE MATH	X	X
M812708	SUBJ0009	HOW OFTEN DO 10 OR MORE MATH PROBLEMS BY	X	X
M812709	SUBJ0010	HOW OFTEN DISCUSS MATH PROBLEMS W/ OTHER	X	X
M812710	SUBJ0011	HOW OFTEN DO YOU USE A COMPUTER FOR MATH?	X	X
M812711	SUBJ0012	HOW OFTEN DO YOU USE A CALCULATOR FOR MATH?	X	X
M811201	SUBJ0013	DO YOU HAVE CALCULATOR TO USE WITH MATH	X	X
M812001	SUBJ0014	HOW OFTEN USE A CALCULATOR FOR MATH	X	X
M812002	SUBJ0015	HOW OFTEN USE A CALCULATOR FOR MATH	X	X
M812003	SUBJ0016	HOW OFTEN USE A CALCULATOR FOR MATH	X	X
M812101	SUBJ0017	HOW MUCH TIME SPEND DAILY ON MATH HOMEWORK?	X	X
M811401	SUBJ0018	GET MATH HELP FROM SPECIAL TEACHER/AIDE/TUTOR?	X	-
M811101	SUBJ0019	AGREE/DISAGREE: I LIKE MATH	X	-
M811103	SUBJ0020	AGREE/DISAGREE: I AM GOOD AT MATH	X	-
M811106	SUBJ0021	HOW MUCH AGREE-UNDERSTAND MOST OF MATH	X	-
M811109	SUBJ0022	HOW MUCH AGREE-ONLY 1 CORRECT WAY TO SOLVE	X	-
M811107	SUBJ0023	HOW MUCH AGREE-LEARNING MATH IS MEMORIZING	X	-
M811105	SUBJ0024	AGREE/DISAGREE: MATH USED FOR SOLVING PROBLEMS	X	-
M811108	SUBJ0025	HOW MUCH AGREE-IF CHOICE I WOULDN'T STUDY MORE?	X	-
M811110	SUBJ0026	HOW MUCH AGREE-EVERYONE CAN DO WELL IF TRY?	X	-
MM00101	SUBJ0027	ABOUT HOW MANY QUESTIONS DID YOU GET RIGHT?	X	X
MM00201	SUBJ0028	HOW HARD WAS THIS TEST COMPARED TO OTHERS?	X	X
MM00301	SUBJ0029	HOW HARD DID YOU TRY COMPARED TO OTHER TESTS?	X	X
MM00401	SUBJ0030	HOW IMPORTANT WAS IT TO DO WELL ON THIS TEST?	X	X
MM00501	SUBJ0031	HOW OFTEN ASKED TO PROVIDE DETAILED SOLUTIONS?	X	X
C030901	SCHL0003	BEST DESCRIBES HOW 4TH GR ARE ORGANIZED?	X	-
C037101	SCHL0004	4TH GRADERS ASSIGNED BY ABILITY/ACHIEVEMENT	X	-
C031212	SCHL0005	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN MATH?	X	-
C031205	SCHL0006	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN SCIENCE?	X	-
C031213	SCHL0007	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN READING?	X	-
C031214	SCHL0008	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN ARTS?	X	-
C031603	SCHL0009	HAS MATH BEEN IDENTIFIED AS A PRIORITY?	X	X
C031607	SCHL0010	HAS SCIENCE BEEN IDENTIFIED AS A PRIORITY?	X	X
C031601	SCHL0011	HAS READING BEEN IDENTIFIED AS A PRIORITY?	X	-
C031610	SCHL0012	HAS ARTS BEEN IDENTIFIED AS A PRIORITY?	X	X
C031606	SCHL0013	HAS SUBJECT INTEGRATION BEEN A PRIORITY?	X	X
C035701	SCHL0014	COMPUTERS AVAILABLE ALL THE TIME IN CLASSROOM?	X	X
C035702	SCHL0015	COMPUTERS GROUPED IN SEPARATE LAB AND	X	X
C035703	SCHL0016	COMPUTERS AVAILABLE TO BRING TO ROOM WHEN	X	X
C037201	SCHL0017	SCHOOL W/ SPECIAL FOCUS ON MATH?	X	X
C037202	SCHL0018	SCHOOL W/ SPECIAL FOCUS ON SCIENCE?	X	X
C037207	SCHL0019	SCHOOL W/ SPECIAL FOCUS ON READING?	X	-
C037204	SCHL0020	SCHOOL W/ SPECIAL FOCUS ON ARTS?	X	X
C037205	SCHL0021	SCHOOL W/ SPECIAL FOCUS ON OTHER?	X	X
C037206	SCHL0022	SCHOOL NOT A SPECIAL FOCUS SCHOOL?	X	X

Table C-2 (continued)
Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
C037301	SCHL0023	SCHOOL FOLLOW DISTRICT/STATE MATH CURRICULUM?	X	X
C037302	SCHL0024	SCHOOL FOLLOW DISTRICT/STATE SCIENCE	X	X
C037303	SCHL0025	SCHOOL FOLLOW DISTRICT/STATE READING	X	-
C037304	SCHL0026	SCHOOL FOLLOW DISTRICT/STATE ARTS CURRICULUM?	X	X
C037305	SCHL0027	SCHOOL FOLLOW DISTRICT/STATE FOR NONE OF ABOVE?	X	X
C037401	SCHL0028	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR MATH?	X	-
C037402	SCHL0029	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR SCIENCE?	X	-
C037403	SCHL0030	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR READING?	X	-
C037404	SCHL0031	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR ARTS?	X	-
C037405	SCHL0032	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR OTHER?	X	-
C037406	SCHL0033	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR NONE	X	-
C037501	SCHL0034	4TH GRADERS IN EXTRACURR ACTS FOR MATH?	X	-
C037502	SCHL0035	4TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?	X	-
C037503	SCHL0036	4TH GRADERS IN EXTRACURR ACTS FOR READING?	X	-
C037504	SCHL0037	4TH GRADERS IN EXTRACURR ACTS FOR ARTS?	X	-
C037505	SCHL0038	4TH GRADERS IN EXTRACURR ACTS FOR NONE OF	X	-
C037601	SCHL0039	4TH GRADERS IN SUMMER PROGRAMS IN MATH?	X	-
C037602	SCHL0040	4TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	X	-
C037603	SCHL0041	4TH GRADERS IN SUMMER PROGRAMS IN READING?	X	-
C037604	SCHL0042	4TH GRADERS IN SUMMER PROGRAMS IN ARTS?	X	-
C037605	SCHL0043	4TH GRADERS IN SUMMER PROGRAMS IN NONE OF	X	-
C036601	SCHL0044	WHICH BEST DESCRIBES PRIMARY WAY LIBRARY	X	X
C032207	SCHL0045	INVOLVE PARENTS AS AIDES IN CLASSROOM?	X	X
C032209	SCHL0046	HAVE PARENTS REVIEW/SIGN HOMEWORK?	X	X
C032210	SCHL0047	ASSIGN HOMEWORK STUDENTS DO WITH PARENTS?	X	X
C032211	SCHL0048	HAVE A PARENT VOLUNTEER PROGRAM?	X	X
C037701	SCHL0049	WHAT % OF PARENTS IN PARENT-TEACHER ORGS?	X	X
C037702	SCHL0050	WHAT % OF PARENTS IN OPEN HOUSE/BACK SCHOOL	X	X
C037703	SCHL0051	WHAT % OF PARENTS IN PARENT-TEACHER	X	X
C037704	SCHL0052	WHAT % PARENTS INVOLVED MAKING CURRICULUM	X	X
C037705	SCHL0053	WHAT % OF PARENTS IN VOLUNTEER PROGRAMS?	X	X
C032402	SCHL0054	IS STUDENT ABSENTEEISM A PROBLEM IN YOUR	X	X
C032401	SCHL0055	IS STUDENT TARDINESS A PROBLEM IN YOUR SCHOOL?	X	X
C032404	SCHL0056	ARE PHYSICAL CONFLICTS A PROBLEM IN YOUR	X	X
C032406	SCHL0057	IS TEACHER ABSENTEEISM A PROBLEM IN YOUR	X	X
C032407	SCHL0058	ARE RACE/CULT. CONFLICTS A PROBLEM IN YOUR	X	X
C032408	SCHL0059	IS STUDENT HEALTH A PROBLEM IN YOUR SCHOOL?	X	X
C032409	SCHL0060	IS LACK OF PARENT INVLMT A PROBLEM IN YOUR	X	X
C032410	SCHL0061	IS STUD USE OF ALCOHOL A PROBLEM IN YOUR SCHOOL?	X	X
C032411	SCHL0062	IS STUDENT TOBACCO USE A PROBLEM IN YOUR	X	X
C032412	SCHL0063	IS STUDENT DRUG USE A PROBLEM IN YOUR SCHOOL?	X	X
C032413	SCHL0064	ARE GANG ACTIVITIES A PROBLEM IN YOUR SCHOOL?	X	X
C032414	SCHL0065	IS STUDENT MISBEHAVIOR A PROBLEM IN YOUR	X	X
C032415	SCHL0066	IS STUDENT CHEATING A PROBLEM IN YOUR SCHOOL?	X	X
C032502	SCHL0067	IS TEACHER MORALE POS. OR NEG.?	X	X

Table C-2 (continued)
Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
C032503	SCHL0068	ARE STUDENT ATTITUDES TO ACADEMICS POS. OR NEG.?	X	X
C032505	SCHL0069	IS PARENT SUPPORT FOR ACHIEVEMENT POS. OR NEG.?	X	X
C032506	SCHL0070	IS REGARD FOR SCHOOL PROPERTY POS. OR NEG.?	X	X
C033601	SCHL0071	% ABSENT ON AVERAGE DAY?	X	X
C036501	SCHL0072	WHAT % OF TEACHERS ABSENT ON GIVEN DAY?	X	X
C037801	SCHL0073	% OF STUDS EROLLED AT START OF YR EROLLED AT	X	X
C037901	SCHL0074	% OF 4TH GRADERS HELD BACK & REPEATING 4TH	X	-
C038001	SCHL0075	% OF FULL TIME TEACHERS LEFT BEFORE END OF YR?	X	X
C038301	SCHL0076	IS SCHOOL IN NATIONAL SCHOOL LUNCH PROGRAM?	X	X
C038801	SCHL0077	SCHOOL RECEIVE CHAP 1/TITLE 1 FUNDING?	X	X
C034101	SCHL0078	DID PRINCIPAL FILL OUT THIS QUESTIONNAIRE	X	X
C034102	SCHL0079	DID HEADMASTER/HEADMISTRESS FILL OUT	X	X
C034103	SCHL0080	DID HEAD TEACHER FILL OUT THIS QUESTIONNAIRE	X	X
C034104	SCHL0081	DID VICE PRINCIPAL FILL OUT THIS QUESTIONNAIRE	X	X
C034105	SCHL0082	DID COUNSELOR FILL OUT THIS QUESTIONNAIRE	X	X
C034106	SCHL0083	DID CURRICULUM COORD FILL OUT THIS	X	X
C034107	SCHL0084	DID TEACHER FILL OUT THIS QUESTIONNAIRE	X	X
C034108	SCHL0085	DID SECRETARY FILL OUT THIS QUESTIONNAIRE	X	X
C034109	SCHL0086	DID OTHER PERSON FILL OUT THIS QUESTIONNAIRE	X	X
T055901	TCHR0001	WHAT IS YOUR GENDER?	X	X
T056001	TCHR0002	WHICH BEST DESRIBES YOU?	X	X
T040301	TCHR0003	YEARS TAUGHT	X	X
T056101	TCHR0004	HOW MANY YRS TOTAL YOU TAUGHT MATH?	X	-
T056102	TCHR0005	HOW MANY YRS TOTAL YOU TAUGHT SCIENCE?	X	-
T056201	TCHR0006	TYPE TCHNG CERT IN THIS ST IN MAIN FIELD?	X	X
T040501	TCHR0007	CERTIFICATION, ELEMENTARY OR MIDDLE/JUNIOR HS	X	X
T040506	TCHR0008	DO YOU HAVE CERTIFICATION IN ELEMENTARY MATH?	X	X
T040504	TCHR0009	DO YOU HAVE CERTIFICATION IN JR HIGH/SEC MATH?	X	X
T040505	TCHR0012	CERTIFICATION, OTHER	X	X
T056301	TCHR0013	HIGHEST ACADEMIC DEGREE YOU HOLD?	X	X
T040701	TCHR0014	EDUCATION UNDERGRAD MAJOR	X	X
T040706	TCHR0015	ELMENT ED UNDERGRAD MAJOR	X	X
T040707	TCHR0016	SEC ED UNDERGRAD MAJOR	X	X
T040703	TCHR0017	WAS YOUR UNDERGRADUATE MAJOR MATH?	X	X
T040704	TCHR0018	WAS YOUR UNDERGRADUATE MAJOR MATH ED?	X	X
T040708	TCHR0023	SPECIAL EDUCATION UNDERGRAD MAJOR	X	X
T040709	TCHR0024	BILINGUAL ED/ESL UNDERGRAD MAJOR	X	X
T040705	TCHR0025	OTHER UNDERGRAD MAJOR	X	X
T040801	TCHR0026	EDUCATION GRAD MAJOR	X	X
T040807	TCHR0027	ELEMENTARY ED GRAD MAJOR	X	X
T040808	TCHR0028	SECONDARY ED GRAD MAJOR	X	X
T040803	TCHR0029	WAS YOUR GRADUATE MAJOR MATHEMATICS?	X	X
T040804	TCHR0030	WAS YOUR GRADUATE MAJOR MATH ED?	X	X
T040809	TCHR0035	SPECIAL ED GRAD MAJOR	X	X
T040810	TCHR0036	BILINGUAL GRAD MAJOR	X	X

Table C-2 (continued)

Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
T040811	TCHR0037	ADMIN/SUPERVISION GRAD MAJOR	X	X
T040812	TCHR0038	CURRICULUM/INSTRUCTION GRAD MAJOR?	X	X
T040813	TCHR0039	COUNSELING GRAD MAJOR?	X	X
T040805	TCHR0040	OTHER GRAD MAJOR	X	X
T040806	TCHR0041	NO GRADUATE STUDY	X	X
T056401	TCHR0042	UNDERGRAD/GRAD MINOR STUDY-EDUCATION	X	X
T056402	TCHR0043	UNDERGRAD/GRAD MINOR STUDY-ELEMENTARY ED	X	X
T056403	TCHR0044	UNDERGRAD/GRAD MINOR STUDY-SECONDARY ED	X	X
T056404	TCHR0045	UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS	X	X
T056405	TCHR0046	UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS ED	X	X
T056406	TCHR0051	UNDERGRAD/GRAD MINOR STUDY-SPECIAL ED	X	X
T056407	TCHR0052	UNDERGRAD/GRAD MINOR STUDY-BILINGUAL ED	X	X
T056408	TCHR0053	UNDERGRAD/GRAD MINOR STUDY-ADMIN &	X	X
T056409	TCHR0054	UNDERGRAD/GRAD MINOR STUDY-CURRICULUM &	X	X
T056410	TCHR0055	UNDERGRAD/GRAD MINOR STUDY-COUNSELING	X	X
T056411	TCHR0056	UNDERGRAD/GRAD MINOR STUDY-OTHER	X	X
T056412	TCHR0057	UNDERGRAD/GRAD MINOR STUDY-NONE	X	X
T056501	TCHR0058	LAST YR, HOW MUCH TIME IN MATH/MATH ED	X	X
T056601	TCHR0060	LAST 2 YRS, HOW MANY MATH/MATH ED UNIV COURSES?	X	X
T056701	TCHR0062	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TELECOMM	X	X
T056702	TCHR0063	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TECH USE	X	X
T056703	TCHR0064	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-COOP	X	X
T056704	TCHR0065	PAST 5 YRS, COURSES/IN PRO DEVLP-INTERDISP INSTRCT	X	X
T056705	TCHR0066	PAST 5 YRS, COURSES/IN PRO DEVLP-PORTFOLIO ASSMNT	X	X
T056706	TCHR0067	PAST 5 YRS, COURSES/IN PRO DEVLP-PERF BASED	X	X
T056707	TCHR0068	PAST 5 YRS, COURSES/PRO DEVLP-TEACH HIGHORDER	X	X
T056708	TCHR0069	PAST 5 YRS, COURSES/PRO DEVLP-TEACH DIFF CULT	X	X
T056709	TCHR0070	PAST 5 YRS, COURSES/PRO DEVLP-TEACH LEP STUDENTS	X	X
T056710	TCHR0071	PAST 5 YRS, COURSES/PRO DEVLP-TEACH SPEC NEED	X	X
T056711	TCHR0072	PAST 5 YRS, COURSES/PRO DEVLP-CLASSRM MNGMT/ORG	X	X
T056712	TCHR0073	PAST 5 YRS, COURSES/PRO DEVLP-OTHER PROF ISSUES	X	X
T056713	TCHR0074	PAST 5 YRS, COURSES/PRO DEVLP-NONE OF ABOVE	X	X
T041201	TCHR0075	AVAILABILITY OF RESOURCES	X	X
T041302	TCHR0076	ARE CURRICULUM SPECIALISTS AVAILABLE FOR MATH?	X	-
T041303	TCHR0077	SCIENCE CURRICULUM SPECIALIST	X	-
T056801	TCHR0078	HOW MANY SCHOOL HOURS ARE PREP TIME PER WEEK?	X	X
T056901	TCHR0079	METHODS OF TEACHING ELEM MATH- 1+COLLEGE	X	X
T0569A1	TCHR0080	METHODS OF TEACHING ELEM MATH-PART COLLEGE	X	X
T0569B1	TCHR0081	METHODS OF TEACHING ELEM MATH-SEMINAR	X	X
T0569C1	TCHR0082	METHODS OF TEACHING ELEM MATH-LITTLE NO	X	X
T056902	TCHR0083	NUMBER SYSTEMS & NUMERATION-1+ COLLEGE COURSE	X	X
T0569A2	TCHR0084	NUMBER SYSTEMS & NUMERATION-PART COLLEGE	X	X
T0569B2	TCHR0085	NUMBER SYSTEMS & NUMERATION-SEMINAR	X	X
T0569C2	TCHR0086	NUMBER SYSTEMS & NUMERATION-LITTLE/NO	X	X
T056903	TCHR0087	MEASUREMENT IN MATH- 1+COLLEGE COURSE	X	X

Table C-2 (continued)

Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
T0569A3	TCHR0088	MEASUREMENT IN MATH- PART COLLEGE COURSE	X	X
T0569B3	TCHR0089	MEASUREMENT IN MATH- -SEMINAR	X	X
T0569C3	TCHR0090	MEASUREMENT IN MATH- -LITTLE NO EXPOSURE	X	X
T056904	TCHR0091	GEOMETRY- 1+COLLEGE COURSE	X	X
T0569A4	TCHR0092	GEOMETRY-PART COLLEGE COURSE	X	X
T0569B4	TCHR0093	GEOMETRY-SEMINAR	X	X
T0569C4	TCHR0094	GEOMETRY-LITTLE NO EXPOSURE	X	X
T056905	TCHR0095	PROBABILITY/STATISTICS- 1+COLLEGE COURSE	X	X
T0569A5	TCHR0096	PROBABILITY/STATISTICS-PART COLLEGE COURSE	X	X
T0569B5	TCHR0097	PROBABILITY/STATISTICS-SEMINAR	X	X
T0569C5	TCHR0098	PROBABILITY/STATISTICS-LITTLE NO EXPOSURE	X	X
T056906	TCHR0099	COLLEGE ALGEBRA- 1+COLLEGE COURSE	X	X
T0569A6	TCHR0100	COLLEGE ALGEBRA-PART COLLEGE COURSE	X	X
T0569B6	TCHR0101	COLLEGE ALGEBRA-SEMINAR	X	X
T0569C6	TCHR0102	COLLEGE ALGEBRA-LITTLE NO EXPOSURE	X	X
T056907	TCHR0103	CALCULUS- 1+COLLEGE COURSE	X	X
T0569A7	TCHR0104	CALCULUS-PART COLLEGE COURSE	X	X
T0569B7	TCHR0105	CALCULUS-SEMINAR	X	X
T0569C7	TCHR0106	CALCULUS-LITTLE NO EXPOSURE	X	X
T056908	TCHR0107	ABSTRACT/LINEAR ALGEBRA- 1+COLLEGE COURSE	X	X
T0569A8	TCHR0108	ABSTRACT/LINEAR ALGEBRA-PART COLLEGE COURSE	X	X
T0569B8	TCHR0109	ABSTRACT/LINEAR ALGEBRA-SEMINAR	X	X
T0569C8	TCHR0110	ABSTRACT/LINEAR ALGEBRA-LITTLE NO EXPOSURE	X	X
T057001	TCHR0111	EVER STUDIED ESTIMATION?	X	X
T057002	TCHR0112	EVER STUDIED PROBLEM SOLVING IN MATH?	X	X
T057003	TCHR0113	EVER STUDIED USE OF MANIPULATIVES?	X	X
T057004	TCHR0114	EVER STUDIED USE OF CALCULATORS IN MATH INSTRC?	X	X
T057005	TCHR0115	EVER STUDIED UNDERSTANDING STUDS MATH	X	X
T057006	TCHR0116	EVER STUDIED GENDER ISSUES IN TEACHING MATH?	X	X
T057007	TCHR0117	EVER STUDIED TEACHING STUDS OF DIFF CULTURES?	X	X
T057101	TCHR0118	KNOWLEDGE OF NCTM CURR & EVAL STANDARDS FOR	X	X
T057201	TCHR0119	PRO ACTVTS-STRATEGIES LOCAL WORKSHOPS	X	X
T057211	TCHR0120	PRO ACTVTS-STRATEGIES REGIONAL NCTM MEETING	X	X
T057221	TCHR0121	PRO ACTVTS-STRATEGIES NATIONAL NCTM MEETING	X	X
T057231	TCHR0122	PRO ACTVTS-STRATEGIES OTHER	X	X
T057241	TCHR0123	PRO ACTVTS-STRATEGIES NO	X	X
T057301	TSUB0001	IMPORTANCE W/ STUDS-APPLYING MATH IDEAS?	X	X
T057302	TSUB0002	IMPORTANCE W/ STUDS-PROB SOLVING=GOAL &	X	X
T057303	TSUB0003	IMPORTANCE W/ STUDS-? TECHS PROMOTE STUD TALK?	X	X
T057304	TSUB0004	IMPORTANCE W/ STUDS-USE RESULTS TO INFORM	X	X
T057401	TSUB0005	TO ACCESS PROGRESS HOW OFTEN USE MULT CHOICE	X	X
T057402	TSUB0006	TO ACCESS PROGRESS HOW OFTEN USE PROBLEM SETS	X	X
T057403	TSUB0007	TO ACCESS PROGRESS HOW OFTEN USE SHORT WRITTEN	X	X
T057404	TSUB0008	TO ACCESS PROGRESS HOW OFTEN USE INDV/GROUP	X	X
T057405	TSUB0009	TO ACCESS PROGRESS HOW OFTEN USE PORTFOLIOS	X	X

Table C-2 (continued)

Summary Table of Conditioning Variable Specifications
for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
T057501	TSUB0010	BEST DESCRIPTION OF COMPUTER AVAILABLITY IN	X	X
T057601	TSUB0011	PRIMARY USE OF COMPUTERS FOR MATH INSTRUCTION?	X	X
T044002	TSUB0012	ARE STUDENTS ASSIGNED TO THIS CLASS BY ABILITY?	X	X
T057701	TSUB0013	IF ASSIGNED BY ABILITY, WHAT BASIS ASSIGNED?	X	X
T057801	TSUB0014	IF ASSIGNED BY ABILITY, WHAT IS MATH ABILITY?	X	X
T044201	TSUB0015	CREATE GROUPS IN CLASS FOR MATH ON ABILITY BASIS?	X	X
T044301	TSUB0016	TIME/WEEK ON MATH INSTRUTION?	X	X
T057901	TSUB0017	HOW MUCH TIME PER WEEK STUDS DO MATH W/	X	X
T044401	TSUB0018	AMOUNT MATH HOMEWORK ASSIGN/DAY?	X	X
T044501	TSUB0019	HOW OFTEN DO STUDENTS DO MATH FROM TEXTBOOKS?	X	X
T044502	TSUB0020	HOW OFTEN DO STUDENTS DO MATH ON WORKSHEETS?	X	X
T044512	TSUB0021	HOW OFTEN DO STUDENTS SOLVE PROBS W/ OTHER	X	X
T044513	TSUB0022	HOW OFTEN DO STUDENTS WORK W/ OBJECTS LIKE	X	X
T044514	TSUB0023	HOW OFTEN WORK W/ COUNTING BLOCKS.GEOMETRIC	X	X
T044505	TSUB0024	HOW OFTEN DO STUDENTS USE A CALCULATOR?	X	X
T044515	TSUB0025	HOW OFTEN DO STUDENTS TAKE MATH TESTS?	X	X
T044507	TSUB0026	HOW OFTEN DO STUDENTS WRITE ABOUT PROBLEM-	X	X
T044516	TSUB0027	HOW OFTEN DO STUDENTS TALK ABOUT MATH WORK?	X	X
T044508	TSUB0028	HOW OFTEN DO STUDENTS WRITE REPORTS/DO	X	X
T044509	TSUB0029	HOW OFTEN DO STUDENTS DISCUSS MATH W/OTHER	X	X
T044510	TSUB0030	HOW OFTEN DO STUDENTS WORK REAL-LIFE MATH	X	X
T044506	TSUB0031	HOW OFTEN DO STUDENTS USE A COMPUTER?	X	X
T058001	TSUB0032	IN MATH CLASS HOW OFTEN ADDRESS-NUMBERS & OPS?	X	X
T058002	TSUB0033	IN MATH CLASS HOW OFTEN ADDRESS-MEASUREMENT?	X	X
T058003	TSUB0034	IN MATH CLASS HOW OFTEN ADDRESS-GEOMETRY?	X	X
T058004	TSUB0035	IN MATH CLASS HOW OFTEN ADDRESS-DATA ANALYSIS?	X	X
T058005	TSUB0036	IN MATH CLASS HOW OFTEN ADDRESS-ALGEBRA &	X	X
T058006	TSUB0037	IN MATH HOW OFTEN ADDRESS-LRN MATH	X	X
T058007	TSUB0038	IN MATH HOW OFTEN ADDRESS-LRN	X	X
T058008	TSUB0039	IN MATH HOW OFTEN ADDRESS-DEVELOP REASONING	X	X
T058009	TSUB0040	IN MATH HOW OFTEN ADDRESS-LRN TO COMMUNICATE	X	X
T045401	TSUB0041	DO YOU PERMIT UNRESTRICTED USE OF CALCULATORS?	X	X
T044801	TSUB0042	DO YOU PERMIT USE OF CALCULATORS ON TESTS?	X	X
T045001	TSUB0043	STUDENTS HAVE ACCESS TO SCHL-OWNED	X	X
T044901	TSUB0044	DO YOU PROVIDE INSTRUCTION IN USE OF	X	X
T045304	TSUB0045	HOW PREPARED TO TEACH MATH CONCEPTS?	X	X
T045305	TSUB0046	HOW PREPARED TO TEACH MATH PROCEDURES?	X	X
T045302	TSUB0047	HOW PREPARED TO TEACH USE OF COMPUTERS?	X	X
T045303	TSUB0048	HOW PREPARED TO TEACH USE OF CALCULATORS?	X	X
T044000	TSUB0049	NUMBER OF STUDENTS IN CLASS?	X	X
NTLUNSC	SCHL0173	PERCENT IN NATIONAL LUNCH PROGRAM FOR SCHOOL	X	X
NTLUNSC	SCHL0174	PERCENT IN NATIONAL LUNCH PROGRAM FOR SCHOOL	X	X
REMRDSC	SCHL0175	PERCENT IN REMEDIAL READING PRGRM FOR SCHOOL	X	X
REMRDSC	SCHL0176	PERCENT IN REMEDIAL READING PRGRM FOR SCHOOL	X	X
REMMHSC	SCHL0177	PERCENT IN REMEDIAL MATH PROGRAM FOR SCHOOL	X	X

Table C-2 (continued)
Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
REMMHSC	SCHL0178	PERCENT IN REMEDIAL MATH PROGRAM FOR SCHOOL	X	X
NTLUNGR	SCHL0179	PERCENT IN NATIONAL LUNCH PROGRAM FOR GRADE	X	-
NTLUNGR	SCHL0180	PERCENT IN NATIONAL LUNCH PROGRAM FOR GRADE	X	-
REMRDGR	SCHL0181	PERCENT IN REMEDIAL READING PRGRM FOR GRADE	X	-
REMRDGR	SCHL0182	PERCENT IN REMEDIAL READING PRGRM FOR GRADE	X	-
REMMHGR	SCHL0183	PERCENT IN REMEDIAL MATH PROGRAM FOR GRADE	X	-
REMMHGR	SCHL0184	PERCENT IN REMEDIAL MATH PROGRAM FOR GRADE	X	-
MATTAKE	SUBJ0001	MATH CLASS TAKING THIS YEAR (ETS)	-	X
B009701	BACK0078	DESCRIBE YOUR OVERALL GRADES SINCE 6TH GRADE	-	X
B009801	BACK0079	HOW FAR IN SCHOOL DO YOU THINK YOU WILL GO?	-	X
B009601	BACK0080	DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?	-	X
B009602	BACK0081	DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?	-	X
M812712	SUBJ0032	WORK W/ MEAS. INSTRUMENTS/GEOM SOLIDS FOR	-	X
M812713	SUBJ0033	HOW OFTEN WRITE REPORTS OR DO MATH PROJECTS?	-	X
M812201	SUBJ0034	IS THERE A PORTFOLIO W/ YOUR MATH WORK IN IT?	-	X
M812301	SUBJ0035	DO YOU USE A SCIENTIFIC CALCULATOR FOR MATH	-	X
M812401	SUBJ0036	DO YOU USE A GRAPHING CALCULATOR FOR MATH	-	X
MATEXP	SUBJ0037	MATH CLASS EXPECT TO TAKE IN NINTH GRADE (ETS)	-	X
M810701	SUBJ0038	DO YOU AGREE: I LIKE MATH	-	X
M810703	SUBJ0039	DO YOU AGREE: I AM GOOD IN MATH	-	X
M810707	SUBJ0040	AGREE/DISAGREE: UNDERSTAND MOST OF MATH CLASS	-	X
M810709	SUBJ0041	AGREE/DISAGREE: ONLY ONE WAY TO SOLVE MATH	-	X
M810708	SUBJ0042	AGREE/DISAGREE: MATH IS MOSTLY MEMORIZING FACTS	-	X
M810710	SUBJ0043	AGREE/DISAGREE: CONCEPTS ARE AS IMPORTANT AS	-	X
M810705	SUBJ0044	DO YOU AGREE: MATH USEFUL/SOLVING EVERYDAY	-	X
M810706	SUBJ0045	AGREE/DISAGREE: WOULD NOT STUDY MORE MATH	-	X
M810711	SUBJ0046	AGREE/DISAGREE: ALL CAN DO WELL IN MATH IF TRY	-	X
C034201	SCHL0087	BEST DESCRIBES HOW 8TH GRADES ARE ORGANIZED?	-	X
C034402	SCHL0088	ARE 8TH-GRADERS ASSIGNED TO MATH BY ABILITY?	-	X
C034403	SCHL0089	ARE 8TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?	-	X
C034401	SCHL0090	ARE 8TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?	-	X
C034406	SCHL0091	ARE 8TH-GRADERS ASSIGNED TO ARTS BY ABILITY?	-	X
C034510	SCHL0092	HOW OFTEN 8TH GRDS RECEIVE COMP SCI INSTRUCTION?	-	X
C034511	SCHL0093	HOW OFTEN 8TH GRDS RECEIVE MATH INSTRUCTION?	-	X
C034512	SCHL0094	HOW OFTEN 8TH GRDS RECEIVE SCIENCE INSTRUCTION?	-	X
C034513	SCHL0095	HOW OFTEN 8TH GRDS RECEIVE ENGLISH INSTRUCTION?	-	X
C034514	SCHL0096	HOW OFTEN 8TH GRDS RECEIVE ARTS INSTRUCTION?	-	X
C031611	SCHL0097	HAS ENGLISH BEEN IDENTIFIED AS A PRIORITY?	-	X
C034601	SCHL0098	SCHOOL OFFER 8TH GR STUDS ALGEBRA FOR HS CREDIT?	-	X
C037203	SCHL0099	SCHOOL W/ SPECIAL FOCUS ON ENGLISH?	-	X
C037306	SCHL0100	SCHOOL FOLLOW DISTRICT/STATE ENGLISH	-	X
C039401	SCHL0101	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR MATH?	-	X
C039402	SCHL0102	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR SCIENCE?	-	X
C039403	SCHL0103	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR READING?	-	X
C039404	SCHL0104	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR ARTS?	-	X

Table C-2 (continued)

Summary Table of Conditioning Variable Specifications for the 1996 State Assessment in Mathematics

Conditioning ID	NAEP ID	Description	Grade 4	Grade 8
C039405	SCHL0105	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR OTHER?	-	X
C039406	SCHL0106	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR NONE	-	X
C039501	SCHL0107	8TH GRADERS IN EXTRACURR ACTS FOR MATH?	-	X
C039502	SCHL0108	8TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?	-	X
C039503	SCHL0109	8TH GRADERS IN EXTRACURR ACTS FOR ENG/LANG	-	X
C039504	SCHL0110	8TH GRADERS IN EXTRACURR ACTS FOR ARTS?	-	X
C039505	SCHL0111	8TH GRADERS IN EXTRACURR ACTS FOR NONE OF	-	X
C039601	SCHL0112	8TH GRADERS IN SUMMER PROGRAMS IN MATH?	-	X
C039602	SCHL0113	8TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	-	X
C039603	SCHL0114	8TH GRADERS IN SUMMER PROGRAMS IN ENG/LANG	-	X
C039604	SCHL0115	8TH GRADERS IN SUMMER PROGRAMS IN ARTS?	-	X
C039605	SCHL0116	8TH GRADERS IN SUMMER PROGRAMS IN NONE OF	-	X
C041901	SCHL0117	WHAT % OF 8TH GRDS HELD BACK/REPEAT 8TH GRADE?	-	X
T063001	TCHR0124	YRS TOTAL TAUGHT MATH	-	X
T058301	TCHR0125	CURRICULUM SPECIALIST TO HELP/ADVISE IN MATH?	-	X
NTLUNGR	SCHL0185	PERCENT IN NATIONAL LUNCH PROGRAM FOR GRADE	-	X
NTLUNGR	SCHL0186	PERCENT IN NATIONAL LUNCH PROGRAM FOR GRADE	-	X
REMRDGR	SCHL0187	PERCENT IN REMEDIAL READING PRGRM FOR GRADE	-	X
REMRDGR	SCHL0188	PERCENT IN REMEDIAL READING PRGRM FOR GRADE	-	X
REMMHGR	SCHL0189	PERCENT IN REMEDIAL MATH PROGRAM FOR GRADE	-	X
REMMHGR	SCHL0190	PERCENT IN REMEDIAL MATH PROGRAM FOR GRADE	-	X

```
CONDITIONING VARIABLE ID:  BACK0001
DESCRIPTION:               GRAND MEAN
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    OVERALL
NAEP ID:                   BKSER                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          OTHER                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 OVERALL  (@          ) 1                         GRAND MEAN


CONDITIONING VARIABLE ID:  BACK0002
DESCRIPTION:               DERIVED SEX
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    GENDER
NAEP ID:                   DSEX                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 MALE     (1          ) 0                         MALE
002 FEMALE   (2          ) 1                         FEMALE


CONDITIONING VARIABLE ID:  BACK0003
DESCRIPTION:               DERIVED RACE/ETHNICITY
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/ETH
NAEP ID:                   DRACE                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 WHI/AI/O (1,5,6      ) 000                       RACE/ETHNICITY:  WHITE, AMERICAN INDIAN/ALASKAN NAT-VE, OTHER,
                                                     MISSING, UNCLASSIFIED
002 BLACK    (2          ) 100                       RACE/ETHNICITY:  BLACK
003 HISPANIC (3          ) 010                       RACE/ETHNICITY:  HISPANIC
004 ASIAN    (4          ) 001                       RACE/ETHNICITY:  ASIAN


CONDITIONING VARIABLE ID:  BACK0004
DESCRIPTION:               IF HISPANIC, WHAT IS YOUR HISPANIC BACKGROUND?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    HISPANIC
NAEP ID:                 . B003101                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 NOT HISP (1          ) 0000                      HISPANIC:  NOT HISPANIC
002 MEXICAN  (2          ) 1000                      HISPANIC:  MEXICAN, MEXICAN AMERICAN, CHICANO
003 PUER RIC (3          ) 0100                      HISPANIC:  PUERTO RICAN
004 CUBN,OTH (4,5        ) 0010                      HISPANIC:  CUBAN, OTHER
005 HISP-?   (M          ) 0001                      HISPANIC:  MISSING


CONDITIONING VARIABLE ID:  BACK0005
DESCRIPTION:               MSA/NON-MSA
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    MSANAT
NAEP ID:                   TOL8                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 MSA      (1,2,3,4,7,9) 0                         MSA
002 NON MSA  (5,6,8      ) 1                         NON-MSA


CONDITIONING VARIABLE ID:  BACK0006
DESCRIPTION:               TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    TOL5
NAEP ID:                   TOL5                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 BIG CTY5 (1          ) 0000                      TOL5:  LARGE CITY
002 MID CTY5 (2,M        ) 1000                      TOL5:  MID-SIZE CITY
003 FR/BTWN5 (3          ) 0100                      TOL5:  URBAN FRINGE OF LARGE CITY, URBAN FRINGE OF MID-SIZE CITY
004 SML TWN5 (4          ) 0010                      TOL5:  SMALL TOWN
005 RURAL5   (5          ) 0001                      TOL5:  RURAL (MSA AND NON-MSA)


CONDITIONING VARIABLE ID:  BACK0007
DESCRIPTION:               DESCRIPTION OF COMMUNITY
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    DOC
NAEP ID:                   DOC                       TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 BIG CITY (1          ) 000                       DOC:  BIG CITY
002 URBAN FR (2          ) 100                       DOC:  URBAN FRINGE
003 MED CITY (3,9,M      ) 010                       DOC:  MEDIUM CITY
004 SM PLACE (4          ) 001                       DOC:  SMALL PLACE
```

CONDITIONING VARIABLE ID: BACK0008
DESCRIPTION: PARENTS' HIGHEST LEVEL OF EDUCATION
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: PARED
NAEP ID: PARED
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001 < HS	(1	) 0000	PARED: LESS THAN HIGH SCHOOL
002 HS GRAD	(2	) 1000	PARED: HIGH SCHOOL GRADUATE
003 POST HS	(3	) 0100	PARED: POST HIGH SCHOOL
004 COL GRAD	(4	) 0010	PARED: COLLEGE GRADUATE
005 PARED-?	(5,M	) 0001	PARED: MISSING, I DON'T KNOW

CONDITIONING VARIABLE ID: BACK0010
DESCRIPTION: SCHOOL TYPE (PQ)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: SCHTYPE
NAEP ID: SCHTYPE
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
NUMBER OF INDEPENDENT CONTRASTS: 2

001 PUBLIC	(1	) 00	SCHOOL TYPE: PUBLIC
002 PRIVATE	(2,4,5,M	) 10	SCHOOL TYPE: PRIVATE, BUREAU OF INDIAN AFFAIRS, DEPARTMENT OF DEFENSE, MISSING
003 CATHOLIC	(3	) 01	SCHOOL TYPE: CATHOLIC

CONDITIONING VARIABLE ID: BACK0011
DESCRIPTION: INDIVIDUALIZED EDUCATION PLAN
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: IEP
NAEP ID: IEP
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 IEP-YES	(1	) 0	IEP: YES
002 IEP-NO	(2	) 1	IEP: NO

CONDITIONING VARIABLE ID: BACK0012
DESCRIPTION: LIMITED ENGLISH PROFICIENCY
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: LEP
NAEP ID: LEP
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 LEP-YES	(1	) 0	LEP: YES
002 LEP-NO	(2	) 1	LEP: NO

CONDITIONING VARIABLE ID: BACK0013
DESCRIPTION: CHAPTER 1 (BOOK COVER)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: CHAPTER1
NAEP ID: CHAP1
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 CHAP1-Y	(1	) 0	CHAPTER 1: YES
002 CHAP1-N	(2	) 1	CHAPTER 1: NO

CONDITIONING VARIABLE ID: BACK0014
DESCRIPTION: DO YOU RECEIVE A FREE OR REDUCED-PRICE LUNCH?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: LUNCH
NAEP ID: SLUNCH
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001 NOT ELIG	(1	) 0000	LUNCH PROGRAM: NOT ELIGIBLE
002 RED PRIC	(2	) 1000	LUNCH PROGRAM: REDUCED PRICE
003 FREE	(3	) 0100	LUNCH PROGRAM: FREE
004 INFO N/A	(4,M	) 0010	LUNCH PROGRAM: INFO NOT AVAILABLE
005 SCH/REF	(5	) 0001	LUNCH PROGRAM: SCHOOL REFUAL

CONDITIONING VARIABLE ID: BACK0015
DESCRIPTION: HOW OFTEN DO THE PEOPLE IN YOUR HOME SPEAK A LANGUAGE OTHER THAN ENGLISH?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: HOMELANG
NAEP ID: B003201
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
NUMBER OF INDEPENDENT CONTRASTS: 3

001 HL-NEVER	(1	) 000	HOMELANG: NEVER
002 HL-SOME	(2	) 100	HOMELANG: SOMETIMES
003 HL-ALWAY	(3	) 010	HOMELANG: ALWAYS
004 HL-?	(M	) 001	HOMELANG: MISSING

CONDITIONING VARIABLE ID: BACK0016
DESCRIPTION: DO YOU HAVE YOUR OWN STUDY DESK OR TABLE AT HOME?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: B008901 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 3

001 B008901Y (01) 000 | YES
002 B008901N (02) 100 | NO
003 B008901I (03) 010 | IDK25 (FILL 1 SHELF)
004 B008901M (M) 001 | MISSING

CONDITIONING VARIABLE ID: BACK0017
DESCRIPTION: HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH DAY? (LINEAR)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: TVWATCHL
NAEP ID: B001801 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 7
TYPE OF CONTRAST: LINEAR | NUMBER OF INDEPENDENT CONTRASTS: 1

001 TVLIN-0 (1) 0 | TV WATCHING (LINEAR) (0 TO 6+ HOURS PER DAY)
002 TVLIN-1 (2) 1 | TV WATCHING (LINEAR)
003 TVLIN-2 (3) 2 | TV WATCHING (LINEAR)
004 TVLIN-3 (4,M) 3 | TV WATCHING (LINEAR)
005 TVLIN-4 (5) 4 | TV WATCHING (LINEAR)
006 TVLIN-5 (6) 5 | TV WATCHING (LINEAR)
007 TVLIN-6 (7) 6 | TV WATCHING (LINEAR)

CONDITIONING VARIABLE ID: BACK0018
DESCRIPTION: HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH DAY? (QUADRATIC)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: TVWATCHQ
NAEP ID: B001801 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 1
TYPE OF CONTRAST: QUADRATIC | NUMBER OF INDEPENDENT CONTRASTS: 1

001 TV-QUAD (1-7,M=4) 1.0 + -2.0*X + 1.0*X**2 | TV WATCHING (QUADRATIC)

CONDITIONING VARIABLE ID: BACK0019
DESCRIPTION: HOMEWORK ASSIGNED?: BASED ON TIME SPENT ON HOMEWORK EACH DAY.
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: HWASSIGN
NAEP ID: B006601 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 2

001 HW-MISS (M) 00 | HOMEWORK ASSIGNED?: MISSING
002 HW-NO (1) 10 | HOMEWORK ASSIGNED?: NO
003 HW-YES (2-5) 01 | HOMEWORK ASSIGNED?: YES

CONDITIONING VARIABLE ID: BACK0020
DESCRIPTION: HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY? (LINEAR)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: HOMEWRKL
NAEP ID: B006601 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: LINEAR | NUMBER OF INDEPENDENT CONTRASTS: 1

001 HWLIN-0 (1,2,M) 0 | HOMEWORK (LINEAR): DON'T HAVE ANY, DON'T DO ANY, MISSING
002 HWLIN-1 (3) 1 | HOMEWORK (LINEAR): 1/2 HOUR OR LESS
003 HWLIN-2 (4) 2 | HOMEWORK (LINEAR): 1 HOUR
004 HWLIN-3 (5) 3 | HOMEWORK (LINEAR): MORE THAN 1 HOUR

CONDITIONING VARIABLE ID: BACK0021
DESCRIPTION: HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY (QUADRATIC)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: HOMEWRKQ
NAEP ID: B006601 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: SCALE | NUMBER OF INDEPENDENT CONTRASTS: 1

001 HWQUAD-0 (1,2,M) 0 | HOMEWORK (QUADRATIC): DON'T HAVE ANY, DON'T DO ANY, MISSING
002 HWQUAD-1 (3) 1 | HOMEWORK (QUADRATIC): 1/2 HOUR OR LESS
003 HWQUAD-2 (4) 4 | HOMEWORK (QUADRATIC): 1 HOUR
004 HWQUAD-3 (5) 9 | HOMEWORK (QUADRATIC): MORE THAN 1 HOUR

CONDITIONING VARIABLE ID: BACK0022
DESCRIPTION: NUMBER OF ITEMS IN THE HOME (NEWSPAPER, > 25 BOOKS, ENCYCLOPEDIA, MAGAZINES) (DERIVED)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: HOMEITMS
NAEP ID: HOMEEN2 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 2

001 HITEM<=2 (1,M) 00 | ITEMS IN HOME: ZERO TO TWO ITEMS, MISSING

```
002 HITEM=3  (2          ) 10                    ITEMS IN HOME:  THREE ITEMS
003 HITEM=4  (3          ) 01                    ITEMS IN HOME:  FOUR ITEMS


CONDITIONING VARIABLE ID:  BACK0023
DESCRIPTION:               DOES MOTHER OR STEPMOTHER LIVE AT HOME WITH YOU?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    MOM@HOME
NAEP ID:                   B005601               TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          2

001 MOMHOM-Y (1          ) 00                    MOTHER AT HOME:  YES
002 MOMHOM-N (2          ) 10                    MOTHER AT HOME:  NO
003 MOMHOM-? (M          ) 01                    MOTHER AT HOME:  MISSING


CONDITIONING VARIABLE ID:  BACK0024
DESCRIPTION:               DOES FATHER OR STEPFATHER LIVE AT HOME WITH YOU?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    DAD@HOME
NAEP ID:                   B005701               TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          2

001 DADHOM-Y (1          ) 00                    FATHER AT HOME:  YES
002 DADHOM-N (2          ) 10                    FATHER AT HOME:  NO
003 DADHOM-? (M          ) 01                    FATHER AT HOME:  MISSING


CONDITIONING VARIABLE ID:  BACK0025
DESCRIPTION:               HOW MANY DAYS OF SCHOOL MISSED LAST MONTH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SCH MISS
NAEP ID:                   S004001               TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          1

001 MISS->2  (3,4,5,M    ) 0                     DAYS OF SCHOOL MISSED:  3-4, 5-10, 10 OR MORE DAYS, MISSING
002 MISS-2<  (1,2        ) 1                     DAYS OF SCHOOL MISSED:  0-1, 2 DAYS


CONDITIONING VARIABLE ID:  BACK0026
DESCRIPTION:               HOW LONG LIVED IN THE UNITED STATES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    YRSINUSA
NAEP ID.                   B008001               TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          4

001 ALL MY L (1          ) 0000                  ALL MY LIFE
002 USA >5   (2          ) 1000                  LIVED IN US MORE THAN 5 YEARS
003 USA 3 5  (3          ) 0100                  LIVED IN US 3-5 YEARS
004 USA <3   (4          ) 0010                  LIVED IN US LESS THAN 3 YEARS
005 USA-?    (M          ) 0001                  LIVED IN US MISSING


CONDITIONING VARIABLE ID:  BACK0027
DESCRIPTION:               HOW MANY GRADES IN THIS STATE? (4TH GRADE)
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:    STGRADE4
NAEP ID:                   B007601               TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          2

001 STGRD<1  (1,M        ) 00                    GRADES IN STATE:  LESS THAN 1 GRADE, MISSING
002 STGRD1-2 (2          ) 10                    GRADES IN STATE:  1-2 GRADES
003 STGRD3>  (3          ) 01                    GRADES IN STATE:  3 OR MORE GRADES


CONDITIONING VARIABLE ID:  BACK0029
DESCRIPTION.               HOW MANY TIMES HAVE YOU CHANGED SCHOOLS IN PAST TWO YEARS BECAUSE YOU MOVED?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL.    SCH CHGS
NAEP ID:                   B007301               TOTAL NUMBER OF SPECIFIED CONTRASTS:      4
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          3

001 SCHCHG-0 (1          ) 000                   SCHOOL CHANGES:  NONE
002 SCHCHG-1 (2          ) 100                   SCHOOL CHANGES:  ONE
003 SCHCHG-2 (3          ) 010                   SCHOOL CHANGES:  TWO
004 SCHCHG-3 (4,M        ) 001                   SCHOOL CHANGES:  THREE OR MORE, MISSING


CONDITIONING VARIABLE ID:  BACK0030
DESCRIPTION:               HOW OFTEN DO YOU DISCUSS THINGS STUDIED IN SCHOOL WITH SOMEONE AT HOME?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    DISC@HOM
NAEP ID:                   B007401               TOTAL NUMBER OF SPECIFIED CONTRASTS:      4
TYPE OF CONTRAST           CLASS                 NUMBER OF INDEPENDENT CONTRASTS:          4

001 DIS@HOM1 (1          ) 000                   DISCUSS STUDIES AT HOME:  ALMOST EVERY DAY
002 DIS@HOM2 (2          ) 100                   DISCUSS STUDIES AT HOME:  ONCE OR TWICE A WEEK
```

003	DIS@HOM3	(3)	010	DISCUSS STUDIES AT HOME: ONCE OR TWICE A MONTH
004	DIS@HOM4	(4,M)	001	DISCUSS STUDIES AT HOME: NEVER OR HARDLY EVER, MISSING

CONDITIONING VARIABLE ID: BACK0031
DESCRIPTION: ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: PGSREAD1
NAEP ID: B001101 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 1

001	PGS<6,?	(5,M)	0	PAGES READ: 5 OR FEWER A DAY, MISSING
002	PGS>5	(1,2,3,4)	1	PAGES READ: 6-10, 11-15, 16-20, 20 OR MORE

CONDITIONING VARIABLE ID: BACK0032
DESCRIPTION: ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: PGSREAD2
NAEP ID: B001101 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 1

001	PGS<11,?	(4,5,M)	0	PAGES READ: 6-10, 5 OR FEWER A DAY, MISSING
002	PGS>10	(1,2,3)	1	PAGES READ: 11-15, 16-20, 20 OR MORE

CONDITIONING VARIABLE ID: BACK0048
DESCRIPTION: INTERACTION: GENDER BY RACE/ETHNICITY
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: GEND/RAC
NAEP ID: N/A — TOTAL NUMBER OF SPECIFIED CONTRASTS: 8
TYPE OF CONTRAST: INTERACTION — NUMBER OF INDEPENDENT CONTRASTS: 3

001	G/R 11	(11)	010101	GEND/RAC INTACT:	1. MALE	1. WHI/AI/O
002	G/R 12	(12)	-10000	GEND/RAC INTACT:	1. MALE	2. BLACK
003	G/R 13	(13)	00-100	GEND/RAC INTACT:	1. MALE	3. HISPANIC
004	G/R 14	(14)	0000-1	GEND/RAC INTACT:	1. MALE	4. ASIAN
005	G/R 21	(21)	-1-1-1	GEND/RAC INTACT:	2. FEMALE	1. WHI/AI/O
006	G/R 22	(22)	010000	GEND/RAC INTACT:	2. FEMALE	2. BLACK
007	G/R 23	(23)	000100	GEND/RAC INTACT:	2. FEMALE	3. HISPANIC
008	G/R 24	(24)	000001	GEND/RAC INTACT:	2. FEMALE	4. ASIAN

CONDITIONING VARIABLE ID: BACK0049
DESCRIPTION: INTERACTION: GENDER BY TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: GEND/TOL
NAEP ID: N/A — TOTAL NUMBER OF SPECIFIED CONTRASTS: 10
TYPE OF CONTRAST: INTERACTION — NUMBER OF INDEPENDENT CONTRASTS: 4

001	G/T 11	(11)	01010101	GEND/TOL INTACT:	1. MALE	1. BIG CTY5
002	G/T 12	(12)	-1000000	GEND/TOL INTACT:	1. MALE	2. MID CTY5
003	G/T 13	(13)	00-10000	GEND/TOL INTACT:	1. MALE	3. FR/BTWN5
004	G/T 14	(14)	0000-100	GEND/TOL INTACT:	1. MALE	4. SML TWN5
005	G/T 15	(15)	000000-1	GEND/TOL INTACT:	1. MALE	5. RURAL5
006	G/T 21	(21)	-1-1-1-1	GEND/TOL INTACT:	2. FEMALE	1. BIG CTY5
007	G/T 22	(22)	01000000	GEND/TOL INTACT:	2. FEMALE	2. MID CTY5
008	G/T 23	(23)	00010000	GEND/TOL INTACT:	2. FEMALE	3. FR/BTWN5
009	G/T 24	(24)	00000100	GEND/TOL INTACT:	2. FEMALE	4 SML TWN5
010	G/T 25	(25)	00000001	GEND/TOL INTACT:	2. FEMALE	5. RURAL5

CONDITIONING VARIABLE ID: BACK0050
DESCRIPTION: INTERACTION: GENDER BY PARENTS' EDUCATION
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: GEND/PAR
NAEP ID: N/A — TOTAL NUMBER OF SPECIFIED CONTRASTS: 10
TYPE OF CONTRAST: INTERACTION — NUMBER OF INDEPENDENT CONTRASTS: 4

001	G/P 11	(11)	01010101	GEND/PAR INTACT:	1. MALE	1. < HS
002	G/P 12	(12)	-1000000	GEND/PAR INTACT:	1. MALE	2. HS GRAD
003	G/P 13	(13)	00-10000	GEND/PAR INTACT:	1. MALE	3. POST HS
004	G/P 14	(14)	0000-100	GEND/PAR INTACT:	1. MALE	4. COL GRAD
005	G/P 15	(15)	000000-1	GEND/PAR INTACT:	1. MALE	5. PARED-?
006	G/P 21	(21)	-1-1-1-1	GEND/PAR INTACT:	2. FEMALE	1. < HS
007	G/P 22	(22)	01000000	GEND/PAR INTACT:	2. FEMALE	2. HS GRAD
008	G/P 23	(23)	00010000	GEND/PAR INTACT:	2. FEMALE	3. POST HS
009	G/P 24	(24)	00000100	GEND/PAR INTACT:	2. FEMALE	4. COL GRAD
010	G/P 25	(25)	00000001	GEND/PAR INTACT:	2. FEMALE	5. PARED-?

CONDITIONING VARIABLE ID: BACK0051
DESCRIPTION: INTERACTION: GENDER BY SCHOOL TYPE
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: GEND/SCH
NAEP ID: N/A — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: INTERACTION — NUMBER OF INDEPENDENT CONTRASTS: 2

001 G/S 11	(11	) 0101	GEND/SCH INTACT: 1. MALE 1. PUBLIC
002 G/S 12	(12	) -100	GEND/SCH INTACT: 1. MALE 2. PRIVATE
003 G/S 13	(13	) 00-1	GEND/SCH INTACT: 1. MALE 3. CATHOLIC
004 G/S 21	(21	) -1-1	GEND/SCH INTACT: 2. FEMALE 1. PUBLIC
005 G/S 22	(22	) 0100	GEND/SCH INTACT: 2. FEMALE 2. PRIVATE
006 G/S 23	(23	) 0001	GEND/SCH INTACT: 2. FEMALE 3. CATHOLIC

CONDITIONING VARIABLE ID: BACK0052
DESCRIPTION: INTERACTION: RACE/ETHNICITY BY TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: RACE/TOL
NAEP ID: N/A
TYPE OF CONTRAST: INTERACTION
TOTAL NUMBER OF SPECIFIED CONTRASTS: 20
NUMBER OF INDEPENDENT CONTRASTS: 12

001 R/T 11	(11	) 010101010101010101010101	RACE/TOL INTACT: 1. WHI/AI/O 1. BIG CTY5
002 R/T 12	(12	) -1000000-1000000-1000000	RACE/TOL INTACT: 1. WHI/AI/O 2. MID CTY5
003 R/T 13	(13	) 00-1000000-1000000-10000	RACE/TOL INTACT: 1. WHI/AI/O 3. FR/BTWN5
004 R/T 14	(14	) 0000-1000000-1000000-100	RACE/TOL INTACT: 1. WHI/AI/O 4. SML TWN5
005 R/T 15	(15	) 000000-1000000-1000000-1	RACE/TOL INTACT: 1. WHI/AI/O 5. RURAL5
006 R/T 21	(21	) -1-1-1-1000000000000000	RACE/TOL INTACT: 2. BLACK 1. BIG CTY5
007 R/T 22	(22	) 010000000000000000000000	RACE/TOL INTACT: 2. BLACK 2. MID CTY5
008 R/T 23	(23	) 000100000000000000000000	RACE/TOL INTACT: 2. BLACK 3. FR/BTWN5
009 R/T 24	(24	) 000001000000000000000000	RACE/TOL INTACT: 2. BLACK 4. SML TWN5
010 R/T 25	(25	) 000000010000000000000000	RACE/TOL INTACT: 2. BLACK 5. RURAL5
011 R/T 31	(31	) 00000000-1-1-1-100000000	RACE/TOL INTACT: 3. HISPANIC 1. BIG CTY5
012 R/T 32	(32	) 000000000100000000000000	RACE/TOL INTACT: 3. HISPANIC 2. MID CTY5
013 R/T 33	(33	) 000000000001000000000000	RACE/TOL INTACT: 3. HISPANIC 3. FR/BTWN5
014 R/T 34	(34	) 000000000000010000000000	RACE/TOL INTACT: 3. HISPANIC 4. SML TWN5
015 R/T 35	(35	) 000000000000000100000000	RACE/TOL INTACT: 3. HISPANIC 5. RURAL5
016 R/T 41	(41	) 0000000000000000-1-1-1-1	RACE/TOL INTACT: 4. ASIAN 1. BIG CTY5
017 R/T 42	(42	) 000000000000000001000000	RACE/TOL INTACT: 4. ASIAN 2. MID CTY5
018 R/T 43	(43	) 000000000000000000010000	RACE/TOL INTACT: 4. ASIAN 3. FR/BTWN5
019 R/T 44	(44	) 000000000000000000000100	RACE/TOL INTACT: 4. ASIAN 4. SML TWN5
020 R/T 45	(45	) 000000000000000000000001	RACE/TOL INTACT: 4. ASIAN 5. RURAL5

CONDITIONING VARIABLE ID: BACK0053
DESCRIPTION: INTERACTION: RACE/ETHNICITY BY PARENTS' EDUCATION
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: RACE/PAR
NAEP ID: N/A
TYPE OF CONTRAST: INTERACTION
TOTAL NUMBER OF SPECIFIED CONTRASTS: 20
NUMBER OF INDEPENDENT CONTRASTS: 12

001 R/P 11	(11	) 010101010101010101010101	RACE/PAR INTACT: 1. WHI/AI/O 1. < HS
002 R/P 12	(12	) -1000000-1000000-1000000	RACE/PAR INTACT: 1. WHI/AI/O 2. HS GRAD
003 R/P 13	(13	) 00-1000000-1000000-10000	RACE/PAR INTACT: 1. WHI/AI/O 3. POST HS
004 R/P 14	(14	) 0000-1000000-1000000-100	RACE/PAR INTACT: 1. WHI/AI/O 4 COL GRAD
005 R/P 15	(15	) 000000-1000000-1000000-1	RACE/PAR INTACT: 1. WHI/AI/O 5. PARED-?
006 R/P 21	(21	) -1-1-1-1000000000000000	RACE/PAR INTACT: 2. BLACK 1. < HS
007 R/P 22	(22	) 010000000000000000000000	RACE/PAR INTACT: 2. BLACK 2. HS GRAD
008 R/P 23	(23	) 000100000000000000000000	RACE/PAR INTACT: 2. BLACK 3. POST HS
009 R/P 24	(24	) 000001000000000000000000	RACE/PAR INTACT: 2 BLACK 4. COL GRAD
010 R/P 25	(25	) 000000010000000000000000	RACE/PAR INTACT: 2. BLACK 5. PARED-?
011 R/P 31	(31	) 00000000-1-1-1-100000000	RACE/PAR INTACT: 3. HISPANIC 1. < HS
012 R/P 32	(32	) 000000000100000000000000	RACE/PAR INTACT: 3. HISPANIC 2. HS GRAD
013 R/P 33	(33	) 000000000001000000000000	RACE/PAR INTACT: 3. HISPANIC 3. POST HS
014 R/P 34	(34	) 000000000000010000000000	RACE/PAR INTACT: 3. HISPANIC 4. COL GRAD
015 R/P 35	(35	) 000000000000000100000000	RACE/PAR INTACT: 3. HISPANIC 5. PARED-?
016 R/P 41	(41	) 0000000000000000-1-1-1-1	RACE/PAR INTACT: 4. ASIAN 1. < HS
017 R/P 42	(42	) 000000000000000001000000	RACE/PAR INTACT: 4. ASIAN 2. HS GRAD
018 R/P 43	(43	) 000000000000000000010000	RACE/PAR INTACT: 4. ASIAN 3. POST HS
019 R/P 44	(44	) 000000000000000000000100	RACE/PAR INTACT: 4. ASIAN 4. COL GRAD
020 R/P 45	(45	) 000000000000000000000001	RACE/PAR INTACT: 4. ASIAN 5. PARED-?

CONDITIONING VARIABLE ID: BACK0054
DESCRIPTION: INTERACTION: RACE/ETHNICITY BY SCHOOL TYPE
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL: RACE/SCH
NAEP ID: N/A
TYPE OF CONTRAST: INTERACTION
TOTAL NUMBER OF SPECIFIED CONTRASTS: 12
NUMBER OF INDEPENDENT CONTRASTS: 6

001 R/S 11	(11	) 010101010101	RACE/SCH INTACT: 1. WHI/AI/O 1. PUBLIC
002 R/S 12	(12	) -100-100-100	RACE/SCH INTACT: 1. WHI/AI/O 2. PRIVATE
003 R/S 13	(13	) 00-100-100-1	RACE/SCH INTACT: 1. WHI/AI/O 3. CATHOLIC
004 R/S 21	(21	) -1-100000000	RACE/SCH INTACT: 2. BLACK 1. PUBLIC
005 R/S 22	(22	) 010000000000	RACE/SCH INTACT: 2. BLACK 2. PRIVATE
006 R/S 23	(23	) 000100000000	RACE/SCH INTACT: 2. BLACK 3. CATHOLIC
007 R/S 31	(31	) 0000-1-10000	RACE/SCH INTACT: 3. HISPANIC 1. PUBLIC
008 R/S 32	(32	) 000001000000	RACE/SCH INTACT: 3. HISPANIC 2. PRIVATE
009 R/S 33	(33	) 000000010000	RACE/SCH INTACT: 3. HISPANIC 3. CATHOLIC
010 R/S 41	(41	) 00000000 1 1	RACE/SCH INTACT: 4. ASIAN 1 PUBLIC
011 R/S 42	(42	) 000000000100	RACE/SCH INTACT: 4. ASIAN 2. PRIVATE
012 R/S 43	(43	) 000000000001	RACE/SCH INTACT. 4. ASIAN 3. CATHOLIC

BEST COPY AVAILABLE

```
CONDITIONING VARIABLE ID:   BACK0055
DESCRIPTION:                INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY PARENT'S EDUCATION
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     TOL5/PAR
NAEP ID:                    N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
TYPE OF CONTRAST:           INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:        16

001 T-P 11   (11   ) 01010101010101010101010101010101 TOL5/PAR INTACT: 1. BIG CTY5 1. < HS
002 T-P 12   (12   ) -1000000-1000000-1000000-1000000 TOL5/PAR INTACT: 1. BIG CTY5 2. HS GRAD
003 T-P 13   (13   ) 00-1000000-1000000-1000000-10000 TOL5/PAR INTACT: 1. BIG CTY5 3. POST HS
004 T-P 14   (14   ) 0000-1000000-1000000-1000000-100 TOL5/PAR INTACT: 1. BIG CTY5 4. COL GRAD
005 T-P 15   (15   ) 000000-1000000-1000000-1000000-1 TOL5/PAR INTACT: 1. BIG CTY5 5. PARED-?
006 T-P 21   (21   ) -1-1-1-1000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 1. < HS
007 T-P 22   (22   ) 01000000000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 2. HS GRAD
008 T-P 23   (23   ) 00010000000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 3. POST HS
009 T-P 24   (24   ) 00000100000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 4. COL GRAD
010 T-P 25   (25   ) 00000001000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 5. PARED-?
011 T-P 31   (31   ) 00000000-1-1-1-10000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 1. < HS
012 T-P 32   (32   ) 00000000010000000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 2. HS GRAD
013 T-P 33   (33   ) 00000000000100000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 3. POST HS
014 T-P 34   (34   ) 00000000000001000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 4. COL GRAD
015 T-P 35   (35   ) 00000000000000010000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 5. PARED-?
016 T-P 41   (41   ) 0000000000000000-1-1-1-100000000 TOL5/PAR INTACT: 4. SML TWN5 1. < HS
017 T-P 42   (42   ) 00000000000000000100000000000000 TOL5/PAR INTACT: 4. SML TWN5 2. HS GRAD
018 T-P 43   (43   ) 00000000000000000001000000000000 TOL5/PAR INTACT: 4. SML TWN5 3. POST HS
019 T-P 44   (44   ) 00000000000000000000010000000000 TOL5/PAR INTACT: 4. SML TWN5 4. COL GRAD
020 T-P 45   (45   ) 00000000000000000000000100000000 TOL5/PAR INTACT: 4. SML TWN5 5. PARED-?
021 T-P 51   (51   ) 000000000000000000000000-1-1-1-1 TOL5/PAR INTACT: 5. RURAL5   1. < HS
022 T-P 52   (52   ) 00000000000000000000000001000000 TOL5/PAR INTACT: 5. RURAL5   2. HS GRAD
023 T-P 53   (53   ) 00000000000000000000000000010000 TOL5/PAR INTACT: 5. RURAL5   3. POST HS
024 T-P 54   (54   ) 00000000000000000000000000000100 TOL5/PAR INTACT: 5. RURAL5   4. COL GRAD
025 T-P 55   (55   ) 00000000000000000000000000000001 TOL5/PAR INTACT: 5. RURAL5   5. PARED-?
```

```
CONDITIONING VARIABLE ID:   BACK0056
DESCRIPTION:                INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY SCHOOL TYPE
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     TOL5/SCH
NAEP ID:                    N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    15
TYPE OF CONTRAST:           INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:         8

001 T-S 11   (11   ) 0101010101010101     TOL5/SCH INTACT: 1. BIG CTY5 1. PUBLIC
002 T-S 12   (12   ) -100-100-100-100     TOL5/SCH INTACT: 1. BIG CTY5 2. PRIVATE
003 T-S 13   (13   ) 00-100-100-100-1     TOL5/SCH INTACT: 1. BIG CTY5 3. CATHOLIC
004 T-S 21   (21   ) -1-1000000000000     TOL5/SCH INTACT: 2. MID CTY5 1. PUBLIC
005 T-S 22   (22   ) 0100000000000000     TOL5/SCH INTACT: 2. MID CTY5 2. PRIVATE
006 T-S 23   (23   ) 0001000000000000     TOL5/SCH INTACT: 2. MID CTY5 3. CATHOLIC
007 T-S 31   (31   ) 0000-1-100000000     TOL5/SCH INTACT: 3. FR/BTWN5 1. PUBLIC
008 T-S 32   (32   ) 0000010000000000     TOL5/SCH INTACT: 3. FR/BTWN5 2. PRIVATE
009 T-S 33   (33   ) 0000000100000000     TOL5/SCH INTACT: 3. FR/BTWN5 3. CATHOLIC
010 T-S 41   (41   ) 00000000-1-10000     TOL5/SCH INTACT: 4. SML TWN5 1. PUBLIC
011 T-S 42   (42   ) 0000000001000000     TOL5/SCH INTACT: 4. SML TWN5 2. PRIVATE
012 T-S 43   (43   ) 0000000000010000     TOL5/SCH INTACT: 4. SML TWN5 3. CATHOLIC
013 T-S 51   (51   ) 000000000000-1-1     TOL5/SCH INTACT: 5. RURAL5   1. PUBLIC
014 T-S 52   (52   ) 0000000000000100     TOL5/SCH INTACT: 5. RURAL5   2. PRIVATE
015 T-S 53   (53   ) 0000000000000001     TOL5/SCH INTACT: 5. RURAL5   3. CATHOLIC
```

```
CONDITIONING VARIABLE ID:   BACK0057
DESCRIPTION:                INTERACTION:  PARENTS' EDUCATION BY SCHOOL TYPE
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     PARE/SCH
NAEP ID:                    N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    15
TYPE OF CONTRAST:           INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:         8

001 P-S 11   (11   ) 0101010101010101     PARE/SCH INTACT: 1. < HS     1. PUBLIC
002 P-S 12   (12   ) -100-100-100-100     PARE/SCH INTACT: 1. < HS     2. PRIVATE
003 P-S 13   (13   ) 00-100-100-100-1     PARE/SCH INTACT: 1. < HS     3. CATHOLIC
004 P-S 21   (21   ) -1-1000000000000     PARE/SCH INTACT: 2. HS GRAD  1. PUBLIC
005 P-S 22   (22   ) 0100000000000000     PARE/SCH INTACT: 2. HS GRAD  2. PRIVATE
006 P-S 23   (23   ) 0001000000000000     PARE/SCH INTACT: 2. HS GRAD  3. CATHOLIC
007 P-S 31   (31   ) 0000-1-100000000     PARE/SCH INTACT: 3. POST HS  1. PUBLIC
008 P-S 32   (32   ) 0000010000000000     PARE/SCH INTACT: 3. POST HS  2. PRIVATE
009 P-S 33   (33   ) 0000000100000000     PARE/SCH INTACT: 3. POST HS  3. CATHOLIC
010 P-S 41   (41   ) 00000000-1-10000     PARE/SCH INTACT: 4. COL GRAD 1. PUBLIC
011 P-S 42   (42   ) 0000000001000000     PARE/SCH INTACT: 4. COL GRAD 2. PRIVATE
012 P-S 43   (43   ) 0000000000010000     PARE/SCH INTACT: 4. COL GRAD 3. CATHOLIC
013 P-S 51   (51   ) 000000000000-1-1     PARE/SCH INTACT: 5. PARED-?  1. PUBLIC
014 P-S 52   (52   ) 0000000000000100     PARE/SCH INTACT: 5. PARED-?  2. PRIVATE
015 P-S 53   (53   ) 0000000000000001     PARE/SCH INTACT: 5. PARED-?  3. CATHOLIC
```

```
CONDITIONING VARIABLE ID:   BACK0058
DESCRIPTION:                INTERACTION:  GENDER BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:     GEND
```


BEST COPY AVAILABLE

NAEP ID:	N/A	TOTAL NUMBER OF SPECIFIED CONTRASTS:	16
TYPE OF CONTRAST:	INTERACTION	NUMBER OF INDEPENDENT CONTRASTS:	7

001	G/	11	(11	) 01010101010101	GEND/	INTACT: 1. MALE	1. NO MATH
002	G/	12	(12	) -1000000000000	GEND/	INTACT: 1. MALE	2. 8TH GRD
003	G/	13	(13	) 00-10000000000	GEND/	INTACT: 1. MALE	3. PREALG
004	G/	14	(14	) 0000-100000000	GEND/	INTACT: 1. MALE	4. ALGEBRA
005	G/	15	(15	) 000000-1000000	GEND/	INTACT: 1. MALE	5. INT/SEQ
006	G/	16	(16	) 00000000-10000	GEND/	INTACT: 1. MALE	6. APPLIED
007	G/	17	(17	) 0000000000-100	GEND/	INTACT: 1. MALE	7. OTHER
008	G/	18	(18	) 000000000000-1	GEND/	INTACT: 1. MALE	8. MISSING
009	G/	21	(21	) -1-1-1-1-1-1-1	GEND/	INTACT: 2. FEMALE	1. NO MATH
010	G/	22	(22	) 01000000000000	GEND/	INTACT: 2. FEMALE	2. 8TH GRD
011	G/	23	(23	) 00010000000000	GEND/	INTACT: 2. FEMALE	3. PREALG
012	G.	24	(24	) 00000100000000	GEND/	INTACT: 2. FEMALE	4. ALGEBRA
013	G/	25	(25	) 00000001000000	GEND/	INTACT: 2. FEMALE	5. INT/SEQ
014	G/	26	(26	) 00000000010000	GEND/	INTACT: 2. FEMALE	6. APPLIED
015	G/	27	(27	) 00000000000100	GEND/	INTACT: 2. FEMALE	7. OTHER
016	G/	28	(28	) 00000000000001	GEND/	INTACT: 2. FEMALE	8. MISSING

CONDITIONING VARIABLE ID:	BACK0060		
DESCRIPTION:	INTERACTION: RACE/ETHNICITY BY MATH COURSES TAKING THIS YEAR		
GRADES/ASSESSMENTS:	N08, S08		
CONDITIONING VAR LABEL:	RACE/		
NAEP ID:	N/A	TOTAL NUMBER OF SPECIFIED CONTRASTS:	32
TYPE OF CONTRAST:	INTERACTION	NUMBER OF INDEPENDENT CONTRASTS:	21

001	R/	11	(11	) 33333333333333333333	RACE/	INTACT: 1. WHI/AI/O	1. NO MATH
002	R/	12	(12	) 12222221222222122222	RACE/	INTACT: 1. WHI/AI/O	2. 8TH GRD
003	R/	13	(13	) 21222222122222212222	RACE/	INTACT: 1. WHI/AI/O	3. PREALG
004	R	14	(14	) 22122222212222221222	RACE/	INTACT: 1. WHI/AI/O	4. ALGEBRA
005	R/	15	(15	) 22212222221222222122	RACE/	INTACT: 1. WHI/AI/O	5. INT/SEQ
006	R	16	(16	) 22221222222122222212	RACE/	INTACT: 1. WHI/AI/O	6. APPLIED
007	R/	17	(17	) 22222122222212222221	RACE/	INTACT: 1. WHI/AI/O	7. OTHER
008	R.	18	(18	) 22222212222221222222	RACE/	INTACT: 1. WHI/AI/O	8. MISSING
009	R/	21	(21	) 11111122222222222222	RACE/	INTACT: 2. BLACK	1. NO MATH
010	R/	22	(22	) 32222222222222222222	RACE/	INTACT: 2. BLACK	2. 8TH GRD
011	R/	23	(23	) 23222222222222222222	RACE/	INTACT: 2. BLACK	3. PREALG
012	R/	24	(24	) 22322222222222222222	RACE/	INTACT: 2. BLACK	4. ALGEBRA
013	R/	25	(25	) 22232222222222222222	RACE/	INTACT: 2. BLACK	5. INT/SEQ
014	R/	26	(26	) 22223222222222222222	RACE/	INTACT: 2. BLACK	6. APPLIED
015	R/	27	(27	) 22222322222222222222	RACE/	INTACT: 2. BLACK	7. OTHER
016	R/	28	(28	) 22222232222222222222	RACE/	INTACT: 2. BLACK	8. MISSING
017	R	31	(31	) 22222221111112222222	RACE/	INTACT: 3. HISPANIC	1. NO MATH
018	R/	32	(32	) 22222223222222222222	RACE/	INTACT: 3. HISPANIC	2. 8TH GRD
019	R/	33	(33	) 22222222322222222222	RACE/	INTACT: 3. HISPANIC	3. PREALG
020	R/	34	(34	) 22222222232222222222	RACE/	INTACT: 3. HISPANIC	4. ALGEBRA
021	R/	35	(35	) 22222222223222222222	RACE/	INTACT: 3. HISPANIC	5. INT/SEQ
022	R	36	(36	) 22222222222322222222	RACE/	INTACT: 3. HISPANIC	6. APPLIED
023	R/	37	(37	) 22222222222232222222	RACE/	INTACT: 3. HISPANIC	7. OTHER
024	R/	38	(38	) 22222222222223222222	RACE/	INTACT: 3. HISPANIC	8. MISSING
025	R/	41	(41	) 22222222222221111111	RACE/	INTACT: 4. ASIAN	1. NO MATH
026	R/	42	(42	) 22222222222222322222	RACE/	INTACT: 4. ASIAN	2. 8TH GRD
027	R	43	(43	) 22222222222222232222	RACE/	INTACT: 4. ASIAN	3. PREALG
028	R.	44	(44	) 22222222222222223222	RACE/	INTACT: 4. ASIAN	4. ALGEBRA
029	R/	45	(45	) 22222222222222222322	RACE/	INTACT: 4. ASIAN	5. INT/SEQ
030	R/	46	(46	) 22222222222222222232	RACE/	INTACT: 4. ASIAN	6. APPLIED
031	R/	47	(47	) 22222222222222222223	RACE/	INTACT: 4. ASIAN	7. OTHER
032	R/	48	(48	) 22222222222222223223	RACE/	INTACT: 4. ASIAN	8 MISSING

CONDITIONING VARIABLE ID:	BACK0062		
DESCRIPTION:	INTERACTION: PARENTS' EDUCATION BY MATH COURSES TAKING THIS YEAR		
GRADES/ASSESSMENTS:	N08, S08		
CONDITIONING VAR LABEL:	PARE/		
NAEP ID:	N/A	TOTAL NUMBER OF SPECIFIED CONTRASTS:	40
TYPE OF CONTRAST:	INTERACTION	NUMBER OF INDEPENDENT CONTRASTS:	28

001	P/	11	(11	) 3333333333333333333333333333	PARE/	INTACT: 1. < HS	1. NO MATH
002	P/	12	(12	) 1222222122222212222221222222	PARE/	INTACT: 1. < HS	2. 8TH GRD
003	P/	13	(13	) 2122222212222221222222122222	PARE/	INTACT: 1. < HS	3. PREALG
004	P	14	(14	) 2212222221222222122222212222	PARE/	INTACT: 1. < HS	4. ALGEBRA
005	P/	15	(15	) 2221222222122222212222221222	PARE/	INTACT: 1. < HS	5. INT/SEQ
006	P/	16	(16	) 2222122222212222221222222122	PARE/	INTACT: 1. < HS	6. APPLIED
007	P/	17	(17	) 2222212222221222222122222212	PARE/	INTACT. 1. < HS	7. OTHER
008	P/	18	(18	) 2222221222222122222212222221	PARE/	INTACT: 1. < HS	8. MISSING
009	P.	21	(21	) 1111112222222222222222222222	PARE/	INTACT: 2. HS GRAD	1. NO MATH
010	P/	22	(22	) 3222222222222222222222222222	PARE/	INTACT: 2. HS GRAD	2. 8TH GRD
011	P	23	(23	) 2322222222222222222222222222	PARE/	INTACT: 2. HS GRAD	3. PREALG
012	P	24	(24	) 2232222222222222222222222222	PARE/	INTACT: 2. HS GRAD	4. ALGEBRA
013	P/	25	(25	) 2223222222222222222222222222	PARE/	INTACT: 2. HS GRAD	5. INT/SEQ
014	P/	26	(26	) 2222322222222222222222222222	PARE/	INTACT: 2. HS GRAD	6. APPLIED
015	P	27	(27	) 2222232222222222222222222222	PARE/	INTACT: 2. HS GRAD	7. OTHER
016	P	28	(28	) 2222223222222222222222222222	PARE/	INTACT: 2. HS GRAD	8. MISSING
017	P/	31	(31	) 2222222111111222222222222222	PARE/	INTACT: 3. POST HS	1. NO MATH
018	P	32	(32	) 2222222322222222222222222222	PARE/	INTACT: 3. POST HS	2. 8TH GRD

BEST COPY AVAILABLE

```
019 P/  33   (33         ) 2222222232222222222222222222   PARE/    INTACT: 3. POST HS  3. PREALG
020 P/  34   (34         ) 2222222223222222222222222222   PARE/    INTACT: 3. POST HS  4. ALGEBRA
021 P/  35   (35         ) 2222222222322222222222222222   PARE/    INTACT: 3. POST HS  5. INT/SEQ
022 P/  36   (36         ) 2222222222232222222222222222   PARE/    INTACT: 3. POST HS  6. APPLIED
023 P/  37   (37         ) 2222222222223222222222222222   PARE/    INTACT: 3. POST HS  7. OTHER
024 P/  38   (38         ) 2222222222222322222222222222   PARE/    INTACT: 3. POST HS  8. MISSING
025 P/  41   (41         ) 2222222222222211111112222222   PARE/    INTACT: 4. COL GRAD 1. NO MATH
026 P/  42   (42         ) 2222222222222232222222222222   PARE/    INTACT: 4. COL GRAD 2. 8TH GRD
027 P/  43   (43         ) 2222222222222223222222222222   PARE/    INTACT: 4. COL GRAD 3. PREALG
028 P/  44   (44         ) 2222222222222222322222222222   PARE/    INTACT: 4. COL GRAD 4. ALGEBRA
029 P/  45   (45         ) 2222222222222222232222222222   PARE/    INTACT: 4. COL GRAD 5. INT/SEQ
030 P/  46   (46         ) 2222222222222222223222222222   PARE/    INTACT: 4. COL GRAD 6. APPLIED
031 P/  47   (47         ) 2222222222222222222322222222   PARE/    INTACT: 4. COL GRAD 7. OTHER
032 P/  48   (48         ) 2222222222222222222232222222   PARE/    INTACT: 4. COL GRAD 8. MISSING
033 P/  51   (51         ) 2222222222222222222221111111   PARE/    INTACT: 5. PARED-?  1. NO MATH
034 P/  52   (52         ) 2222222222222222222223222222   PARE/    INTACT: 5. PARED-?  2. 8TH GRD
035 P/  53   (53         ) 2222222222222222222222322222   PARE/    INTACT: 5. PARED-?  3. PREALG
036 P/  54   (54         ) 2222222222222222222222232222   PARE/    INTACT: 5. PARED-?  4. ALGEBRA
037 P/  55   (55         ) 2222222222222222222222223222   PARE/    INTACT: 5. PARED-?  5. INT/SEQ
038 P/  56   (56         ) 2222222222222222222222222322   PARE/    INTACT: 5. PARED-?  6. APPLIED
039 P/  57   (57         ) 2222222222222222222222222232   PARE/    INTACT: 5. PARED-?  7. OTHER
040 P/  58   (58         ) 2222222222222222222222222223   PARE/    INTACT: 5. PARED-?  8. MISSING
```

```
CONDITIONING VARIABLE ID:   BACK0064
DESCRIPTION:                INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:     TOL5/
NAEP ID:                    N A                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    40
TYPE OF CONTRAST:           INTERACTION                NUMBER OF INDEPENDENT CONTRASTS:        28

001 T/  11   (11         ) 3333333333333333333333333333   TOL5/    INTACT: 1. BIG CTY5 1. NO MATH
002 T/  12   (12         ) 1222222122222212222221222222   TOL5/    INTACT: 1. BIG CTY5 2. 8TH GRD
003 T/  13   (13         ) 2122222212222221222222122222   TOL5/    INTACT: 1. BIG CTY5 3. PREALG
004 T/  14   (14         ) 2212222221222222122222212222   TOL5/    INTACT: 1. BIG CTY5 4. ALGEBRA
005 T/  15   (15         ) 2221222222122222212222221222   TOL5/    INTACT: 1. BIG CTY5 5. INT/SEQ
006 T/  16   (16         ) 2222122222212222221222222122   TOL5/    INTACT: 1. BIG CTY5 6. APPLIED
007 T/  17   (17         ) 2222212222221222222122222212   TOL5/    INTACT: 1. BIG CTY5 7. OTHER
008 T/  18   (18         ) 2222221222222122222212222221   TOL5/    INTACT: 1. BIG CTY5 8. MISSING
009 T/  21   (21         ) 1111111222222222222222222222   TOL5/    INTACT: 2. MID CTY5 1. NO MATH
010 T/  22   (22         ) 3222222222222222222222222222   TOL5/    INTACT: 2. MID CTY5 2. 8TH GRD
011 T   23   (23         ) 2322222222222222222222222222   TOL5/    INTACT: 2  MID CTY5 3. PREALG
012 T.  24   (24         ) 2232222222222222222222222222   TOL5/    INTACT: 2. MID CTY5 4. ALGEBRA
013 T.  25   (25         ) 2223222222222222222222222222   TOL5/    INTACT· 2. MID CTY5 5. INT/SEQ
014 T/  26   (26         ) 2222322222222222222222222222   TOL5     INTACT: 2. MID CTY5 6. APPLIED
015 T/  27   (27         ) 2222232222222222222222222222   TOL5/    INTACT: 2. MID CTY5 7. OTHER
016 T   28   (28         ) 2222223222222222222222222222   TOL5     INTACT. 2. MID CTY5 8. MISSING
017 T.  31   (31         ) 2222222111111122222222222222   TOL5     INTACT: 3. FR/BTWN5 1. NO MATH
018 T   32   (32         ) 2222222322222222222222222222   TOL5.    INTACT: 3. FR/BTWN5 2. 8TH GRD
019 T/  33   (33         ) 2222222232222222222222222222   TOL5/    INTACT: 3. FR/BTWN5 3. PREALG
020 T   34   (34         ) 2222222223222222222222222222   TOL5.    INTACT: 3. FR/BTWN5 4. ALGEBRA
021 T   35   (35         ) 2222222222322222222222222222   TOL5.    INTACT: 3. FR/BTWN5 5. INT/SEQ
022 T   36   (36         ) 2222222222232222222222222222   TOL5     INTACT: 3. FR/BTWN5 6. APPLIED
023 T/  37   (37         ) 2222222222223222222222222222   TOL5     INTACT: 3. FR/BTWN5 7. OTHER
024 T   38   (38         ) 2222222222222322222222222222   TOL5/    INTACT: 3. FR/BTWN5 8. MISSING
025 T.  41   (41         ) 2222222222222211111112222222   TOL5.    INTACT: 4. SML TWN5 1. NO MATH
026 T/  42   (42         ) 2222222222222232222222222222   TOL5.    INTACT: 4. SML TWN5 2. 8TH GRD
027 T   43   (43         ) 2222222222222223222222222222   TOL5/    INTACT: 4. SML TWN5 3. PREALG
028 T.  44   (44         ) 2222222222222222322222222222   TOL5/    INTACT: 4. SML TWN5 4. ALGEBRA
029 T/  45   (45         ) 2222222222222222232222222222   TOL5/    INTACT: 4. SML TWN5 5. INT/SEQ
030 T/  46   (46         ) 2222222222222222223222222222   TOL5/    INTACT: 4. SML TWN5 6. APPLIED
031 T/  47   (47         ) 2222222222222222222322222222   TOL5/    INTACT: 4. SML TWN5 7. OTHER
032 T/  48   (48         ) 2222222222222222222232222222   TOL5     INTACT: 4. SML TWN5 8. MISSING
033 T/  51   (51         ) 2222222222222222222221111111   TOL5/    INTACT: 5. RURAL5   1. NO MATH
034 T/  52   (52         ) 2222222222222222222223222222   TOL5/    INTACT: 5. RURAL5   2. 8TH GRD
035 T/  53   (53         ) 2222222222222222222222322222   TOL5     INTACT: 5. RURAL5   3. PREALG
036 T   54   (54         ) 2222222222222222222222232222   TOL5     INTACT: 5. RURAL5   4. ALGEBRA
037 T/  55   (55         ) 2222222222222222222222223222   TOL5     INTACT: 5. RURAL5   5. INT/SEQ
038 T   56   (56         ) 2222222222222222222222222322   TOL5/    INTACT: 5. RURAL5   6. APPLIED
039 T   57   (57         ) 2222222222222222222222222232   TOL5/    INTACT: 5. RURAL5   7. OTHER
040 T   58   (58         ) 2222222222222222222222222223   TOL5/    INTACT: 5. RURAL5   8. MISSING
```

```
CONDITIONING VARIABLE ID:   BACK0066
DESCRIPTION:                INTERACTION:  SCHOOL TYPE BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:     SCHT/
NAEP ID:                    N A                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    24
TYPE OF CONTRAST:           INTERACTION                NUMBER OF INDEPENDENT CONTRASTS:        14

001 S/  11   (11         ) 0101010101010101010101010101   SCHT/    INTACT: 1. PUBLIC   1. NO MATH
002 S   12   (12         ) -1000000000000-1000000000000   SCHT/    INTACT: 1. PUBLIC   2. 8TH GRD
003 S.  13   (13         ) 00-1000000000000-10000000000   SCHT/    INTACT: 1. PUBLIC   3. PREALG
004 S   14   (14         ) 0000-1000000000000-100000000   SCHT/    INTACT: 1. PUBLIC   4. ALGEBRA
005 S.  15   (15         ) 000000-1000000000000-1000000   SCHT/    INTACT: 1. PUBLIC   5. INT/SEQ
006 S/  16   (16         ) 00000000-1000000000000-10000   SCHT/    INTACT: 1. PUBLIC   6. APPLIED
007 S/  17   (17         ) 0000000000-1000000000000-100   SCHT/    INTACT: 1. PUBLIC   7. OTHER
```

```
008 S/  18   (18        ) 000000000000-1000000000000-1     SCHT/    INTACT: 1. PUBLIC    8. MISSING
009 S/  21   (21        ) -1-1-1-1-1-1-100000000000000     SCHT/    INTACT: 2. PRIVATE   1. NO MATH
010 S/  22   (22        ) 0100000000000000000000000000     SCHT/    INTACT: 2. PRIVATE   2. 8TH GRD
011 S/  23   (23        ) 0001000000000000000000000000     SCHT/    INTACT: 2. PRIVATE   3. PREALG
012 S/  24   (24        ) 0000010000000000000000000000     SCHT/    INTACT: 2. PRIVATE   4. ALGEBRA
013 S/  25   (25        ) 0000000100000000000000000000     SCHT/    INTACT: 2. PRIVATE   5. INT/SEQ
014 S/  26   (26        ) 0000000001000000000000000000     SCHT/    INTACT: 2. PRIVATE   6. APPLIED
015 S/  27   (27        ) 0000000000010000000000000000     SCHT/    INTACT: 2. PRIVATE   7. OTHER
016 S/  28   (28        ) 0000000000000100000000000000     SCHT/    INTACT: 2. PRIVATE   8. MISSING
017 S/  31   (31        ) 00000000000000-1-1-1-1-1-1-1     SCHT/    INTACT: 3. CATHOLIC 1. NO MATH
018 S/  32   (32        ) 0000000000000001000000000000     SCHT/    INTACT: 3. CATHOLIC 2. 8TH GRD
019 S/  33   (33        ) 0000000000000000010000000000     SCHT/    INTACT: 3. CATHOLIC 3. PREALG
020 S/  34   (34        ) 000000000000000- 00100000000     SCHT/    INTACT: 3. CATHOLIC 4. ALGEBRA
021 S/  35   (35        ) 000000000000000. 00001000000     SCHT/    INTACT: 3. CATHOLIC 5. INT/SEQ
022 S/  36   (36        ) 0000000000000000000000010000     SCHT/    INTACT: 3. CATHOLIC 6. APPLIED
023 S/  37   (37        ) 0000000000000000000000000100     SCHT/    INTACT: 3. CATHOLIC 7. OTHER
024 S/  38   (38        ) 0000000000000000000000000001     SCHT/    INTACT: 3. CATHOLIC 8. MISSING

CONDITIONING VARIABLE ID:  BACK0068
DESCRIPTION:               MSA/NON-MSA
GRADES/ASSESSMENTS:        S04, S08
CONDITIONING VAR LABEL:    MSATSA
NAEP ID:                   MA93FLG                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         2

001 MSA      (0         ) 00                              MSA
002 NON MSA  (1         ) 10                              NON-MSA
003 MSA-MISS (M         ) 01                              MSA MISSING

CONDITIONING VARIABLE ID:  BACK0069
DESCRIPTION:               STATE ADMINISTRATION MONITORED/UNMONITORED SESSION
GRADES/ASSESSMENTS:        S04, S08
CONDITIONING VAR LABEL:    MONITOR
NAEP ID:                   MONSTUD                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS.         1

001 UNMONIT  (0         ) 0                               UNMONITORED SESSION
002 MONITOR  (1         ) 1                               MONITORED SESSION

CONDITIONING VARIABLE ID:  BACK0070
DESCRIPTION:               INTERACTION:  SCHOOL TYPE BY MONITORED/UNMONITORED SESSION
GRADES/ASSESSMENTS:        S04, S08
CONDITIONING VAR LABEL:    SCHT/MON
NAEP ID:                   N/A                            TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
TYPE OF CONTRAST:          INTERACTION                    NUMBER OF INDEPENDENT CONTRASTS:         2

001 S/M 11   (11        ) 0101                            SCHT/MON INTACT: 1. PUBLIC    1. UNMONIT
002 S/M 12   (12        ) -1-1                            SCHT/MON INTACT: 1. PUBLIC    2. MONITOR
003 S/M 21   (21        ) -100                            SCHT/MON INTACT: 2. PRIVATE   1. UNMONIT
004 S/M 22   (22        ; 0100                            SCHT/MON INTACT: 2. PRIVATE   2. MONITOR
005 S/M 31   (31        ) 00-1                            SCHT/MON INTACT: 3. CATHOLIC 1. UNMONIT
006 S/M 32   (32        ) 0001                            SCHT/MON INTACT: 3. CATHOLIC 2. MONITOR

CONDITIONING VARIABLE ID:  BACK0071
DESCRIPTION:               SAMPLE TYPE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   SUBSAMP                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         2

001 SAMP S1  (01        ) 00                              SAMPLE S1
002 SAMP S2  (02        ) 10                              SAMPLE S2
003 SAMP S3  (03        ) 01                              SAMPLE S3

CONDITIONING VARIABLE ID:  BACK0072
DESCRIPTION:               INTERACTION:  SAMPLE BY RACE/ETHNICITY
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:        /RAC
NAEP ID:                   N/A                            TOTAL NUMBER OF SPECIFIED CONTRA.. S·   12
TYPE OF CONTRAST:          INTERACTION                    NUMBER OF INDEPENDENT CONTRASTS:         6

001   /R 11   (11       ) 010101010101                        /RAC INTACT: 1. SAMP S1  1. WHI/AI/O
002   /R 12   (12       ) -10000-10000                        /RAC INTACT: 1. SAMP S1  2. BLACK
003   /R 13   (13       ) 00-10000-100                        /RAC INTACT: 1. SAMP S1  3. HISPANIC
004   /R 14   (14       ) 0000-10000-1                        /RAC INTACT: 1. SAMP S1  4. ASIAN
005   /R 21   (21       ) -1-1-1000000                        /RAC INTACT: 2. SAMP S2  1. WHI/AI/O
006   /R 22   (22       ) 010000000000                        /RAC INTACT: 2. SAMP S2  2. BLACK
007   /R 23   (23       ) 000100000000                        /RAC INTACT: 2. SAMP S2  3. HISPANIC
008   /R 24   (24       ) 000001000000                        /RAC INTACT: 2. SAMP S2  4. ASIAN
009   /R 31   (31       ) 000000-1-1-1                        /RAC INTACT: 3. SAMP S3  1. WHI/AI/O
010   /R 32   (32       ) 000000010000                        /RAC INTACT: 3. SAMP S3  2. BLACK
011   /R 33   (33       ) 000000000100                        /RAC INTACT: 3. SAMP S3  3. HISPANIC
```

CONDITIONING VARIABLE ID: BACK0073
DESCRIPTION: REPORTING SAMPLE
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: RPTSAMP — TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 1

001 RPTSAMP	(01	) 0	YES
002 RPT NO	(02	) 1	NO

CONDITIONING VARIABLE ID: BACK0074
DESCRIPTION: HOW OFTEN USE A HOME COMPUTER FOR SCHOOLWORK?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: B009301 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 B009301A	(01	) 00000	ALMOST EVERY DAY
002 B009301B	(02	) 10000	ONCE OR TWICE A WEEK
003 B009301C	(03	) 01000	ONCE OR TWICE A MTH
004 B009301D	(04	) 00100	NEVER OR HARDLY EVER
005 B009301E	(05	) 00010	NO COMPUTER AT HOME
006 B009301M	(M	) 00001	MISSING

CONDITIONING VARIABLE ID: BACK0075
DESCRIPTION. HOW SAFE DO YOU FEEL AT SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: B009401 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001 B009401A	(01	) 0000	VERY SAFE
002 B009401B	(02	) 1000	SOMEWHAT SAFE
003 B009401C	(03	) 0100	SOMEWHAT UNSAFE
004 B009401D	(04	) 0010	VERY UNSAFERDLY EVER
005 B009401M	(M	) 0001	MISSING

CONDITIONING VARIABLE ID: BACK0076
DESCRIPTION: DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: B009501 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001 B009501A	(01	) 000	YES
002 B009501B	(02	) 100	NO
003 B009501C	(03	) 010	DON'T LIVE W/ MOTHER
004 B009501M	(M	) 001	MISSING

CONDITIONING VARIABLE ID: BACK0077
DESCRIPTION: DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: B009502 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001 B009502A	(01	) 000	YES
002 B009502B	(02	) 100	NO
003 B009502C	(03	) 010	DON'T LIVE W/ FATHER
004 B009502M	(M	) 001	MISSING

CONDITIONING VARIABLE ID: BACK0078
DESCRIPTION. DESCRIBE YOUR OVERALL GRADES SINCE 6TH GRADE
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID. B009701 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 7
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 6

001 B009701A	(01	) 000000	MOSTLY A'S
002 B009701B	(02	) 100000	MOSTLY B'S
003 B009701C	(03	) 010000	MOSTLY C'S
004 B009701D	(04	) 001000	MOSTLY D'S
005 B009701E	(05	) 000100	MOSTLY BELOW D'S
006 B009701F	(06	) 000010	CLASSES NOT GRADED
007 B009701M	(M	) 000001	MISSING

CONDITIONING VARIABLE ID: BACK0079
DESCRIPTION. HOW FAR IN SCHOOL DO YOU THINK YOU WILL GO?

BEST COPY AVAILABLE

```
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      B009801                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:             CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        6

001 NO HS      (01          ) 000000                          NOT FINISH HS
002 GRAD HS    (02          ) 100000                          GRADUATE HS
003 ED > HS    (03          ) 010000                          SOME ED PAST HS
004 GRAD CLG   (04          ) 001000                          GRADUATE COLLEGE
005 GRAD SCH   (05          ) 000100                          GO GRADUATE SCHOOL
006 IDK        (06          ) 000010                          I DON'T KNOWGRADED
007 MISSING    (M           ) 000001                          MISSING


CONDITIONING VARIABLE ID:     BACK0080
DESCRIPTION:                  DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:           N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      B009601                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 B009601A (01            ) 0000                            YES, FULL-TIME
002 B009601B (02            ) 1000                            YES, PART-TIME
003 B009601C (03            ) 0100                            NO
004 B009601D (04            ) 0010                            DON'T LIVE W/ MOTHER
005 B009601M (M             ) 0001                            MISSING


CONDITIONING VARIABLE ID:     BACK0081
DESCRIPTION:                  DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:           N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      B009602                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 B009601A (01            ) 0000                            YES, FULL-TIME
002 B009601B (02            ) 1000                            YES, PART-TIME
003 B009601C (03            ) 0100                            NO
004 B009601D (04            ) 0010                            DON'T LIVE W/ FATHER
005 B009601M (M             ) 0001                            MISSING


CONDITIONING VARIABLE ID:     BACK0090
DESCRIPTION:                  FIPS CODE FOR THE STATE DATA
GRADES/ASSESSMENTS:           S04, S08
CONDITIONING VAR LABEL:
NAEP ID:                      FIPS                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:             LINEAR                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 FIPS       (1-99,M=0    )  0.0 +  1.0*X                   LINEAR


CONDITIONING VARIABLE ID:     SUBJ0001
DESCRIPTION:                  WHAT KIND OF MATH CLASS ARE YOU TAKING THIS YEAR?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      MATTAKE                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:             CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        7

001 NO MATH    (01          ) 0000000                         NOT TAKING THIS YEAR
002 8TH GRD    (02          ) 1000000                         EIGHTH GRADE MATH
003 PREALG     (03          ) 0100000                         PREALGEBRA
004 ALGEBRA    (04          ) 0010000                         ALGEBRA
005 INT/SEQ    (05          ) 0001000                         INTEGRATED/SEQUENTAL
006 APPLIED    (06          ) 0000100                         APPLIED MATH
007 OTHER      (07          ) 0000010                         OTHER MATH CLASSUR
008 MISSING    (M           ) 0000001                         MISSING


CONDITIONING VARIABLE ID:     SUBJ0002
DESCRIPTION:                  HOW OFTEN DO YOU DO MATH PROBLEMS FROM TEXTBOOK?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      M812701                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812701A (01            ) 0000                            ALMOST EVERY DAY
002 M812701B (02            ) 1000                            ONCE OR TWICE A WEEK
003 M812701C (03            ) 0100                            ONCE OR TWICE MONTH
004 M812701D (04            ) 0010                            NEVER OR HARDLY EVER
005 M812701M (M             ) 0001                            MISSING


CONDITIONING VARIABLE ID:     SUBJ0003
DESCRIPTION:                  HOW OFTEN DO YOU DO MATH PROBLEMS ON WORK SHEETS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
```

```
NAEP ID:                    M812702                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812702A (01          ) 0000                             ALMOST EVERY DAY
002 M812702B (02          ) 1000                             ONCE OR TWICE A WEEK
003 M812702C (03          ) 0100                             ONCE OR TWICE MONTH
004 M812701D (04          ) 0010                             NEVER OR HARDLY EVER
005 M812701M (M           ) 0001                             MISSING


CONDITIONING VARIABLE ID:   SUBJ0004
DESCRIPTION:                HOW OFTEN SOLVE MATH PROBLEMS WITH PARTNER/GROUP?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812703                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812703A (01          ) 0000                             ALMOST EVERY DAY
002 M812703B (02          ) 1000                             ONCE OR TWICE A WEEK
003 M812703C (03          ) 0100                             ONCE OR TWICE MONTH
004 M812703D (04          ) 0010                             NEVER OR HARDLY EVER
005 M812703M (M           ) 0001                             MISSING


CONDITIONING VARIABLE ID:   SUBJ0005
DESCRIPTION:                HOW OFTEN IN MATH WORK W/ RULERS, GEOM SHAPES?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M812704                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812704A (01          ) 0000                             ALMOST EVERY DAY
002 M812704B (02          ) 1000                             ONCE OR TWICE A WEEK
003 M812704C (03          ) 0100                             ONCE OR TWICE MONTH
004 M812704D (04          ) 0010                             NEVER OR HARDLY EVER
005 M812704M (M           ) 0001                             MISSING


CONDITIONING VARIABLE ID:   SUBJ0006
DESCRIPTION:                HOW OFTEN WRITE ABOUT SOLVING A MATH PROBLEM?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812705                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812705A (01          ) 0000                             ALMOST EVERY DAY
002 M812705B (02          ) 1000                             ONCE OR TWICE A WEEK
003 M812705C (03          ) 0100                             ONCE OR TWICE MONTH
004 M812705D (04          ) 0010                             NEVER OR HARDLY EVER
005 M812705M (M           ) 0001                             MISSING    RDLY EVER


CONDITIONING VARIABLE ID:   SUBJ0007
DESCRIPTION:                HOW OFTEN DO YOU TAKE MATHEMATICS TESTS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812706                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812706A (01          ) 0000                             ALMOST EVERY DAY
002 M812706B (02          ) 1000                             ONCE OR TWICE A WEEK
003 M812706C (03          ) 0100                             ONCE OR TWICE MONTH
004 M812706D (04          ) 0010                             NEVER OR HARDLY EVER
005 M812706M (M           ) 0001                             MISSING


CONDITIONING VARIABLE ID:   SUBJ0008
DESCRIPTION:                HOW OFTEN DO YOU TALK TO THE CLASS RE MATH WORK?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812707                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812707A (01          ) 0000                             ALMOST EVERY DAY
002 M812707B (02          ) 1000                             ONCE OR TWICE A WEEK
003 M812707C (03          ) 0100                             ONCE OR TWICE MONTH
004 M812707D (04          ) 0010                             NEVER OR HARDLY EVER
005 M812707M (M           ) 0001                             MISSING


CONDITIONING VARIABLE ID:   SUBJ0009
DESCRIPTION:                HOW OFTEN DO 10 OR MORE MATH PROBLEMS BY YOURSELF?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812708                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                            NUMBER OF INDEPENDENT CONTRASTS:        4
```

001 M812708A (01)	0000	ALMOST EVERY DAY
002 M812708B (02)	1000	ONCE OR TWICE A WEEK
003 M812708C (03)	0100	ONCE OR TWICE MONTH
004 M812708D (04)	0010	NEVER OR HARDLY EVER
005 M812708M (M)	0001	MISSING

CONDITIONING VARIABLE ID:	SUBJ0010		
DESCRIPTION:	HOW OFTEN DISCUSS MATH PROBLEMS W/ OTHER STUDENTS?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	M812709	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 M812709A (01)	0000	ALMOST EVERY DAY
002 M812709B (02)	1000	ONCE OR TWICE A WEEK
003 M812709C (03)	0100	ONCE OR TWICE MONTH
004 M812709D (04)	0010	NEVER OR HARDLY EVER
005 M812709M (M)	0001	MISSING

CONDITIONING VARIABLE ID:	SUBJ0011		
DESCRIPTION:	HOW OFTEN DO YOU USE A COMPUTER FOR MATH?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	M812710	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 M812710A (01)	0000	ALMOST EVERY DAY
002 M812710B (02)	1000	ONCE OR TWICE A WEEK
003 M812710C (03)	0100	ONCE OR TWICE MONTH
004 M812710D (04)	0010	NEVER OR HARDLY EVER
005 M812710M (M)	0001	MISSING

CONDITIONING VARIABLE ID:	SUBJ0012		
DESCRIPTION:	HOW OFTEN DO YOU USE A CALCULATOR FOR MATH?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	M812711	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 M812711A (01)	0000	ALMOST EVERY DAY
002 M812711B (02)	1000	ONCE OR TWICE A WEEK
003 M812711C (03)	0100	ONCE OR TWICE MONTH
004 M812711D (04)	0010	NEVER OR HARDLY EVER
005 M812711M (M)	0001	MISSING

CONDITIONING VARIABLE ID:	SUBJ0013		
DESCRIPTION:	DO YOU HAVE CALCULATOR TO USE WITH MATH HOMEWORK?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	M811201	TOTAL NUMBER OF SPECIFIED CONTRASTS:	3
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	2

001 M811201Y (01)	00	YES
002 M811201N (02)	10	NODECIDED
003 M811201M (M)	01	MISSING

CONDITIONING VARIABLE ID:	SUBJ0014		
DESCRIPTION:	HOW OFTEN USE A CALCULATOR FOR MATH CLASSWORK?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	M812001	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 M812001A (01)	0000	ALMOST EVERY DAY
002 M812001B (02)	1000	ONCE OR TWICE A WEEK
003 M812001C (03)	0100	ONCE OR TWICE MONTH
004 M812001D (04)	0010	NEVER OR HARDLY EVER
005 M812001M (M)	0001	MISSING

CONDITIONING VARIABLE ID:	SUBJ0015		
DESCRIPTION:	HOW OFTEN USE A CALCULATOR FOR MATH HOMEWORK?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	M812002	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 M812002A (01)	0000	ALMOST EVERY DAY
002 M812002B (02)	1000	ONCE OR TWICE A WEEK
003 M812001C (03)	0100	ONCE OR TWICE MONTH
004 M812001D (04)	0010	NEVER OR HARDLY EVER
005 M812001M (M)	0001	MISSING

CONDITIONING VARIABLE ID: SUBJ0016
DESCRIPTION: HOW OFTEN USE A CALCULATOR FOR MATH TESTS/QUIZZES?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M812003 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001	M812003A (01	) 0000	ALMOST EVERY DAY
002	M812003B (02	) 1000	ONCE OR TWICE A WEEK
003	M812003C (03	) 0100	ONCE OR TWICE MONTH
004	M812003D (04	) 0010	NEVER OR HARDLY EVER
005	M812003M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SUBJ0017
DESCRIPTION: HOW MUCH TIME SPEND DAILY ON MATH HOMEWORK?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M812101 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 8
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 7

001	M812101A (01	) 0000000	NOT TAKING THIS YEAR
002	M812101B (02	) 1000000	NONE
003	M812101C (03	) 0100000	15 MINUTES
004	M812101D (04	) 0010000	30 MINUTES
005	M812101E (05	) 0001000	45 MINUTES
006	M812101F (06	) 0000100	ONE HOUR
007	M812101G (07	) 0000010	MORE THAN ONE HOUR
008	M812101M (M	) 0000001	MISSING

CONDITIONING VARIABLE ID: SUBJ0018
DESCRIPTION: GET MATH HELP FROM SPECIAL TEACHER/AIDE/TUTOR?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: M811401 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001	M811401Y (01	) 00	YES
002	M811401N (02	) 10	NODECIDED
003	M811401M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SUBJ0019
DESCRIPTION: AGREE/DISAGREE: I LIKE MATH
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: M811101 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001	M811101A (01	) 000	AGREE
002	M811101B (02	) 100	UNDECIDED
003	M811101C (03	) 010	DISAGREE OR LESS
004	M811101M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SUBJ0020
DESCRIPTION: AGREE/DISAGREE: I AM GOOD AT MATH
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: M811103 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001	M811103A (01	) 000	AGREE
002	M811103B (02	) 100	UNDECIDED
003	M811103C (03	) 010	DISAGREE OR LESS
004	M811103M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SUBJ0021
DESCRIPTION: HOW MUCH AGREE-UNDERSTAND MOST OF MATH CLASS?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: M811106 — TOTAL NUMBER OF SPECIFIED CONTRASTS. 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001	M811106A (01	) 000	AGREE
002	M811106B (02	) 100	UNDECIDED
003	M811106C (03	) 010	DISAGREE OR LESS
004	M811106M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SUBJ0022
DESCRIPTION: HOW MUCH AGREE-ONLY 1 CORRECT WAY TO SOLVE PROB?
GRADES/ASSESSMENTS: N04, S04

```
CONDITIONING VAR LABEL:
NAEP ID:                  M811109                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:         CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811109A (01        ) 000                      AGREE
002 M811109B (02        ) 100                      UNDECIDED
003 M811109C (03        ) 010                      DISAGREE OR LESS
004 M811109M (M         ) 001                      MISSING


CONDITIONING VARIABLE ID: SUBJ0023
DESCRIPTION:              HOW MUCH AGREE-LEARNING MATH IS MEMORIZING FACTS?
GRADES/ASSESSMENTS:       N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                  M811107                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:         CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811107A (01        ) 000                      AGREE
002 M811107B (02        ) 100                      UNDECIDED
003 M811107C (03        ) 010                      DISAGREE OR LESS
004 M811107M (M         ) 001                      MISSING


CONDITIONING VARIABLE ID: SUBJ0024
DESCRIPTION:              AGREE/DISAGREE: MATH USED FOR SOLVING PROBLEMS
GRADES/ASSESSMENTS:       N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                  M811105                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:         CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811105A (01        ) 000                      AGREE
002 M811105B (02        ) 100                      UNDECIDED
003 M811105C (03        ) 010                      DISAGREE OR LESS
004 M811105M (M         ) 001                      MISSING


CONDITIONING VARIABLE ID: SUBJ0025
DESCRIPTION:              HOW MUCH AGREE-IF CHOICE I WOULDN'T STUDY MORE?
GRADES/ASSESSMENTS:       N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                  M811108                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:         CLASS                    NUMBER OF INDEPENDENT CONTRASTS.        3

001 M811108A (01        ) 000                      AGREE
002 M811108B (02        ) 100                      UNDECIDED
003 M811108C (03        ) 010                      DISAGREE OR LESS
004 M811108M (M         ) 001                      MISSING


CONDITIONING VARIABLE ID: SUBJ0026
DESCRIPTION:              HOW MUCH AGREE-EVERYONE CAN DO WELL IF TRY?
GRADES/ASSESSMENTS:       N04, S04
CONDITIONING VAR LABEL:
NAEP ID.                  M811110                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST·         CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811110A (01        ) 000                      AGREE
002 M811110B (02        ) 100                      UNDECIDED
003 M811110C (03        ) 010                      DISAGREE OR LESS
004 M811110M (M         ) 001                      MISSING


CONDITIONING VARIABLE ID· SUBJ0027
DESCRIPTION:              ABOUT HOW MANY QUESTIONS RIGHT ON TEST?
GRADES.ASSESSMENTS.       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  MM00101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:         CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00101A (01        ) 0000                     ALMOST ALL
002 MM00101B (02        ) 1000                     MORE THAN HALF
003 MM00101C (03        ) 0100                     ABOUT HALF
004 MM00101D (04        ) 0010                     LESS THAN HALF
005 MM00101M (M         ) 0001                     MISSING


CONDITIONING VARIABLE ID: SUBJ0028
DESCRIPTION:              HOW HARD TEST COMPARED TO THOSE IN SCHOOL?
GRADES.ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  MM00201                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:         CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00201A (01        ) 0000                     MUCH HARDER
002 MM00201B (02        ) 1000                     HARDER THAN OTHERS
003 MM00201C (03        ) 0100                     ABOUT THE SAME
004 MM00201D (04        ) 0010                     EASIER THEN OTHES
```

```
005 MM00201M (M          ) 0001                          MISSING


CONDITIONING VARIABLE ID:  SUBJ0029
DESCRIPTION:               HOW HARD DID YOU TRY ON TEST COMPARED TO OTHERS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   MM00301                       TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                         NUMBER OF INDEPENDENT CONTRASTS:         4

001 MM00301A (01         ) 0000                          MUCH HARDER
002 MM00301B (02         ) 1000                          HARDER THAN OTHERS
003 MM00301C (03         ) 0100                          ABOUT AS HARD
004 MM00301D (04         ) 0010                          NOT AS HARD AS OTHER
005 MM00301M (M          ) 0001                          MISSING


CONDITIONING VARIABLE ID:  SUBJ0030
DESCRIPTION:               HOW IMPORTANT WAS IT YOU DO WELL ON THIS TEST?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   MM00401                       TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                         NUMBER OF INDEPENDENT CONTRASTS:         4

001 MM00401A (01         ) 0000                          VERY IMPORTANT
002 MM00401B (02         ) 1000                          IMPORTANT
003 MM00401C (03         ) 0100                          SOMEWHAT IMPORTANT
004 MM00401D (04         ) 0010                          NOT VERY IMPORTANTER
005 MM00401M (M          ) 0001                          MISSING


CONDITIONING VARIABLE ID:  SUBJ0031
DESCRIPTION:               HOW OFTEN HAD TO WRITE LONG ANSWERS TO QSTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   MM00501                       TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                         NUMBER OF INDEPENDENT CONTRASTS:         4

001 MM00501A (01         ) 0000                          AT LEAST ONCE A WEEK
002 MM00501B (02         ) 1000                          ONCE OR TWICE A MNTH
003 MM00501C (03         ) 0100                          ONCE OR TWICE A YEAR
004 MM00501D (04         ) 0010                          NEVERERY IMPORTANTER
005 MM00501M (M          ) 0001                          MISSING


CONDITIONING VARIABLE ID:  SUBJ0032
DESCRIPTION:               WORK W/ MEAS. INSTRUMENTS/GEOM SOLIDS FOR MATH?
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812712                       TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                         NUMBER OF INDEPENDENT CONTRASTS:         4

001 M812712A (01         ) 0000                          ALMOST EVERY DAY
002 M812712B (02         ) 1000                          ONCE OR TWICE A WEEK
003 M812712C (03         ) 0100                          ONCE OR TWICE MONTH
004 M812712D (04         ) 0010                          NEVER OR HARDLY EVER
005 M812712M (M          ) 0001                          MISSING


CONDITIONING VARIABLE ID:  SUBJ0033
DESCRIPTION:               HOW OFTEN WRITE REPORTS OR DO MATH PROJECTS?
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812713                       TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                         NUMBER OF INDEPENDENT CONTRASTS:         4

001 M812713A (01         ) 0000                          ALMOST EVERY DAY
002 M812713B (02         ) 1000                          ONCE OR TWICE A WEEK
003 M812713C (03         ) 0100                          ONCE OR TWICE MONTH
004 M812713D (04         ) 0010                          NEVER OR HARDLY EVER
005 M812713M (M          ) 0001                          MISSING    RDLY EVER


CONDITIONING VARIABLE ID:  SUBJ0034
DESCRIPTION:               IS THERE A PORTFOLIO W/ YOUR MATH WORK IN IT?
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812201                       TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:          CLASS                         NUMBER OF INDEPENDENT CONTRASTS:         2

001 M812201Y (01         ) 00                            YES
002 M812201N (02         ) 10                            NONE
003 M812201M (M          ) 01                            MISSING


CONDITIONING VARIABLE ID:  SUBJ0035
DESCRIPTION:               DO YOU USE A SCIENTIFIC CALCULATOR FOR MATH WORK?
```

GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M812301 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 M812301Y	(01	) 00	YES
002 M812301N	(02	) 10	NONE
003 M812301M	(M	) 01	MISSING

CONDITIONING VARIABLE ID: SUBJ0036
DESCRIPTION: DO YOU USE A GRAPHING CALCULATOR FOR MATH WORK?
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M812401 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 M812401Y	(01	) 00	YES
002 M812401N	(02	) 10	NONE
003 M812401M	(M	) 01	MISSING

CONDITIONING VARIABLE ID: SUBJ0037
DESCRIPTION: WHAT KIND OF MATH CLASS WILL YOU TAKE IN 9TH GR?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: MATEXP TOTAL NUMBER OF SPECIFIED CONTRASTS: 10
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 9

001 NO MATH	(01	) 000000000	NOT EXPECT TO TAKE
002 BASIC	(02	) 100000000	BASIC,GEN,BUSINESS
003 APPLIED	(03	) 010000000	APPLIED MATH
004 PREALG	(04	) 001000000	PREALGEBRA
005 ALG 1	(05	) 000100000	ALGEBRA 1/ELEM ALG
006 GEOMETRY	(06	) 000010000	GEOMETRY
007 INT/SEQ	(07	) 000001000	INTERGATED/SEQUENTAL
008 OTHER	(08	) 000000100	OTHER MATH CLASS
009 IDK	(09	) 000000010	I DON'T KNOW
010 MISSING	(M	) 000000001	MISSING W

CONDITIONING VARIABLE ID: SUBJ0038
DESCRIPTION: DO YOU AGREE: I LIKE MATH
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810701 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M812701A	(01	) 00000	STRONGLY AGREE
002 M812701B	(02	) 10000	AGREE
003 M812701C	(03	) 01000	UNDECIDED
004 M812701D	(04	) 00100	DISAGREE
005 M812701E	(05	) 00010	STRONGLY DISAGREE
006 M812701M	(M	) 00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0039
DESCRIPTION: DO YOU AGREE: I AM GOOD IN MATH
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810703 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810701A	(01	) 00000	STRONGLY AGREE
002 M810701B	(02	) 10000	AGREE
003 M810701C	(03	) 01000	UNDECIDED
004 M810701D	(04	) 00100	DISAGREE
005 M810701E	(05	) 00010	STRONGLY DISAGREE
006 M810701M	(M	) 00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0040
DESCRIPTION: AGREE/DISAGREE: UNDERSTAND MOST OF MATH CLASS
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810707 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810707A	(01	) 00000	STRONGLY AGREE
002 M810707B	(02	) 10000	AGREE
003 M810707C	(03	) 01000	UNDECIDED
004 M810707D	(04	) 00100	DISAGREE
005 M810707E	(05	) 00010	STRONGLY DISAGREE
006 M810707M	(M	) 00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0041

DESCRIPTION: AGREE/DISAGREE: ONLY ONE WAY TO SOLVE MATH PROBLEM
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810709 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810709A	(01)	00000	STRONGLY AGREE
002 M810709B	(02)	10000	AGREE
003 M810709C	(03)	01000	UNDECIDED
004 M810709D	(04)	00100	DISAGREE
005 M810709E	(05)	00010	STRONGLY DISAGREE
006 M810709M	(M)	00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0042
DESCRIPTION: AGREE/DISAGREE: MATH IS MOSTLY MEMORIZING FACTS
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810708 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810708A	(01)	00000	STRONGLY AGREE
002 M810708B	(02)	10000	AGREE
003 M810708C	(03)	01000	UNDECIDED
004 M810708D	(04)	00100	DISAGREE
005 M810708E	(05)	00010	STRONGLY DISAGREE
006 M810708M	(M)	00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0043
DESCRIPTION: AGREE/DISAGREE: CONCEPTS ARE AS IMPORTANT AS OPER
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810710 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810710A	(01)	00000	STRONGLY AGREE
002 M810710B	(02)	10000	AGREE
003 M810710C	(03)	01000	UNDECIDED
004 M810710D	(04)	00100	DISAGREE
005 M810710E	(05)	00010	STRONGLY DISAGREE
006 M810710M	(M)	00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0044
DESCRIPTION: DO YOU AGREE: MATH USEFUL/SOLVING EVERYDAY PROBLEM
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810705 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810705A	(01)	00000	STRONGLY AGREE
002 M810705B	(02)	10000	AGREE
003 M810705C	(03)	01000	UNDECIDED
004 M810705D	(04)	00100	DISAGREE
005 M810705E	(05)	00010	STRONGLY DISAGREE
006 M810705M	(M)	00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0045
DESCRIPTION: AGREE/DISAGREE: WOULD NOT STUDY MORE MATH
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810706 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810706A	(01)	00000	STRONGLY AGREE
002 M810706B	(02)	10000	AGREE
003 M810706C	(03)	01000	UNDECIDED
004 M810706D	(04)	00100	DISAGREE
005 M810706E	(05)	00010	STRONGLY DISAGREE
006 M810706M	(M)	00001	MISSING

CONDITIONING VARIABLE ID: SUBJ0046
DESCRIPTION: AGREE/DISAGREE: ALL CAN DO WELL IN MATH IF TRY
GRADES/ASSESSMENTS: N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: M810711 TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 5

001 M810711A	(01)	00000	STRONGLY AGREE
002 M810711B	(02)	10000	AGREE
003 M810711C	(03)	01000	UNDECIDED
004 M810711D	(04)	00100	DISAGREE
005 M810711E	(05)	00010	STRONGLY DISAGREE
006 M810711M	(M)	00001	MISSING

```
CONDITIONING VARIABLE ID:  SCHL0001
DESCRIPTION:               SCHOOL LEVEL AVERAGE MATH NORMIT (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SCH NORM
NAEP ID:                   SCHNORM                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 SCHNRM-? (M          ) 0                              SCHOOL LEVEL AVERAGE MATH NORMIT MISSING
002 SCHNRM-Y (@          ) 1                              SCHOOL LEVEL AVERAGE MATH NORMIT NOT-MISSING


CONDITIONING VARIABLE ID:  SCHL0002
DESCRIPTION:               SCHOOL LEVEL AVERAGE MATH NORMIT
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SNRM-LIN
NAEP ID:                   SCHNORM                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          SCALE                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 SNRM-LIN (#          ) (F8.4)                         SCHOOL LEVEL AVERAGE MATH NORMIT MEAN
002 SNRM-LIN (M          ) 0                              SCHOOL LEVEL AVERAGE MATH NORMIT MISSING


CONDITIONING VARIABLE ID:  SCHL0003
DESCRIPTION:               BEST DESCRIBES HOW 4TH GR ARE ORGANIZED?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C030901                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        3

001 C030901A (01         ) 000                            SELF CONTAINED
002 C030901B (02         ) 100                            DEPARTMENTALIZED
003 C030901C (03         ) 010                            REGROUPED
004 C030901M (M          ) 001                            MISSING


CONDITIONING VARIABLE ID:  SCHL0004
DESCRIPTION:               4TH GRADERS ASSIGNED BY ABILITY/ACHIEVEMENT LEVEL?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037101                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037101A (01         ) 0000                           YES, BY MATH ABILITY
002 C037101B (02         ) 1000                           YES, READING ABILITY
003 C037101C (03         ) 0100                           YES, GENERAL ABILITY
004 C037101N (04         ) 0010                           NO
005 C037101M (M          ) 0001                           MISSING


CONDITIONING VARIABLE ID:  SCHL0005
DESCRIPTION:               HOW OFTEN IS 4TH-GRADER INSTRUCTED IN MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C031212                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        5

001 C031212A (01         ) 00000                          EVERY DAY
002 C031212B (02         ) 10000                          THREE OR FOUR/WEEK
003 C031212C (03         ) 01000                          ONCE OR TWICE A WEEK
004 C031212D (04         ) 00100                          LESS THAN ONCE/WEEK
005 C031212E (05         ) 00010                          SUBJECT NOT TAUGHT
006 C031212M (M          ) 00001                          MISSING


CONDITIONING VARIABLE ID:  SCHL0006
DESCRIPTION:               HOW OFTEN IS 4TH-GRADER INSTRUCTED IN SCIENCE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C031205                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        5

001 C031205A (01         ) 00000                          EVERY DAY
002 C031205B (02         ) 10000                          THREE OR FOUR/WEEK
003 C031205C (03         ) 01000                          ONCE OR TWICE A WEEK
004 C031205D (04         ) 00100                          LESS THAN ONCE/WEEK
005 C031205E (05         ) 00010                          SUBJECT NOT TAUGHT
006 C031205M (M          ) 00001                          MISSING


CONDITIONING VARIABLE ID:  SCHL0007
DESCRIPTION:               HOW OFTEN IS 4TH-GRADER INSTRUCTED IN READING?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C031213                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        5
```

001	C031213A (01	) 00000	EVERY DAY
002	C031213B (02	) 10000	THREE OR FOUR/WEEK
003	C031213C (03	) 01000	ONCE OR TWICE A WEEK
004	C031213D (04	) 00100	LESS THAN ONCE/WEEK
005	C031213E (05	) 00010	SUBJECT NOT TAUGHT
006	C031213M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: SCHL0008
DESCRIPTION: HOW OFTEN IS 4TH-GRADER INSTRUCTED IN ARTS?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C031214 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001	C031214A (01	) 00000	EVERY DAY
002	C031214B (02	) 10000	THREE OR FOUR/WEEK
003	C031214C (03	) 01000	ONCE OR TWICE A WEEK
004	C031214D (04	) 00100	LESS THAN ONCE/WEEK
005	C031214E (05	) 00010	SUBJECT NOT TAUGHT
006	C031214M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: SCHL0009
DESCRIPTION: HAS MATH BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C031603 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001	C031603Y (01	) 00	YES
002	C031603N (02	) 10	NO
003	C031603M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0010
DESCRIPTION: HAS SCIENCE BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C031607 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001	C031607Y (01	) 00	YES
002	C031607N (02	) 10	NO
003	C031607M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0011
DESCRIPTION: HAS READING BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C031601 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001	C031601Y (01	) 00	YES
002	C031601N (02	) 10	NO
003	C031601M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0012
DESCRIPTION: HAS ARTS BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C031610 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001	C031610Y (01	) 00	YES
002	C031610N (02	) 10	NO
003	C031610M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0013
DESCRIPTION: HAS SUBJECT INTEGRATION BEEN A PRIORITY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C031606 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001	C031606Y (01	) 00	YES
002	C031606N (02	) 10	NO
003	C031606M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0014
DESCRIPTION: COMPUTERS AVAILABLE ALL THE TIME IN CLASSROOM?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12

```
CONDITIONING VAR LABEL:
NAEP ID:                  C035701                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035701Y (01        ) 00                                YES
002 C035701N (02        ) 10                                NO
003 C035701M (M         ) 01                                MISSING


CONDITIONING VARIABLE ID:  SCHL0015
DESCRIPTION:              COMPUTERS GROUPED IN SEPARATE LAB AND AVAILABLE?
GRADES/ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  C035702                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035702Y (01        ) 00                                YES
002 C035702N (02        ) 10                                NO
003 C035702M (M         ) 01                                MISSING


CONDITIONING VARIABLE ID:  SCHL0016
DESCRIPTION:              COMPUTERS AVAILABLE TO BRING TO ROOM WHEN NEEDED?
GRADES/ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  C035703                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035703Y (01        ) 00                                YES
002 C035703N (02        ) 10                                NO
003 C035703M (M         ) 01                                MISSING


CONDITIONING VARIABLE ID:  SCHL0017
DESCRIPTION:              SCHOOL W/ SPECIAL FOCUS ON MATH?
GRADES/ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  C037201                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037201Y (01        ) 0                                 YES
002 C037201M (M         ) 1                                 MISSING


CONDITIONING VARIABLE ID:  SCHL0018
DESCRIPTION:              SCHOOL W/ SPECIAL FOCUS ON SCIENCE?
GRADES/ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  C037202                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037202Y (01        ) 0                                 YES
002 C037202M (M         ) 1                                 MISSING


CONDITIONING VARIABLE ID:  SCHL0019
DESCRIPTION:              SCHOOL W/ SPECIAL FOCUS ON MATH?
GRADES/ASSESSMENTS:       N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                  C037207                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037207Y (01        ) 0                                 YES
002 C037207M (M         ) 1                                 MISSING


CONDITIONING VARIABLE ID:  SCHL0020
DESCRIPTION:              SCHOOL W/ SPECIAL FOCUS ON ARTS?
GRADES/ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  C037204                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037204Y (01        ) 0                                 YES
002 C037204M (M         ) 1                                 MISSING


CONDITIONING VARIABLE ID:  SCHL0021
DESCRIPTION:              SCHOOL W/ SPECIAL FOCUS ON OTHER?
GRADES/ASSESSMENTS:       N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  C037205                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:         CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037205Y (01        ) 0                                 YES
002 C037205M (M         ) 1                                 MISSING
```

```
CONDITIONING VARIABLE ID:  SCHL0022
DESCRIPTION:               SCHOOL NOT A SPECIAL FOCUS SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037206                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037206Y (01        ) 0                          YES
002 C037206M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0023
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE MATH CURRICULUM?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037301                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037301Y (01        ) 0                          YES
002 C037301M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0024
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE SCIENCE CURRICULUM?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037302                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037302Y (01        ) 0                          YES
002 C037302M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0025
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE READING CURRICULUM?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037303                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037303Y (01        ) 0                          YES
002 C037303M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0026
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE ARTS CURRICULUM?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037304                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037304Y (01        ) 0                          YES
002 C037304M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID.  SCHL0027
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037305                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037305Y (01        ) 0                          YES
002 C037305M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0028
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037401                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037401Y (01        ) 0                          YES
002 C037401M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0029
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR SCIENCE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037402                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037402Y (01        ) 0                          YES
002 C037402M (M         ) 1                          MISSING
```

```
CONDITIONING VARIABLE ID:  SCHL0030
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR READING?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037403                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037403Y (01        ) 0                           YES
002 C037403M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0031
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR ARTS?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037404                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037404Y (01        ) 0                           YES
002 C037404M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0032
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR OTHER?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037405                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037405Y (01        ) 0                           YES
002 C037405M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0033
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR NONE ABOVE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037406                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037406Y (01        ) 0                           YES
002 C037406M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0034
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037501Y (01        ) 0                           YES
002 C037501M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0035
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037502                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS.       1

001 C037502Y (01        ) 0                           YES
002 C037502M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0036
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR READING?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037503                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037503Y (01        ) 0                           YES
002 C037503M (M         ) 1                           MISSING


CONDITIONING VARIABLE ID:  SCHL0037
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR ARTS?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037504                    TOTAL NUMBER OF SPECIFIED CONTRASTS.   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037504Y (01        ) 0                           YES
```

002 C037504M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0038
DESCRIPTION: 4TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037505 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C037505Y (01) 0 YES
002 C037505M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0039
DESCRIPTION: 4TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037601 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C037601Y (01) 0 YES
002 C037601M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0040
DESCRIPTION: 4TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037602 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C037602Y (01) 0 YES
002 C037602M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0041
DESCRIPTION: 4TH GRADERS IN SUMMER PROGRAMS IN READING?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037603 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C037603Y (01) 0 YES
002 C037603M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0042
DESCRIPTION: 4TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037604 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C037604Y (01) 0 YES
002 C037604M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0043
DESCRIPTION: 4TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037605 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C037605Y (01) 0 YES
002 C037605M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0044
DESCRIPTION: WHICH BEST DESCRIBES PRIMARY WAY LIBRARY STAFFED?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C036601 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C036601A (01) 0000 NO LIBRARY IN SCHOOL
002 C036601B (02) 1000 LIBRARY-NO/VOL STAFF
003 C036601C (03) 0100 PART-TIME STAFF
004 C036601D (04) 0010 FULL-TIME STAFF
005 C036601M (M) 0001 MISSING

CONDITIONING VARIABLE ID: SCHL0045
DESCRIPTION: INVOLVE PARENTS AS AIDES IN CLASSROOM?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:

NAEP ID: C032207 TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 3

001 C032207A (01	) 000	YES, ROUTINELY
002 C032207B (02	) 100	YES, OCCASIONALLY
003 C032207N (03	) 010	NO
004 C032207M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SCHL0046
DESCRIPTION: HAVE PARENTS REVIEW/SIGN HOMEWORK?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032209 TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 3

001 C032209A (01	) 000	YES, ROUTINELY
002 C032209B (02	) 100	YES, OCCASIONALLY
003 C032209N (03	) 010	NO
004 C032209M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SCHL0047
DESCRIPTION: ASSIGN HOMEWORK STUDENTS DO WITH PARENTS?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032210 TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 3

001 C032210A (01	) 000	YES, ROUTINELY
002 C032210B (02	) 100	YES, OCCASIONALLY
003 C032210N (03	) 010	NO
004 C032210M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SCHL0048
DESCRIPTION: HAVE A PARENT VOLUNTEER PROGRAM?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032211 TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 3

001 C032211A (01	) 000	YES, ROUTINELY
002 C032211B (02	) 100	YES, OCCASIONALLY
003 C032211N (03	) 010	NO
004 C032211M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SCHL0049
DESCRIPTION: WHAT % OF PARENTS IN PARENT-TEACHER ORGS?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C037701 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C037701A (01	) 0000	0-25%
002 C037701B (02	) 1000	26-50%
003 C037701C (03	) 0100	51-75%
004 C037701D (04	) 0010	76-100%
005 C037701M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0050
DESCRIPTION: WHAT % OF PARENTS IN OPEN HOUSE/BACK SCHOOL NIGHT?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C037702 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C037702A (01	) 0000	0-25%
002 C037702B (02	) 1000	26-50%
003 C037702C (03	) 0100	51-75%
004 C037702D (04	) 0010	76-100%
005 C037702M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0051
DESCRIPTION: WHAT % OF PARENTS IN PARENT-TEACHER CONFERENCES?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C037703 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C037703A (01	) 0000	0-25%
002 C037703B (02	) 1000	26-50%
003 C037703C (03	) 0100	51-75%
004 C037703D (04	) 0010	76-100%

BEST COPY AVAILABLE

005 C037703M (M) 0001 MISSING

CONDITIONING VARIABLE ID: SCHL0052
DESCRIPTION: WHAT % PARENTS INVOLVED MAKING CURRICULUM DECISION
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C037704 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C037704A (01)	0000	0-25%
002 C037704B (02)	1000	26-50%
003 C037704C (03)	0100	51-75%
004 C037704D (04)	0010	76-100%
005 C037704M (M)	0001	MISSING

CONDITIONING VARIABLE ID: SCHL0053
DESCRIPTION: WHAT % OF PARENTS IN VOLUNTEER PROGRAMS?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C037705 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C037705A (01)	0000	0-25%
002 C037705B (02)	1000	26-50%
003 C037705C (03)	0100	51-75%
004 C037705D (04)	0010	76-100%
005 C037705M (M)	0001	MISSING

CONDITIONING VARIABLE ID: SCHL0054
DESCRIPTION: IS STUDENT ABSENTEEISM A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032402 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032402A (01)	0000	SERIOUS
002 C032402B (02)	1000	MODERATE
003 C032402C (03)	0100	MINOR
004 C032402D (04)	0010	NOT A PROBLEM
005 C032402M (M)	0001	MISSING

CONDITIONING VARIABLE ID: SCHL0055
DESCRIPTION: IS STUDENT TARDINESS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032401 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032401A (01)	0000	SERIOUS
002 C032401B (02)	1000	MODERATE
003 C032401C (03)	0100	MINOR
004 C032401D (04)	0010	NOT A PROBLEM
005 C032401M (M)	0001	MISSING

CONDITIONING VARIABLE ID: SCHL0056
DESCRIPTION: ARE PHYSICAL CONFLICTS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032404 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032404A (01)	0000	SERIOUS
002 C032404B (02)	1000	MODERATE
003 C032404C (03)	0100	MINOR
004 C032404D (04)	0010	NOT A PROBLEM
005 C032404M (M)	0001	MISSING

CONDITIONING VARIABLE ID: SCHL0057
DESCRIPTION: IS TEACHER ABSENTEEISM A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032406 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032406A (01)	0000	SERIOUS
002 C032406B (02)	1000	MODERATE
003 C032406C (03)	0100	MINOR
004 C032406D (04)	0010	NOT A PROBLEM
005 C032406M (M)	0001	MISSING

CONDITIONING VARIABLE ID:	SCHL0058		
DESCRIPTION:	ARE RACE/CULT. CONFLICTS A PROBLEM IN YOUR SCHOOL?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	C032407	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 C032407A (01	) 0000	SERIOUS	
002 C032407B (02	) 1000	MODERATE	
003 C032407C (03	) 0100	MINOR	
004 C032407D (04	) 0010	NOT A PROBLEM	
005 C032407M (M	) 0001	MISSING	

CONDITIONING VARIABLE ID:	SCHL0059		
DESCRIPTION:	IS STUDENT HEALTH A PROBLEM IN YOUR SCHOOL?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	C032408	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 C032408A (01	) 0000	SERIOUS
002 C032408B (02	) 1000	MODERATE
003 C032408C (03	) 0100	MINOR
004 C032408D (04	) 0010	NOT A PROBLEM
005 C032408M (M	) 0001	MISSING

CONDITIONING VARIABLE ID:	SCHL0060		
DESCRIPTION:	IS LACK OF PARENT INVLMT A PROBLEM IN YOUR SCHOOL?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	C032409	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 C032409A (01	) 0000	SERIOUS
002 C032409B (02	) 1000	MODERATE
003 C032409C (03	) 0100	MINOR
004 C032409D (04	) 0010	NOT A PROBLEM
005 C032409M (M	) 0001	MISSING

CONDITIONING VARIABLE ID:	SCHL0061		
DESCRIPTION:	IS STUD USE OF ALCOHOL A PROBLEM IN YOUR SCHOOL?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	C032410	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 C032410A (01	) 0000	SERIOUS
002 C032410B (02	) 1000	MODERATE
003 C032410C (03	) 0100	MINOR
004 C032410D (04	) 0010	NOT A PROBLEM
005 C032410M (M	) 0001	MISSING

CONDITIONING VARIABLE ID:	SCHL0062		
DESCRIPTION:	IS STUDENT TOBACCO USE A PROBLEM IN YOUR SCHOOL?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	C032411	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 C032411A (01	) 0000	SERIOUS
002 C032411B (02	) 1000	MODERATE
003 C032411C (03	) 0100	MINOR
004 C032411D (04	) 0010	NOT A PROBLEM
005 C032411M (M	) 0001	MISSING

CONDITIONING VARIABLE ID:	SCHL0063		
DESCRIPTION:	IS STUDENT DRUG USE A PROBLEM IN YOUR SCHOOL?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12		
CONDITIONING VAR LABEL:			
NAEP ID:	C032412	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 C032412A (01	) 0000	SERIOUS
002 C032412B (02	) 1000	MODERATE
003 C032412C (03	) 0100	MINOR
004 C032412D (04	) 0010	NOT A PROBLEM
005 C032412M (M	) 0001	MISSING

CONDITIONING VARIABLE ID:	SCHL0064
DESCRIPTION:	ARE GANG ACTIVITIES A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:	N04, S04, N08, S08, N12

CONDITIONING VAR LABEL:
NAEP ID: C032413 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032413A (01	) 0000	SERIOUS	
002 C032413B (02	) 1000	MODERATE	
003 C032413C (03	) 0100	MINOR	
004 C032413D (04	) 0010	NOT A PROBLEM	
005 C032413M (M	) 0001	MISSING	

CONDITIONING VARIABLE ID: SCHL0065
DESCRIPTION: IS STUDENT MISBEHAVIOR A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032414 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032414A (01	) 0000	SERIOUS
002 C032414B (02	) 1000	MODERATE
003 C032414C (03	) 0100	MINOR
004 C032414D (04	) 0010	NOT A PROBLEM
005 C032414M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0066
DESCRIPTION: IS STUDENT CHEATING A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032415 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032415A (01	) 0000	SERIOUS
002 C032415B (02	) 1000	MODERATE
003 C032415C (03	) 0100	MINOR
004 C032415D (04	) 0010	NOT A PROBLEM
005 C032415M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0067
DESCRIPTION: IS TEACHER MORALE POS. OR NEG.?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032502 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032502A (01	) 0000	VERY POSITIVE
002 C032502B (02	) 1000	SOMEWHAT POSITIVE
003 C032502C (03	) 0100	SOMEWHAT NEGATIVE
004 C032502D (04	) 0010	VERY NEGATIVE
005 C032502M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0068
DESCRIPTION: ARE STUDENT ATTITUDES TO ACADEMICS POS. OR NEG.?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032503 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032503A (01	) 0000	VERY POSITIVE
002 C032503B (02	) 1000	SOMEWHAT POSITIVE
003 C032503C (03	) 0100	SOMEWHAT NEGATIVE
004 C032503D (04	) 0010	VERY NEGATIVE
005 C032503M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0069
DESCRIPTION: IS PARENT SUPPORT FOR ACHIEVEMENT POS. OR NEG.?
GRADES ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C032505 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032505A (01	) 0000	VERY POSITIVE
002 C032505B (02	) 1000	SOMEWHAT POSITIVE
003 C032505C (03	) 0100	SOMEWHAT NEGATIVE
004 C032505D (04	) 0010	VERY NEGATIVE
005 C032505M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0070
DESCRIPTION: IS REGARD FOR SCHOOL PROPERTY POS. OR NEG.?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL
NAEP ID: C032506 TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 4

001 C032506A (01	) 0000	VERY POSITIVE
002 C032506B (02	) 1000	SOMEWHAT POSITIVE
003 C032506C (03	) 0100	SOMEWHAT NEGATIVE
004 C032506D (04	) 0010	VERY NEGATIVE
005 C032506M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0071
DESCRIPTION: % ABSENT ON AVERAGE DAY?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C033601 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001 C033601A (01	) 0000	0-2%
002 C033601B (02	) 1000	3-5%
003 C033601C (03	) 0100	6-10%
004 C033601D (04	) 0010	MORE THAN 10%
005 C033601M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0072
DESCRIPTION: WHAT % OF TEACHERS ABSENT ON GIVEN DAY?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C036501 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001 C036501A (01	) 0000	0-2%
002 C036501B (02	) 1000	3-5%
003 C036501C (03	) 0100	6-10%
004 C036501D (04	) 0010	MORE THAN 10%
005 C036501M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: SCHL0073
DESCRIPTION: % OF STUDS EROLLED AT START OF YR EROLLED AT END?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C037801 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 9
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 8

001 C037801A (01	) 00000000	98-100%
002 C037801B (02	) 10000000	95-97%
003 C037801C (03	) 01000000	90-94%
004 C037801D (04	) 00100000	80-89%
005 C037801E (05	) 00010000	70-79%
006 C037801F (06	) 00001000	60-69%
007 C037801G (07	) 00000100	50-59%
008 C037801H (08	) 00000010	LESS THAN 50%
009 C037801M (M	) 00000001	MISSING

CONDITIONING VARIABLE ID: SCHL0074
DESCRIPTION: % OF 4TH GRADERS HELD BACK & REPEATING 4TH GRADE?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: C037901 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 C037901A (01	) 00000	0%
002 C037901B (02	) 10000	1-2%
003 C037901C (03	) 01000	3-5%
004 C037901D (04	) 00100	6-10%
005 C037901E (05	) 00010	MORE THAN 10%
006 C037901M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: SCHL0075
DESCRIPTION: % OF FULL TIME TEACHERS LEFT BEFORE END OF YR?
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C038001 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 8
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 7

001 C038001A (01	) 0000000	0%
002 C038001B (02	) 1000000	1-2%
003 C038001C (03	) 0100000	3-5%
004 C038001D (04	) 0010000	6-10%
005 C038001E (05	) 0001000	11-15%
006 C038001F (06	) 0000100	16-20%
007 C038001G (07	) 0000010	MORE THAN 20%
008 C038001M (M	) 0000001	MISSING

CONDITIONING VARIABLE ID: SCHL0076

```
DESCRIPTION:                  IS SCHOOL IN NATIONAL SCHOOL LUNCH PROGRAM?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C038301                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C038301Y (01          ) 00                            YES
002 C038301N (02          ) 10                            NO
003 C038301M (M           ) 01                            MISSING


CONDITIONING VARIABLE ID:  SCHL0077
DESCRIPTION:                  SCHOOL RECEIVE CHAP 1/TITLE 1 FUNDING?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C038801                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C038801Y (01          ) 00                            YES
002 C038801N (02          ) 10                            NO
003 C038801M (M           ) 01                            MISSING


CONDITIONING VARIABLE ID:  SCHL0078
DESCRIPTION:                  DID PRINCIPAL FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034101                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034101Y (01          ) 0                             YES
002 C034101M (M           ) 1                             MISSING


CONDITIONING VARIABLE ID:  SCHL0079
DESCRIPTION:                  DID HEADMASTER/HEADMISTRESS FILL OUT QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034102                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034102Y (01          ) 0                             YES
002 C034102M (M           ) 1                             MISSING


CONDITIONING VARIABLE ID:  SCHL0080
DESCRIPTION:                  DID HEAD TEACHER FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034103                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034103Y (01          ) 0                             YES
002 C034103M (M           ) 1                             MISSING


CONDITIONING VARIABLE ID:  SCHL0081
DESCRIPTION:                  DID VICE PRINCIPAL FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034104                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034104Y (01          ) 0                             YES
002 C034104M (M           ) 1                             MISSING


CONDITIONING VARIABLE ID:  SCHL0082
DESCRIPTION:                  DID COUNSELOR FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034105                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034105Y (01          ) 0                             YES
002 C034105M (M           ) 1                             MISSING


CONDITIONING VARIABLE ID:  SCHL0083
DESCRIPTION:                  DID CURRICULUM COORD FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034106                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034106Y (01          ) 0                             YES
002 C034106M (M           ) 1                             MISSING
```

CONDITIONING VARIABLE ID: SCHL0084
DESCRIPTION: DID TEACHER FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C034107 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001	C034107Y (01	) 0	YES
002	C034107M (M	) 1	MISSING

CONDITIONING VARIABLE ID: SCHL0085
DESCRIPTION: DID SECRETARY FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C034108 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001	C034108Y (01	) 0	YES
002	C034108M (M	) 1	MISSING

CONDITIONING VARIABLE ID: SCHL0086
DESCRIPTION: DID OTHER PERSON FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS: N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID: C034109 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001	C034109Y (01	) 0	YES
002	C034109M (M	) 1	MISSING

CONDITIONING VARIABLE ID: SCHL0087
DESCRIPTION: BEST DESCRIBES HOW 8TH GRADES ARE ORGANIZED?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C034201 TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 3

001	C034201A (01	) 000	SELF-CONTAINED
002	C034201B (02	) 100	SEMI-DEPARTMENTALIZE
003	C034201C (03	) 010	DEPARTMENTALIZED
004	C034201M (M	) 001	MISSING

CONDITIONING VARIABLE ID: SCHL0088
DESCRIPTION: ARE 8TH-GRADERS ASSIGNED TO MATH BY ABILITY?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C034402 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001	C034402Y (01	) 00	YES
002	C034402N (02	) 10	NO
003	C034402M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0089
DESCRIPTION: ARE 8TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C034403 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001	C034403Y (01	) 00	YES
002	C034403N (02	) 10	NO
003	C034403M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0090
DESCRIPTION: ARE 8TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C034401 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001	C034401Y (01	) 00	YES
002	C034401N (02	) 10	NO
003	C034401M (M	) 01	MISSING

CONDITIONING VARIABLE ID: SCHL0091
DESCRIPTION: ARE 8TH-GRADERS ASSIGNED TO ARTS BY ABILITY?
GRADES/ASSESSMENTS: N08, S08

```
CONDITIONING VAR LABEL:
NAEP ID:                    C034406                                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 C034406Y (01          ) 00                                        YES
002 C034406N (02          ) 10                                        NO
003 C034406M (M           ) 01                                        MISSING


CONDITIONING VARIABLE ID:   SCHL0092
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE COMP SCI INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034510                                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 C034510A (01          ) 00000                                     EVERY DAY
002 C034510B (02          ) 10000                                     3 OR 4 TIMES A WEEK
003 C034510C (03          ) 01000                                     ONCE OR TWICE/WEEK
004 C034510D (04          ) 00100                                     LESS THAN ONCE/WEEK
005 C034510E (05          ) 00010                                     SUBJECT NOT TAUGHT
006 C034510M (M           ) 00001                                     MISSING


CONDITIONING VARIABLE ID:   SCHL0093
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE MATH INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034511                                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 C034511A (01          ) 00000                                     EVERY DAY
002 C034511B (02          ) 10000                                     3 OR 4 TIMES A WEEK
003 C034511C (03          ) 01000                                     ONCE OR TWICE/WEEK
004 C034511D (04          ) 00100                                     LESS THAN ONCE/WEEK
005 C034511E (05          ) 00010                                     SUBJECT NOT TAUGHT
006 C034511M (M           ) 00001                                     MISSING


CONDITIONING VARIABLE ID:   SCHL0094
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE SCIENCE INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034512                                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 C034512A (01          ) 00000                                     EVERY DAY
002 C034512B (02          ) 10000                                     3 OR 4 TIMES A WEEK
003 C034512C (03          ) 01000                                     ONCE OR TWICE/WEEK
004 C034512D (04          ) 00100                                     LESS THAN ONCE/WEEK
005 C034512E (05          ) 00010                                     SUBJECT NOT TAUGHT
006 C034512M (M           ) 00001                                     MISSING


CONDITIONING VARIABLE ID:   SCHL0095
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE ENGLISH INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034513                                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 C034513A (01          ) 00000                                     EVERY DAY
002 C034513B (02          ) 10000                                     3 OR 4 TIMES A WEEK
003 C034513C (03          ) 01000                                     ONCE OR TWICE/WEEK
004 C034513D (04          ) 00100                                     LESS THAN ONCE/WEEK
005 C034513E (05          ) 00010                                     SUBJECT NOT TAUGHT
006 C034513M (M           ) 00001                                     MISSING


CONDITIONING VARIABLE ID:   SCHL0096
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE ARTS INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034514                                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 C034514A (01          ) 00000                                     EVERY DAY
002 C034514B (02          ) 10000                                     3 OR 4 TIMES A WEEK
003 C034514C (03          ) 01000                                     ONCE OR TWICE/WEEK
004 C034514D (04          ) 00100                                     LESS THAN ONCE/WEEK
005 C034514E (05          ) 00010                                     SUBJECT NOT TAUGHT
006 C034514M (M           ) 00001                                     MISSING


CONDITIONING VARIABLE ID:   SCHL0097
DESCRIPTION:                HAS ENGLISH BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:         N08, S08
```

```
CONDITIONING VAR LABEL:
NAEP ID:                    C031611                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031611Y (01         ) 00                           YES
002 C031611N (02         ) 10                           NO
003 C031611M (M          ) 01                           MISSING


CONDITIONING VARIABLE ID:   SCHL0098
DESCRIPTION:                SCHOOL OFFER 8TH GR STUDS ALGEBRA FOR HS CREDIT?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034601                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C034601Y (01         ) 00                           YES
002 C034601N (02         ) 10                           NO
003 C034601M (M          ) 01                           MISSING


CONDITIONING VARIABLE ID:   SCHL0099
DESCRIPTION:                SCHOOL W/ SPECIAL FOCUS ON ENGLISH?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037203                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037203Y (01         ) 0                            YES
002 C037203M (M          ) 1                            MISSING


CONDITIONING VARIABLE ID:   SCHL0100
DESCRIPTION:                SCHOOL FOLLOW DISTRICT/STATE ENGLISH CURRICULUM?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037306                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037306Y (01         ) 0                            YES
002 C037306M (M          ) 1                            MISSING


CONDITIONING VARIABLE ID:   SCHL0101
DESCRIPTION:                SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR MATH?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C039401                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039401Y (01         ) 0                            YES
002 C039401M (M          ) 1                            MISSING


CONDITIONING VARIABLE ID:   SCHL0102
DESCRIPTION:                SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR SCIENCE?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C039402                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039402Y (01         ) 0                            YES
002 C039402M (M          ) 1                            MISSING


CONDITIONING VARIABLE ID:   SCHL0103
DESCRIPTION:                SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR READING?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C039403                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039403Y (01         ) 0                            YES
002 C039403M (M          ) 1                            MISSING


CONDITIONING VARIABLE ID:   SCHL0104
DESCRIPTION:                SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR ARTS?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C039404                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039404Y (01         ) 0                            YES
002 C039404M (M          ) 1                            MISSING
```


BEST COPY AVAILABLE

CONDITIONING VARIABLE ID: SCHL0105
DESCRIPTION: SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR OTHER?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039405 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039405Y (01) 0 YES
002 C039405M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0106
DESCRIPTION: SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR NONE ABOVE?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039406 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039406Y (01) 0 YES
002 C039406M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0107
DESCRIPTION: 8TH GRADERS IN EXTRACURR ACTS FOR MATH?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039501 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039501Y (01) 0 YES
002 C039501M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0108
DESCRIPTION: 8TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039502 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039502Y (01) 0 YES
002 C039502M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0109
DESCRIPTION: 8TH GRADERS IN EXTRACURR ACTS FOR ENG/LANG ARTS?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039503 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039503Y (01) 0 YES
002 C039503M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0110
DESCRIPTION: 8TH GRADERS IN EXTRACURR ACTS FOR ARTS?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039504 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039504Y (01) 0 YES
002 C039504M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0111
DESCRIPTION: 8TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039505 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039505Y (01) 0 YES
002 C039505M (M) 1 MISSING

CONDITIONING VARIABLE ID: SCHL0112
DESCRIPTION: 8TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: C039601 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 C039601Y (01) 0 YES
002 C039601M (M) 1 MISSING

```
CONDITIONING VARIABLE ID:  SCHL0113
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039602                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039602Y (01        ) 0                          YES
002 C039602M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0114
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN ENG/LANG ARTS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039603                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039603Y (01        ) 0                          YES
002 C039603M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0115
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039604                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039604Y (01        ) 0                          YES
002 C039604M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0116
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039605                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039605Y (01        ) 0                          YES
002 C039605M (M         ) 1                          MISSING


CONDITIONING VARIABLE ID:  SCHL0117
DESCRIPTION:               WHAT % OF 8TH GRDS HELD BACK/REPEAT 8TH GRADE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C041901                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       5

001 C041901A (01        ) 00000                      0%
002 C041901B (02        ) 10000                      1-2%
003 C041901C (03        ) 01000                      3-5%
004 C041901D (04        ) 00100                      6-10%
005 C041901E (05        ) 00010                      MORE THAN 10%
006 C041901M (M         ) 00001                      MISSING


CONDITIONING VARIABLE ID:  SCHL0173
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNSC                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 NATLUNCM (M         ) 0                          MISSING
002 NATLUNCH (@         ) 1                          PERCENT


CONDITIONING VARIABLE ID:  SCHL0174
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNSC                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 NATLUNCL (0-100,M=0  )  0.0 +  1.0*X             LINEAR


CONDITIONING VARIABLE ID:  SCHL0175
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDSC                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1
```

```
001 REMREADM (M          ) 0                              MISSING
002 REM READ (@          ) 1                              PERCENT


CONDITIONING VARIABLE ID:  SCHL0176
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDSC                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                         NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREADL (0-100,M=0  )  0.0 +  1.0*X                  LINEAR


CONDITIONING VARIABLE ID:  SCHL0177
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHSC                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMATHM (M          ) 0                              MISSING
002 REM MATH (@          ) 1                              PERCENT


CONDITIONING VARIABLE ID:  SCHL0178
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHSC                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                         NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMATHL (0-100,M=0  )  0.0 +  1.0*X                  LINEAR


CONDITIONING VARIABLE ID:  SCHL0179
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLUN4M (M          ) 0                              MISSING
002 NATLUN4  (@          ) 1                              PERCENT


CONDITIONING VARIABLE ID:  SCHL0180
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                         NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLUN4L (0-100,M=0  )  0.0 +  1.0*X                  LINEAR


CONDITIONING VARIABLE ID:  SCHL0181
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREA4M (M          ) 0                              MISSING
002 REMREAD4 (@          ) 1                              PERCENT


CONDITIONING VARIABLE ID:  SCHL0182
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                         NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREA4L (0-100,M=0  )  0.0 +  1.0*X                  LINEAR


CONDITIONING VARIABLE ID:  SCHL0183
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT4M (M          ) 0                              MISSING
002 REMMATH4 (@          ) 1                              PERCENT
```

```
CONDITIONING VARIABLE ID:  SCHL0184
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT4L (0-100,M=0  )  0.0 +  1.0*X                LINEAR


CONDITIONING VARIABLE ID:  SCHL0185
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLUN8M (M          ) 0                            MISSING
002 NATLUN8  (@          ) 1                            PERCENT


CONDITIONING VARIABLE ID:  SCHL0186
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLUN8L (0-100,M=0  )  0.0 +  1.0*X                LINEAR


CONDITIONING VARIABLE ID:  SCHL0187
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREA8M (M          ) 0                            MISSING
002 REMREAD8 (@          ) 1                            PERCENT


CONDITIONING VARIABLE ID:  SCHL0188
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREA8L (0-100,M=0  )  0.0 +  1.0*X                LINEAR


CONDITIONING VARIABLE ID:  SCHL0189
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT8M (M          ) 0                            MISSING
002 REMMATH8 (@          ) 1                            PERCENT


CONDITIONING VARIABLE ID:  SCHL0190
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT8L (0-100,M=0  )  0.0 +  1.0*X                LINEAR


CONDITIONING VARIABLE ID:  TCHR0001
DESCRIPTION:               WHAT IS YOUR GENDER?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T055901                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        2

001 T055901A (01         ) 00                           MALE
002 T055901B (02         ) 10                           FEMALE
003 T055901M (M          ) 01                           MISSING
```

CONDITIONING VARIABLE ID: TCHR0002
DESCRIPTION: WHICH BEST DESRIBES YOU?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056001 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 7
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 6

001 T056001A (01	) 000000	WHITE
002 T056001B (02	) 100000	BLACK
003 T056001C (03	) 010000	HISPANIC
004 T056001D (04	) 001000	ASIAN/PACIFIC AMERIC
005 T056001E (05	) 000100	AMER IND/ALASKA NATV
006 T056001F (06	) 000010	OTHER
007 T056001M (M	) 000001	MISSING

CONDITIONING VARIABLE ID: TCHR0003
DESCRIPTION: YEARS TAUGHT
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040301 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 T040301A (01	) 00000	2 YEARS OR LESS
002 T040301B (02	) 10000	3-5 YEARS
003 T040301C (03	) 01000	5-10 YEARS
004 T040301D (04	) 00100	11-24 YEARS
005 T040301E (05	) 00010	25 YEARS OR MORE
006 T040301M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: TCHR0004
DESCRIPTION: HOW MANY YRS TOTAL YOU TAUGHT MATH?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: T056101 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 T056101A (01	) 00000	2 YEARS OR LESS
002 T056101B (02	) 10000	3-5 YEARS
003 T056101C (03	) 01000	6-10 YEARS
004 T056101D (04	) 00100	11-24 YEARS
005 T056101E (05	) 00010	25 YEARS OR MORE
006 T056101M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: TCHR0005
DESCRIPTION: HOW MANY YRS TOTAL YOU TAUGHT SCIENCE?
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: T056102 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 T056102A (01	) 00000	2 YEARS OR LESS
002 T056102B (02	) 10000	3-5 YEARS
003 T056102C (03	) 01000	6-10 YEARS
004 T056102D (04	) 00100	11-24 YEARS
005 T056102E (05	) 00010	25 YEARS OR MORE
006 T056102M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: TCHR0006
DESCRIPTION: TYPE TCHNG CERT IN THIS ST IN MAIN FIELD?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056201 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 7
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 6

001 T056201A (01	) 000000	ADVANCED PROFESSIONL
002 T056201B (02	) 100000	REGULAR/STANDARD ST
003 T056201C (03	) 010000	PROBATIONARY STATE
004 T056201D (04	) 001000	TEMPORARY/PROVISIONL
005 T056201E (05	) 000100	OTHER THAN STATE CRT
006 T056201F (06	) 000010	NOT HAVE CERT MAIN
007 T056201M (M	) 000001	MISSING

CONDITIONING VARIABLE ID: TCHR0007
DESCRIPTION: CERTIFICATION, ELEMENTARY OR MIDDLE/JUNIOR HS ED?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040501 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001 T040501Y (01	) 000	YES
002 T040501N (02	) 100	NO
003 [illegible] (03	) 010	NOT OFFERED IN STATE

```
004 T040501M (M          ) 001                          MISSING

CONDITIONING VARIABLE ID:  TCHR0008
DESCRIPTION:               DO YOU HAVE CERTIFICATION IN ELEMENTARY MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040506                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040506Y (01         ) 000                          YES
002 T040506N (02         ) 100                          NO
003 T040506C (03         ) 010                          NOT OFFERED IN STATE
004 T040506M (M          ) 001                          MISSING

CONDITIONING VARIABLE ID:  TCHR0009
DESCRIPTION:               DO YOU HAVE CERTIFICATION IN JR HIGH/SEC MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040504                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040504Y (01         ) 000                          YES
002 T040504N (02         ) 100                          NO
003 T040504C (03         ) 010                          NOT OFFERED IN STATE
004 T040504M (M          ) 001                          MISSING

CONDITIONING VARIABLE ID:  TCHR0012
DESCRIPTION:               CERTIFICATION, OTHER
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040505                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040505Y (01         ) 000                          YES
002 T040505N (02         ) 100                          NO
003 T040505C (03         ) 010                          NOT OFFERED IN STATE
004 T040505M (M          ) 001                          MISSING

CONDITIONING VARIABLE ID:  TCHR0013
DESCRIPTION:               HIGHEST ACADEMIC DEGREE YOU HOLD?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056301                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        7

001 T056301A (01         ) 0000000                      HIGH SCHOOL DIPLOMA
002 T056301B (02         ) 1000000                      ASSOCIATES/VOCATIONL
003 T056301C (03         ) 0100000                      BACHELORS DEGREE
004 T056301D (04         ) 0010000                      MASTER'S DEGREE
005 T056301E (05         ) 0001000                      EDUCATION SPECIALIST
006 T056301F (06         ) 0000100                      DOCTORATE
007 T056301G (07         ) 0000010                      PROFESSIONAL DEGREE
008 T056301M (M          ) 0000001                      MISSING

CONDITIONING VARIABLE ID:  TCHR0014
DESCRIPTION:               EDUCATION UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040701                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040701Y (01         ) 0                            YES
002 T040701M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:  TCHR0015
DESCRIPTION:               ELMENT ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040706                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040706Y (01         ) 0                            YES
002 T040706M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:  TCHR0016
DESCRIPTION:               SEC ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040707                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1
```

BEST COPY AVAILABLE

001 T040707Y (01) 0 YES
002 T040707M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0017
DESCRIPTION: WAS YOUR UNDERGRADUATE MAJOR MATH?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040703 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040703Y (01) 0 YES
002 T040703M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0018
DESCRIPTION: WAS YOUR UNDERGRADUATE MAJOR MATH ED?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040704 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040704Y (01) 0 YES
002 T040704M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0023
DESCRIPTION: SPECIAL EDUCATION UNDERGRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040708 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040708Y (01) 0 YES
002 T040708M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0024
DESCRIPTION: BILINGUAL ED/ESL UNDERGRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040709 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040709Y (01) 0 YES
002 T040709M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0025
DESCRIPTION: OTHER UNDERGRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040705 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040705Y (01) 0 YES
002 T040705M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0026
DESCRIPTION: EDUCATION GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040801 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040801Y (01) 0 YES
002 T040801M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0027
DESCRIPTION: ELEMENTARY ED GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040807 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040807Y (01) 0 YES
002 T040807M (M) 1 MISSING

CONDITIONING VARIABLE ID. TCHR0028
DESCRIPTION: SECONDARY ED GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040808 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2

TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040808Y (01) 0 YES
002 T040808M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0029
DESCRIPTION: WAS YOUR GRADUATE MAJOR MATHEMATICS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040803 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040803Y (01) 0 YES
002 T040803M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0030
DESCRIPTION: WAS YOUR GRADUATE MAJOR MATH ED?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040804 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040804Y (01) 0 YES
002 T040804M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0035
DESCRIPTION: SPECIAL ED GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040809 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040809Y (01) 0 YES
002 T040809M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0036
DESCRIPTION: BILINGUAL GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040810 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040810Y (01) 0 YES
002 T040810M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0037
DESCRIPTION: ADMIN/SUPERVISION GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040811 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040811Y (01) 0 YES
002 T040811M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0038
DESCRIPTION: CURRICULUM/INSTRUCTION GRAD MAJOR?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040812 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040812Y (01) 0 YES
002 T040812M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0039
DESCRIPTION: COUNSELING GRAD MAJOR?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040813 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040813Y (01) 0 YES
002 T040813M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0040
DESCRIPTION: OTHER GRAD MAJOR
GRADES/ASSESSMENTS: N04, S04 N08, S08
CONDITIONING VAR LABEL:

BEST COPY AVAILABLE

NAEP ID: T040805 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040805Y (01) 0 YES
002 T040805M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0041
DESCRIPTION: NO GRADUATE STUDY
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T040806 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T040806Y (01) 0 YES
002 T040806M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0042
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-EDUCATION
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056401 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056401Y (01) 0 YES
002 T056401M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0043
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-ELEMENTARY ED
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056402 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056402Y (01) 0 YES
002 T056402M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0044
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-SECONDARY ED
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056403 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056403Y (01) 0 YES
002 T056403M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0045
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056404 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056404Y (01) 0 YES
002 T056404M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0046
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS ED
GRADES/ASSESSMENTS: N04 S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056405 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056405Y (01) 0 YES
002 T056405M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0051
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-SPECIAL ED
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056406 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056406Y (01) 0 YES
002 T056406M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0052
DESCRIPTION: UNDERGRAD/GRAD MINOR STUDY-BILINGUAL ED
GRADES/ASSESSMENTS: N04, S04, N08, S08

```
CONDITIONING VAR LABEL:
NAEP ID:                    T056407                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056407Y (01          ) 0                              YES
002 T056407M (M           ) 1                              MISSING


CONDITIONING VARIABLE ID:   TCHR0053
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-ADMIN & SUPERVISION
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056408                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056408Y (01          ) 0                              YES
002 T056408M (M           ) 1                              MISSING


CONDITIONING VARIABLE ID:   TCHR0054
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-CURRICULUM & INSTRUC
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056409                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056409Y (01          ) 0                              YES
002 T056409M (M           ) 1                              MISSING


CONDITIONING VARIABLE ID    TCHR0055
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-COUNSELING
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056410                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056410Y (01          ) 0                              YES
002 T056410M (M           ) 1                              MISSING


CONDITIONING VARIABLE ID:   TCHR0056
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-OTHER
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056411                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056411Y (01          ) 0                              YES
002 T056411M (M           ) 1                              MISSING


CONDITIONING VARIABLE ID:   TCHR0057
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-NONE
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056412                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056412Y (01          ) 0                              YES
002 T056412M (M           ) 1                              MISSING


CONDITIONING VARIABLE ID:   TCHR0058
DESCRIPTION:                LAST YR, HOW MUCH TIME IN MATH/MATH ED SEM/WRKSHP?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056501                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056501A (01          ) 00000                          NONE
002 T056501B (02          ) 10000                          LESS THAN 6 HOURS
003 T056501C (03          ) 01000                          6-15 HOURS
004 T056501D (04          ) 00100                          16-35 HOURS
005 T056501E (05          ) 00010                          MORE THAN 35 HOURS
006 T056501M (M           ) 00001                          MISSING


CONDITIONING VARIABLE ID:   TCHR0060
DESCRIPTION:                LAST 2 YRS, HOW MANY MATH/MATH ED UNIV COURSES?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056601                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056601A (01          ) 00000                          NONE
002 T056601B (02          ) 10000                          ONE
```

003 T056601C (03) 01000 TWO
004 T056601D (04) 00100 THREE
005 T056601E (05) 00010 FOUR OR MORE
006 T056601M (M) 00001 MISSING

CONDITIONING VARIABLE ID: TCHR0062
DESCRIPTION: PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TELECOMM USE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056701 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056701Y (01) 0 YES
002 T056701M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0063
DESCRIPTION: PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TECH USE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056702 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056702Y (01) 0 YES
002 T056702M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0064
DESCRIPTION: PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-COOP INSTRCT
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056703 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056703Y (01) 0 YES
002 T056703M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0065
DESCRIPTION: PAST 5 YRS, COURSES/IN PRO DEVLP-INTERDISP INSTRCT
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056704 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056704Y (01) 0 YES
002 T056704M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0066
DESCRIPTION: PAST 5 YRS, COURSES/IN PRO DEVLP-PORTFOLIO ASSMNT
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056705 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056705Y (01) 0 YES
002 T056705M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0067
DESCRIPTION: PAST 5 YRS, COURSES/IN PRO DEVLP-PERF BASED ASSMNT
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056706 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056706Y (01) 0 YES
002 T056706M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0068
DESCRIPTION: PAST 5 YRS, COURSES/PRO DEVLP-TEACH HIGHORDER THKG
GRADES/ASSESSMENTS: N04, S04, N08 S08
CONDITIONING VAR LABEL:
NAEP ID: T056707 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056707Y (01) 0 YES
002 T056707M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0069
DESCRIPTION: PAST 5 YRS, COURSES/PRO DEVLP-TEACH DIFF CULT BKGD
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:

NAEP ID: T056708 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 1

```
001 T056708Y (01        ) 0        YES
002 T056708M (M         ) 1        MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0070
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-TEACH LEP STUDENTS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056709        TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056709Y (01        ) 0        YES
002 T056709M (M         ) 1        MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0071
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-TEACH SPEC NEED STDS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056710        TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056710Y (01        ) 0        YES
002 T056710M (M         ) 1        MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0072
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-CLASSRM MNGMT/ORG
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056711        TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056711Y (01        ) 0        YES
002 T056711M (M         ) 1        MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0073
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-OTHER PROF ISSUES
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056712        TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056712Y (01        ) 0        YES
002 T056712M (M         ) 1        MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0074
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-NONE OF ABOVE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056713        TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056713Y (01        ) 0        YES
002 T056713M (M         ) 1        MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0075
DESCRIPTION:               AVAILABILITY OF RESOURCES
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T041201        TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS.       4

001 T041201A (01        ) 0000     GET ALL RESOURCES
002 T041201B (02        ) 1000     GET MOST RESOURCES
003 T041201C (03        ) 0100     GET SOME RESOURCES
004 T041201D (04        ) 0010     DONT GET RESOURCES
005 T041201M (M         ) 0001     MISSING
```

```
CONDITIONING VARIABLE ID:  TCHR0076
DESCRIPTION:               ARE CURRICULUM SPECIALISTS AVAILABLE FOR MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   T041302        TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS          NUMBER OF INDEPENDENT CONTRASTS:       2

001 T041302Y (01        ) 00       YES
002 T041302N (02        ) 10       NO
003 T041302M (M         ) 01       MISSING
```

CONDITIONING VARIABLE ID: TCHR0077
DESCRIPTION: SCIENCE CURRICULUM SPECIALIST
GRADES/ASSESSMENTS: N04, S04
CONDITIONING VAR LABEL:
NAEP ID: T041303
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
NUMBER OF INDEPENDENT CONTRASTS: 2

001 T041303Y (01)	00	YES
002 T041303N (02)	10	NO
003 T041303M (M)	01	MISSING

CONDITIONING VARIABLE ID: TCHR0078
DESCRIPTION: HOW MANY SCHOOL HOURS ARE PREP TIME PER WEEK?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056801
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 7
NUMBER OF INDEPENDENT CONTRASTS: 6

001 T056801A (01)	000000	NONE
002 T056801B (02)	100000	LESS THAN ONE
003 T056801C (03)	010000	1-2
004 T056801D (04)	001000	3-4
005 T056801E (05)	000100	5
006 T056801F (06)	000010	MORE THAN 5
007 T056801M (M)	000001	MISSING

CONDITIONING VARIABLE ID: TCHR0079
DESCRIPTION: METHODS OF TEACHING ELEM MATH- 1+COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056901
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056901Y (01)	0	YES
002 T056901M (M)	1	MISSING

CONDITIONING VARIABLE ID: TCHR0080
DESCRIPTION: METHODS OF TEACHING ELEM MATH-PART COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569A1
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569A1Y (01)	0	YES
002 T0569A1M (M)	1	MISSING

CONDITIONING VARIABLE ID: TCHR0081
DESCRIPTION: METHODS OF TEACHING ELEM MATH-SEMINAR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569B1
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569B1Y (01)	0	YES
002 T0569B1M (M)	1	MISSING

CONDITIONING VARIABLE ID: TCHR0082
DESCRIPTION: METHODS OF TEACHING ELEM MATH-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569C1
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569C1Y (01)	0	YES
002 T0569C1M (M)	1	MISSING

CONDITIONING VARIABLE ID: TCHR0083
DESCRIPTION: NUMBER SYSTEMS & NUMERATION-1+ COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056902
TYPE OF CONTRAST: CLASS
TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056902Y (01)	0	YES
002 T056902M (M)	1	MISSING

CONDITIONING VARIABLE ID: TCHR0084
DESCRIPTION: NUMBER SYSTEMS & NUMERATION-PART COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08

CONDITIONING VAR LABEL:
NAEP ID: T0569A2 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569A2Y (01) 0 YES
002 T0569A2M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0085
DESCRIPTION: NUMBER SYSTEMS & NUMERATION-SEMINAR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569B2 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569B2Y (01) 0 YES
002 T0569B2M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0086
DESCRIPTION: NUMBER SYSTEMS & NUMERATION-LITTLE/NO EXPOSURE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569C2 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569C2Y (01) 0 YES
002 T0569C2M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0087
DESCRIPTION: MEASUREMENT IN MATH- 1+COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056903 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056903Y (01) 0 YES
002 T056903M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0088
DESCRIPTION: MEASUREMENT IN MATH- PART COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569A3 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569A3Y (01) 0 YES
002 T0569A3M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0089
DESCRIPTION: MEASUREMENT IN MATH- -SEMINAR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569B3 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569B3Y (01) 0 YES
002 T0569B3M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0090
DESCRIPTION: MEASUREMENT IN MATH- -LITTLE NO EXPOSURE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569C3 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569C3Y (01) 0 YES
002 T0569C3M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0091
DESCRIPTION: GEOMETRY- 1+COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056904 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056904Y (01) 0 YES
002 T056904M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0092
DESCRIPTION: GEOMETRY-PART COLLEGE COURSE

GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569A4 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569A4Y (01) 0 YES
002 T0569A4M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0093
DESCRIPTION: GEOMETRY-SEMINAR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569B4 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569B4Y (01) 0 YES
002 T0569B4M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0094
DESCRIPTION: GEOMETRY-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569C4 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569C4Y (01) 0 YES
002 T0569C4M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0095
DESCRIPTION: PROBABILITY/STATISTICS- 1+COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056905 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056905Y (01) 0 YES
002 T056905M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0096
DESCRIPTION: PROBABILITY/STATISTICS-PART COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569A5 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569A5Y (01) 0 YES
002 T0569A5M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0097
DESCRIPTION: PROBABILITY/STATISTICS-SEMINAR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569B5 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569B5Y (01) 0 YES
002 T0569B5M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0098
DESCRIPTION: PROBABILITY/STATISTICS-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569C5 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569C5Y (01) 0 YES
002 T0569C5M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0099
DESCRIPTION: COLLEGE ALGEBRA- 1+COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T056906 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T056906Y (01) 0 YES
002 T056906M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0100

```
DESCRIPTION:                 COLLEGE ALGEBRA-PART COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569A6                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T0569A6Y (01          ) 0                                  YES
002 T0569A6M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0101
DESCRIPTION:                 COLLEGE ALGEBRA-SEMINAR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569B6                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T0569B6Y (01          ) 0                                  YES
002 T0569B6M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0102
DESCRIPTION:                 COLLEGE ALGEBRA-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569C6                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T0569C6Y (01          ) 0                                  YES
002 T0569C6M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0103
DESCRIPTION:                 CALCULUS- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056907                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T056907Y (01          ) 0                                  YES
002 T056907M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0104
DESCRIPTION:                 CALCULUS-PART COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569A7                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T0569A7Y (01          ) 0                                  YES
002 T0569A7M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0105
DESCRIPTION:                 CALCULUS-SEMINAR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569B7                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T0569B7Y (01          ) 0                                  YES
002 T0569B7M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0106
DESCRIPTION:                 CALCULUS-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569C7                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T0569C7Y (01          ) 0                                  YES
002 T0569C7M (M           ) 1                                  MISSING


CONDITIONING VARIABLE ID:  TCHR0107
DESCRIPTION:                 ABSTRACT/LINEAR ALGEBRA- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056908                           TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:            CLASS                             NUMBER OF INDEPENDENT CONTRASTS:         1

001 T056908Y (01          ) 0                                  YES
002 T056908M (M           ) 1                                  MISSING
```

CONDITIONING VARIABLE ID: TCHR0108
DESCRIPTION: ABSTRACT/LINEAR ALGEBRA-PART COLLEGE COURSE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569A8 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569A8Y (01) 0 YES
002 T0569A8M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0109
DESCRIPTION: ABSTRACT/LINEAR ALGEBRA-SEMINAR
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569B8 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569B8Y (01) 0 YES
002 T0569B8M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0110
DESCRIPTION: ABSTRACT/LINEAR ALGEBRA-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T0569C8 TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 1

001 T0569C8Y (01) 0 YES
002 T0569C8M (M) 1 MISSING

CONDITIONING VARIABLE ID: TCHR0111
DESCRIPTION: EVER STUDIED ESTIMATION?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057001 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 T057001Y (01) 00 YES
002 T057001N (02) 10 NO
003 T057001M (M) 01 MISSING

CONDITIONING VARIABLE ID: TCHR0112
DESCRIPTION: EVER STUDIED PROBLEM SOLVING IN MATH?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057002 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 T057002Y (01) 00 YES
002 T057002N (02) 10 NO
003 T057002M (M) 01 MISSING

CONDITIONING VARIABLE ID: TCHR0113
DESCRIPTION: EVER STUDIED USE OF MANIPULATIVES?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057003 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 T057003Y (01) 00 YES
002 T057003N (02) 10 NO
003 T057003M (M) 01 MISSING

CONDITIONING VARIABLE ID: TCHR0114
DESCRIPTION: EVER STUDIED USE OF CALCULATORS IN MATH INSTRC?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057004 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 T057004Y (01) 00 YES
002 T057004N (02) 10 NO
003 T057004M (M) 01 MISSING

CONDITIONING VARIABLE ID: TCHR0115
DESCRIPTION: EVER STUDIED UNDERSTANDING STU'S MATH THINKING?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057005 TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS NUMBER OF INDEPENDENT CONTRASTS: 2

001 T057005Y (01	) 00	YES	
002 T057005N (02	) 10	NO	
003 T057005M (M	) 01	MISSING	

CONDITIONING VARIABLE ID:	TCHR0116		
DESCRIPTION:	EVER STUDIED GENDER ISSUES IN TEACHING MATH?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057006	TOTAL NUMBER OF SPECIFIED CONTRASTS:	3
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	2

001 T057006Y (01	) 00	YES	
002 T057006N (02	) 10	NO	
003 T057006M (M	) 01	MISSING	

CONDITIONING VARIABLE ID:	TCHR0117		
DESCRIPTION:	EVER STUDIED TEACHING STUDS OF DIFF CULTURES?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057007	TOTAL NUMBER OF SPECIFIED CONTRASTS:	3
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	2

001 T057007Y (01	) 00	YES	
002 T057007N (02	) 10	NO	
003 T057007M (M	) 01	MISSING	

CONDITIONING VARIABLE ID:	TCHR0118		
DESCRIPTION:	KNOWLEDGE OF NCTM CURR & EVAL STANDARDS FOR MATH?		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057101	TOTAL NUMBER OF SPECIFIED CONTRASTS:	5
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	4

001 T057101A (01	) 0000	VERY KNOWLEDGEABLE	
002 T057101B (02	) 1000	KNOWLEDGEABLE	
003 T057101C (03	) 0100	SOMEWHAT KNOWLEDGEAB	
004 T057101D (04	) 0010	LITTLE/NO KNOWLEDGE	
005 T057101M (M	) 0001	MISSING	

CONDITIONING VARIABLE ID:	TCHR0119		
DESCRIPTION:	PRO ACTVTS-STRATEGIES LOCAL WORKSHOPS		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057201	TOTAL NUMBER OF SPECIFIED CONTRASTS:	2
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	1

001 T057201Y (01	) 0	YES	
002 T057201M (M	) 1	MISSING	

CONDITIONING VARIABLE ID:	TCHR0120		
DESCRIPTION:	PRO ACTVTS-STRATEGIES REGIONAL NCTM MEETING		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057211	TOTAL NUMBER OF SPECIFIED CONTRASTS:	2
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	1

001 T057211Y (01	) 0	YES	
002 T057211M (M	) 1	MISSING	

CONDITIONING VARIABLE ID:	TCHR0121		
DESCRIPTION:	PRO ACTVTS-STRATEGIES NATIONAL NCTM MEETING		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057221	TOTAL NUMBER OF SPECIFIED CONTRASTS:	2
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	1

001 T057221Y (01	) 0	YES	
002 T057221M (M	) 1	MISSING	

CONDITIONING VARIABLE ID:	TCHR0122		
DESCRIPTION:	PRO ACTVTS-STRATEGIES OTHER		
GRADES/ASSESSMENTS:	N04, S04, N08, S08		
CONDITIONING VAR LABEL:			
NAEP ID:	T057231	TOTAL NUMBER OF SPECIFIED CONTRASTS:	2
TYPE OF CONTRAST:	CLASS	NUMBER OF INDEPENDENT CONTRASTS:	1

001 T057231Y (01	) 0	YES	
002 T057231M (M	) 1	MISSING	

CONDITIONING VARIABLE ID: TCHR0123
DESCRIPTION: PRO ACTVTS-STRATEGIES NO
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057241 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 2
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 1

001	T057241Y (01	) 0	YES
002	T057241M (M	) 1	MISSING

CONDITIONING VARIABLE ID: TCHR0124
DESCRIPTION: YRS TOTAL TAUGHT MATH
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T063001 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 5

001	T063001A (01	) 00000	2 YEARS OR LESS
002	T063001B (02	) 10000	3-5 YEARS
003	T063001C (03	) 01000	6-10 YEARS
004	T063001D (04	) 00100	11-24 YEARS
005	T063001E (05	) 00010	25 YEARS OR MORE
006	T063001M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: TCHR0125
DESCRIPTION: CURRICULUM SPECIALIST TO HELP/ADVISE IN MATH?
GRADES/ASSESSMENTS: N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T058301 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 2

001	T058301Y (01	) 00	YES
002	T058301N (02	) 10	NO
003	T058301M (M	) 01	MISSING

CONDITIONING VARIABLE ID: TSUB0001
DESCRIPTION: IMPORTANCE W/ STUDS-APPLYING MATH IDEAS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057301 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 4

001	T057301A (01	) 0000	VERY IMPORTANT
002	T057301B (02	) 1000	SOMEWHAT IMPORTANT
003	T057301C (03	) 0100	NOT VERY IMPORTANT
004	T057301D (04	) 0010	NOT IMPORTANT
005	T057301M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0002
DESCRIPTION: IMPORTANCE W/ STUDS-PROB SOLVING=GOAL & CONCEPT?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057302 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 4

001	T057302A (01	) 0000	VERY IMPORTANT
002	T057302B (02	) 1000	SOMEWHAT IMPORTANT
003	T057302C (03	) 0100	NOT VERY IMPORTANT
004	T057302D (04	) 0010	NOT IMPORTANT
005	T057302M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0003
DESCRIPTION: IMPORTANCE W/ STUDS-? TECHS PROMOTE STUD TALK?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057303 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 4

001	T057303A (01	) 0000	VERY IMPORTANT
002	T057303B (02	) 1000	SOMEWHAT IMPORTANT
003	T057303C (03	) 0100	NOT VERY IMPORTANT
004	T057303D (04	) 0010	NOT IMPORTANT
005	T057303M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0004
DESCRIPTION: IMPORTANCE W/ STUDS-USE RESULTS TO INFORM DECISION
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057304 | TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS | NUMBER OF INDEPENDENT CONTRASTS: 4

```
001 T057304A (01          ) 0000                          VERY IMPORTANT
002 T057304B (02          ) 1000                          SOMEWHAT IMPORTANT
003 T057304C (03          ) 0100                          NOT VERY IMPORTANT
004 T057304D (04          ) 0010                          NOT IMPORTANT
005 T057304M (M           ) 0001                          MISSING


CONDITIONING VARIABLE ID:  TSUB0005
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE MULT CHOICE TESTS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057401                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          4

001 T057401A (01          ) 0000                          ONCE OR TWICE A WEEK
002 T057401B (02          ) 1000                          ONCE OR TWICE MONTH
003 T057401C (03          ) 0100                          ONCE OR TWICE A YEAR
004 T057401D (04          ) 0010                          NEVER/HARDLY EVER
005 T057401M (M           ) 0001                          MISSING


CONDITIONING VARIABLE ID:  TSUB0006
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE PROBLEM SETS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057402                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          4

001 T057402A (01          ) 0000                          ONCE OR TWICE A WEEK
002 T057402B (02          ) 1000                          ONCE OR TWICE MONTH
003 T057402C (03          ) 0100                          ONCE OR TWICE A YEAR
004 T057402D (04          ) 0010                          NEVER/HARDLY EVER
005 T057402M (M           ) 0001                          MISSING


CONDITIONING VARIABLE ID:  TSUB0007
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE SHORT WRITTEN RSP
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057403                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          4

001 T057403A (01          ) 0000                          ONCE OR TWICE A WEEK
002 T057403B (02          ) 1000                          ONCE OR TWICE MONTH
003 T057403C (03          ) 0100                          ONCE OR TWICE A YEAR
004 T057403D (04          ) 0010                          NEVER/HARDLY EVER
005 T057403M (M           ) 0001                          MISSING


CONDITIONING VARIABLE ID:  TSUB0008
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE INDV/GROUP PRJCTS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057404                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          4

001 T057404A (01          ) 0000                          ONCE OR TWICE A WEEK
002 T057404B (02          ) 1000                          ONCE OR TWICE MONTH
003 T057404C (03          ) 0100                          ONCE OR TWICE A YEAR
004 T057404D (04          ) 0010                          NEVER/HARDLY EVER
005 T057404M (M           ) 0001                          MISSING


CONDITIONING VARIABLE ID:  TSUB0009
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE PORTFOLIOS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057405                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          4

001 T057405A (01          ) 0000                          ONCE OR TWICE A WEEK
002 T057405B (02          ) 1000                          ONCE OR TWICE MONTH
003 T057405C (03          ) 0100                          ONCE OR TWICE A YEAR
004 T057405D (04          ) 0010                          NEVER/HARDLY EVER
005 T057405M (M           ) 0001                          MISSING


CONDITIONING VARIABLE ID:  TSUB0010
DESCRIPTION:               BEST DESCRIPTION OF COMPUTER AVAILABLITY IN MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057501                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      [illegible]
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          6

001 T057501A (01          ) 000000                        NONE AVAILABLE
002 T057501B (02          ) 100000                        ONE IN CLASS
```

BEST COPY AVAILABLE

003 T057501C (03	) 010000	2 OR 3 IN CLASS
004 T057501D (04	) 001000	4 OR MORE IN CLASS
005 T057501E (05	) 000100	DIFFICULT TO ACCESS
006 T057501F (06	) 000010	EASY TO ACCESS
007 T057501M (M	) 000001	MISSING

CONDITIONING VARIABLE ID: TSUB0011
DESCRIPTION: PRIMARY USE OF COMPUTERS FOR MATH INSTRUCTION?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057601 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 T057601A (01	) 00000	DRILL AND PRACTICE
002 T057601B (02	) 10000	DEMO OF NEW TOPICS
003 T057601C (03	) 01000	PLAYING MATH GAMES
004 T057601D (04	) 00100	STIMULATIONS/APPS
005 T057601E (05	) 00010	DO NOT USE COMPUTERS
006 T057601M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: TSUB0012
DESCRIPTION: ARE STUDENTS ASSIGNED TO THIS CLASS BY ABILITY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044002 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001 T044002Y (01	) 00	YES
002 T044002N (02	) 10	NO
003 T044002M (M	) 01	MISSING

CONDITIONING VARIABLE ID: TSUB0013
DESCRIPTION: IF ASSIGNED BY ABILITY, WHAT BASIS ASSIGNED?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057701 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001 T057701A (01	) 0000	NOT BY ABILITY
002 T057701B (02	) 1000	BY READING ABILITY
003 T057701C (03	) 0100	BY MATH ABILITY
004 T057701D (04	) 0010	BY GENERAL ABILITY
005 T057701M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0014
DESCRIPTION: IF ASSIGNED BY ABILITY, WHAT IS MATH ABILITY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057801 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 5

001 T057801A (01	) 00000	NOT BY ABILITY
002 T057801B (02	) 10000	HIGH ABILITY
003 T057801C (03	) 01000	AVERAGE ABILITY
004 T057801D (04	) 00100	LOW ABILITY
005 T057801E (05	) 00010	MIXED ABILITY
006 T057801M (M	) 00001	MISSING

CONDITIONING VARIABLE ID: TSUB0015
DESCRIPTION: CREATE GROUPS IN CLASS FOR MATH ON ABILITY BASIS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044201 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 3
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 2

001 T044201Y (01	) 00	YES
002 T044201N (02	) 10	NO
003 T044201M (M	) 01	MISSING

CONDITIONING VARIABLE ID: TSUB0016
DESCRIPTION: TIME/WEEK ON MATH INSTRUTION?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044301 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 4
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 3

001 T044301A (01	) 000	2 1/2 HOURS OR LESS
002 T044301B (02	) 100	> 2 1/2 HRS-< 4 HRS
003 T044301C (03	) 010	4 HRS OR MORE
004 T044301M (M	) 001	MISSING

CONDITIONING VARIABLE ID: TSUB0017
DESCRIPTION: HOW MUCH TIME PER WEEK STUDS DO MATH W/ PARTNER?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T057901 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001	T057901A (01	) 0000	NONE
002	T057901B (02	) 1000	LESS THAN 1/2 HOUR
003	T057901C (03	) 0100	1/2-1 HOUR
004	T057901D (04	) 0010	MORE THAN 1 HOUR
005	T057901M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0018
DESCRIPTION: AMOUNT MATH HOMEWORK ASSIGN/DAY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044401 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 7
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 6

001	T044401A (01	) 000000	NONE
002	T044401B (02	) 100000	15 MINUTES
003	T044401C (03	) 010000	30 MINUTES
004	T044401D (04	) 001000	45 MINUTES
005	T044401E (05	) 000100	ONE HOUR
006	T044401F (06	) 000010	MORE THAN ONE HOUR
007	T044401M (M	) 000001	MISSING

CONDITIONING VARIABLE ID: TSUB0019
DESCRIPTION: HOW OFTEN DO STUDENTS DO MATH FROM TEXTBOOKS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044501 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044501A (01	) 0000	ALMOST EVERY DAY
002	T044501B (02	) 1000	ONCE OR TWICE A WEEK
003	T044501C (03	) 0100	ONCE OR TWICE MONTH
004	T044501D (04	) 0010	NEVER OR HARDLY EVER
005	T044501M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0020
DESCRIPTION: HOW OFTEN DO STUDENTS DO MATH ON WORKSHEETS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044502 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044502A (01	) 0000	ALMOST EVERY DAY
002	T044502B (02	) 1000	ONCE OR TWICE A WEEK
003	T044502C (03	) 0100	ONCE OR TWICE MONTH
004	T044502D (04	) 0010	NEVER OR HARDLY EVER
005	T044502M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0021
DESCRIPTION: HOW OFTEN DO STUDENTS SOLVE PROBS W/ OTHER STUDS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044512 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044512A (01	) 0000	ALMOST EVERY DAY
002	T044512B (02	) 1000	ONCE OR TWICE A WEEK
003	T044512C (03	) 0100	ONCE OR TWICE MONTH
004	T044512D (04	) 0010	NEVER OR HARDLY EVER
005	T044512M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0022
DESCRIPTION: HOW OFTEN DO STUDENTS WORK W/ OBJECTS LIKE RULERS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044513 — TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
TYPE OF CONTRAST: CLASS — NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044513A (01	) 0000	ALMOST EVERY DAY
002	T044513B (02	) 1000	ONCE OR TWICE A WEEK
003	T044513C (03	) 0100	ONCE OR TWICE MONTH
004	T044513D (04	) 0010	NEVER OR HARDLY EVER
005	T044513M (M	) 0001	MISSING

```
CONDITIONING VARIABLE ID:  TSUB0023
DESCRIPTION:               HOW OFTEN WORK W/ COUNTING BLOCKS.GEOMETRIC SHAPES
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044514                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044514A (01         ) 0000                   ALMOST EVERY DAY
002 T044514B (02         ) 1000                   ONCE OR TWICE A WEEK
003 T044514C (03         ) 0100                   ONCE OR TWICE MONTH
004 T044514D (04         ) 0010                   NEVER OR HARDLY EVER
005 T044514M (M          ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0024
DESCRIPTION:               HOW OFTEN DO STUDENTS USE A CALCULATOR?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044505                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044505A (01         ) 0000                   ALMOST EVERY DAY
002 T044505B (02         ) 1000                   ONCE OR TWICE A WEEK
003 T044505C (03         ) 0100                   ONCE OR TWICE MONTH
004 T044505D (04         ) 0010                   NEVEP OR HARDLY EVER
005 T044505M (M          ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0025
DESCRIPTION:               HOW OFTEN DO STUDENTS TAKE MATH TESTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044515                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044515A (01         ) 0000                   ALMOST EVERY DAY
002 T044515B (02         ) 1000                   ONCE OR TWICE A WEEK
003 T044515C (03         ) 0100                   ONCE OR TWICE MONTH
004 T044515D (04         ) 0010                   NEVER OR HARDLY EVER
005 T044515M (M          ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0026
DESCRIPTION:               HOW OFTEN DO STUDENTS WRITE ABOUT PROBLEM-SOLVING?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:    -
NAEP ID:                   T044507                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044507A (01         ) 0000                   ALMOST EVERY DAY
002 T044507B (02         ) 1000                   ONCE OR TWICE A WEEK
003 T044507C (03         ) 0100                   ONCE OR TWICE MONTH
004 T044507D (04         ) 0010                   NEVER OR HARDLY EVER
005 T044507M (M          ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0027
DESCRIPTION:               HOW OFTEN DO STUDENTS TALK ABOUT MATH WORK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044516                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044516A (01         ) 0000                   ALMOST EVERY DAY
002 T044516B (02         ) 1000                   ONCE OR TWICE A WEEK
003 T044516C (03         ) 0100                   ONCE OR TWICE MONTH
004 T044516D (04         ) 0010                   NEVER OR HARDLY EVER
005 T044516M (M          ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0028
DESCRIPTION:               HOW OFTEN DO STUDENTS WRITE REPORTS/DO PROJECTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044508                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044508A (01         ) 0000                   ALMOST EVERY DAY
002 T044508B (02         ) 1000                   ONCE OR TWICE A WEEK
003 T044508C (03         ) 0100                   ONCE OR TWICE MONTH
004 T044508D (04         ) 0010                   NEVER OR HARDLY EVER
005 T044508M (M          ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0029
DESCRIPTION:               HOW OFTEN DO STUDENTS DISCUSS MATH W/OTHER STDNTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
```

CONDITIONING VAR LABEL:
NAEP ID: T044509
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044509A (01	) 0000	ALMOST EVERY DAY
002	T044509B (02	) 1000	ONCE OR TWICE A WEEK
003	T044509C (03	) 0100	ONCE OR TWICE MONTH
004	T044509D (04	) 0010	NEVER OR HARDLY EVER
005	T044509M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0030
DESCRIPTION: HOW OFTEN DO STUDENTS WORK REAL-LIFE MATH PRBLMS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044510
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044510A (01	) 0000	ALMOST EVERY DAY
002	T044510B (02	) 1000	ONCE OR TWICE A WEEK
003	T044510C (03	) 0100	ONCE OR TWICE MONTH
004	T044510D (04	) 0010	NEVER OR HARDLY EVER
005	T044510M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0031
DESCRIPTION: HOW OFTEN DO STUDENTS USE A COMPUTER?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044506
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001	T044506A (01	) 0000	ALMOST EVERY DAY
002	T044506B (02	) 1000	ONCE OR TWICE A WEEK
003	T044506C (03	) 0100	ONCE OR TWICE MONTH
004	T044506D (04	) 0010	NEVER OR HARDLY EVER
005	T044506M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0032
DESCRIPTION: IN MATH CLASS HOW OFTEN ADDRESS-NUMBERS & OPS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T058001
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001	T058001A (01	) 0000	A LOT
002	T058001B (02	) 1000	SOME
003	T058001C (03	) 0100	A LITTLE
004	T058001D (04	) 0010	NONE
005	T058001M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0033
DESCRIPTION: IN MATH CLASS HOW OFTEN ADDRESS-MEASUREMENT?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T058002
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001	T058002A (01	) 0000	A LOT
002	T058002B (02	) 1000	SOME
003	T058002C (03	) 0100	A LITTLE
004	T058002D (04	) 0010	NONE
005	T058002M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0034
DESCRIPTION: IN MATH CLASS HOW OFTEN ADDRESS-GEOMETRY?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T058003
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

001	T058003A (01	) 0000	A LOT
002	T058003B (02	) 1000	SOME
003	T058003C (03	) 0100	A LITTLE
004	T058003D (04	) 0010	NONE
005	T058003M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0035
DESCRIPTION: IN MATH CLASS HOW OFTEN ADDRESS DATA ANALYSIS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T058004
TYPE OF CONTRAST: CLASS

TOTAL NUMBER OF SPECIFIED CONTRASTS: 5
NUMBER OF INDEPENDENT CONTRASTS: 4

```
001 T058004A (01          ) 0000                              A LOT
002 T058004B (02          ) 1000                              SOME
003 T058004C (03          ) 0100                              A LITTLE
004 T058004D (04          ) 0010                              NONE
005 T058004M (M           ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TSUB0036
DESCRIPTION:               IN MATH CLASS HOW OFTEN ADDRESS-ALGEBRA & FUNCT?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058005                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058005A (01          ) 0000                              A LOT
002 T058005B (02          ) 1000                              SOME
003 T058005C (03          ) 0100                              A LITTLE
004 T058005D (04          ) 0010                              NONE
005 T058005M (M           ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TSUB0037
DESCRIPTION:               IN MATH HOW OFTEN ADDRESS-LRN MATH FACTS/CONCEPTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058006                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058006A (01          ) 0000                              A LOT
002 T058006B (02          ) 1000                              SOME
003 T058006C (03          ) 0100                              A LITTLE
004 T058006D (04          ) 0010                              NONE
005 T058006M (M           ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TSUB0038
DESCRIPTION:               IN MATH HOW OFTEN ADDRESS-LRN SKILLS/PROCEDURES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058007                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058007A (01          ) 0000                              A LOT
002 T058007B (02          ) 1000                              SOME
003 T058007C (03          ) 0100                              A LITTLE
004 T058007D (04          ) 0010                              NONE
005 T058007M (M           ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TSUB0039
DESCRIPTION:               IN MATH HOW OFTEN ADDRESS-DEVELOP REASONING ABLTY?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058008                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058008A (01          ) 0000                              A LOT
002 T058008B (02          ) 1000                              SOME
003 T058008C (03          ) 0100                              A LITTLE
004 T058008D (04          ) 0010                              NONE
005 T058008M (M           ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TSUB0040
DESCRIPTION:               IN MATH HOW OFTEN ADDRESS-LRN TO COMMUNICATE MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058009                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058009A (01          ) 0000                              A LOT
002 T058009B (02          ) 1000                              SOME
003 T058009C (03          ) 0100                              A LITTLE
004 T058009D (04          ) 0010                              NONE
005 T058009M (M           ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TSUB0041
DESCRIPTION:               DO YOU PERMIT UNRESTRICTED USE OF CALCULATORS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T045401                            TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:        2

001 T045401Y (01          ) 00                                YES
002 T045401N (02          ) 10                                NO
```

```
003 T045401M (M          ) 01                                    MISSING


CONDITIONING VARIABLE ID:  TSUB0042
DESCRIPTION:               DO YOU PERMIT USE OF CALCULATORS ON TESTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044801                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS.        2

001 T044801Y (01          ) 00                                   YES
002 T044801N (02          ) 10                                   NO
003 T044801M (M           ) 01                                   MISSING


CONDITIONING VARIABLE ID:  TSUB0043
DESCRIPTION:               STUDENTS HAVE ACCESS TO SCHL-OWNED CALCULATORS?
GRADES/ASSESSMENTS.        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T045001                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 T045001Y (01          ) 00                                   YES
002 T045001N (02          ) 10                                   NO
003 T045001M (M           ) 01                                   MISSING


CONDITIONING VARIABLE ID:  TSUB0044
DESCRIPTION:               DO YOU PROVIDE INSTRUCTION IN USE OF CALCULATORS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044901                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 T044901Y (01          ) 00                                   YES
002 T044901N (02          ) 10                                   NO
003 T044901M (M           ) 01                                   MISSING


CONDITIONING VARIABLE ID:  TSUB0045
DESCRIPTION:               HOW PREPARED TO TEACH MATH CONCEPTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T045304                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T045304A (01          ) 0000                                 VERY WELL PREPARED
002 T045304B (02          ) 1000                                 MODERATELY PREPARED
003 T045304C (03          ) 0100                                 NOT VERY PREPARED
004 T045304D (04          ) 0010                                 NOT AT ALL PREPARED
005 T045304M (M           ) 0001                                 MISSING


CONDITIONING VARIABLE ID:  TSUB0046
DESCRIPTION:               HOW PREPARED TO TEACH MATH PROCEDURES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T045305                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T045305A (01          ) 0000                                 VERY WELL PREPARED
002 T045305B (02          ) 1000                                 MODERATELY PREPARED
003 T045305C (03          ) 0100                                 NOT VERY PREPARED
004 T045305D (04          ) 0010                                 NOT AT ALL PREPARED
005 T045305M (M           ) 0001                                 MISSING


CONDITIONING VARIABLE ID:  TSUB0047
DESCRIPTION:               HOW PREPARED TO TEACH USE OF COMPUTERS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T045302                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T045302A (01          ) 0000                                 VERY WELL PREPARED
002 T045302B (02          ) 1000                                 MODERATELY PREPARED
003 T045302C (03          ) 0100                                 NOT VERY PREPARED
004 T045302D (04          ) 0010                                 NOT AT ALL PREPARED
005 T045302M (M           ) 0001                                 MISSING


CONDITIONING VARIABLE ID:  TSUB0048
DESCRIPTION:               HOW PREPARED TO TEACH USE OF CALCULATORS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T045303                               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                                 NUMBER OF INDEPENDENT CONTRASTS:        4
```

001 T045303A (01	) 0000	VERY WELL PREPARED
002 T045303B (02	) 1000	MODERATELY PREPARED
003 T045303C (03	) 0100	NOT VERY PREPARED
004 T045303D (04	) 0010	NOT AT ALL PREPARED
005 T045303M (M	) 0001	MISSING

CONDITIONING VARIABLE ID: TSUB0049
DESCRIPTION: NUMBER OF STUDENTS IN CLASS?
GRADES/ASSESSMENTS: N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID: T044000
TOTAL NUMBER OF SPECIFIED CONTRASTS: 6
TYPE OF CONTRAST: CLASS
NUMBER OF INDEPENDENT CONTRASTS: 5

001 T044000A (01	) 00000	1-20 STUDENTS
002 T044000B (02	) 10000	21-25 STUDENTS
003 T044000C (03	) 01000	26-30 STUDENTS
004 T044000D (04	) 00100	31-35 STUDENTS
005 T044000E (05	) 00010	36 OR MORE STUDENTS
006 T044000M (M	) 00001	MISSING

Appendix D

IRT PARAMETERS FOR MATHEMATICS ITEMS

This appendix contains 10 tables of IRT (item response theory) parameters for the items that were used in each mathematics scale for the fourth- and eighth-grade State Assessments.

For each of the binary scored items used in scaling (i.e., multiple-choice items and short constructed-response items), the tables provide estimates of the IRT parameters (which correspond to a_j, b_j, and c_j in Equation 8.1 in Chapter 8) and their associated standard errors (s.e.) of the estimates. For each of the polytomously scored items (i.e., the extended constructed-response items and the testlets), the tables also show the estimates of the d_{jv} parameters (see Equation 8.1) and their associated standard errors.

The tables also show the block in which each item appears for each grade (*Block*) and the position of each item within its block (*Item*).

Note that because the item parameters in this appendix are in the metrics used for the original calibration of the scales, the grade 4 and grade 8 parameters are shown in different metrics. The transformations needed to represent these parameters in terms of the metric of the final reporting scales are given in Chapter 9.

Table D-1
IRT Parameters for Mathematics Items
Number Sense, Properties, and Operations Scale, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
M010131	MH	2A	0.341 (0.024)	-2.982 (0.271)	0.185 (0.055)				
M010231	MH	3A	0.530 (0.031)	-0.740 (0.136)	0.173 (0.043)				
M010431	MH	5A	0.675 (0.042)	0.028 (0.082)	0.185 (0.029)				
M010531	MH	6A	0.419 (0.048)	1.736 (0.112)	0.133 (0.027)				
M010631	MH	7A	0.287 (0.017)	-2.127 (0.132)	0.000 (0.000)				
M010831	MH	9A	1.012 (0.047)	0.087 (0.040)	0.152 (0.018)				
M011131	MH	13A	0.741 (0.043)	-0.074 (0.075)	0.189 (0.028)				
M017401	MD	1	0.396 (0.025)	-2.590 (0.218)	0.181 (0.053)				
M017701	MD	4	0.782 (0.039)	0.388 (0.044)	0.102 (0.017)				
M017901	MD	6	1.067 (0.044)	0.478 (0.027)	0.069 (0.011)				
M018201	MD	9	0.890 (0.061)	1.348 (0.043)	0.127 (0.011)				
M018401	MD	11	1.373 (0.082)	0.911 (0.029)	0.233 (0.010)				
M018501	MD	12	1.833 (0.158)	2.478 (0.095)	0.248 (0.006)				
M018601	MD	13	0.715 (0.086)	2.243 (0.114)	0.144 (0.012)				
M020001	MF	4A	1.130 (0.029)	-0.217 (0.017)	0.000 (0.000)				
M020101	MF	5A	0.888 (0.030)	1.295 (0.033)	0.000 (0.000)				
M020501	MF	9A	0.647 (0.023)	1.053 (0.037)	0.000 (0.000)				
M039001	MC	1	0.812 (0.037)	-1.495 (0.089)	0.162 (0.042)				
M039201	MC	3A	0.773 (0.022)	-0.138 (0.023)	0.000 (0.000)				
M039901	MC	10	0.749 (0.064)	1.755 (0.066)	0.126 (0.011)				
M040201	MC	13A	0.973 (0.040)	1.779 (0.047)	0.000 (0.000)				
M040301	MI	1A	0.655 (0.020)	0.156 (0.026)	0.000 (0.000)				
M040701	MI	5	0.792 (0.058)	0.740 (0.059)	0.271 (0.019)				
M040901	MI	7A	1.389 (0.036)	0.375 (0.015)	0.000 (0.000)				
M042601	MM	1	1.007 (0.051)	-0.344 (0.058)	0.241 (0.026)				
M042901	MM	4	0.542 (0.046)	0.853 (0.090)	0.168 (0.028)				
M043001	MM	5	0.675 (0.038)	-0.938 (0.120)	0.215 (0.045)				
M043301	MM	8A	0.667 (0.022)	0.833 (0.032)	0.000 (0.000)				
M046001	MK	1A	0.571 (0.020)	-0.975 (0.039)	0.000 (0.000)				
M046301	MK	4	1.047 (0.055)	0.614 (0.034)	0.163 (0.013)				
M046501	MK	6	0.801 (0.080)	1.462 (0.063)	0.298 (0.015)				
M046801	MK	9A	1.006 (0.029)	0.736 (0.021)	0.000 (0.000)				
M046901	MK	10A	0.958 (0.026)	0.372 (0.020)	0.000 (0.000)				
M047501	MK	16	0.464 (0.028)	-0.876 (0.151)	0.164 (0.044)				
M066101	ME	2	0.691 (0.034)	-0.904 (0.096)	0.166 (0.038)				
M066401	ME	5	0.678 (0.054)	1.262 (0.056)	0.148 (0.017)				
M066701	ME	8A	0.657 (0.015)	-0.170 (0.017)	0.000 (0.000)	-0.102 (0.034)	0.102 (0.032)		
M066801	ME	9A	0.410 (0.008)	0.088 (0.023)	0.000 (0.000)	-2.625 (0.083)	2.625 (0.083)		
M067801	MG	3	1.239 (0.069)	1.046 (0.028)	0.143 (0.009)				
M068001	MG	5A	0.665 (0.022)	0.723 (0.030)	0.000 (0.000)				
M068002	MG	6A	0.647 (0.015)	0.599 (0.019)	0.000 (0.000)	-0.078 (0.032)	0.078 (0.036)		
M068301	ML	1A	1.135 (0.050)	-0.092 (0.037)	0.173 (0.017)				
M068401	ML	2A	0.743 (0.044)	0.239 (0.062)	0.168 (0.023)				

Table D-1 (continued)

IRT Parameters for Mathematics Items

Number Sense, Properties, and Operations Scale, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
M068501	ML	3A	1.036 (0.055)	0.546 (0.035)	0.173 (0.014)				
M068701	ML	5A	0.465 (0.014)	-1.254 (0.034)	0.000 (0.000)	0.950 (0.058)	-0.950 (0.037)		
M068801	ML	6A	1.611 (0.092)	0.776 (0.026)	0.257 (0.010)				
M068901	ML	7A	0.707 (0.019)	1.097 (0.023)	0.000 (0.000)	-0.068 (0.031)	0.068 (0.041)		
M071901	MN	1A	0.679 (0.044)	0.381 (0.069)	0.167 (0.024)				
M072001	MN	2A	0.550 (0.039)	-0.086 (0.125)	0.197 (0.038)				
M072401	MN	7A	0.712 (0.018)	0.485 (0.017)	0.000 (0.000)	0.219 (0.028)	-0.219 (0.032)		
M072501	MN	8A	0.701 (0.021)	1.550 (0.033)	0.000 (0.000)	-0.190 (0.037)	0.190 (0.054)		
M072601	MN	9A	0.452 (0.013)	1.667 (0.047)	0.000 (0.000)	-1.618 (0.078)	1.618 (0.095)		
M074601	MO	5	0.832 (0.069)	0.919 (0.059)	0.321 (0.018)				
M074701	MO	6A	0.854 (0.024)	-0.358 (0.022)	0.000 (0.000)				
M075001	MO	9A	0.551 (0.013)	1.360 (0.029)	0.000 (0.000)	-1.583 (0.063)	1.583 (0.072)		
M075101	MO	10A	0.512 (0.011)	0.713 (0.019)	0.000 (0.000)	1.931 (0.042)	-0.554 (0.045)	-0.859 (0.067)	-0.518 (0.082)
N202831	MH	12A	0.809 (0.048)	-0.311 (0.083)	0.230 (0.033)				
N240031	MH	14A	1.293 (0.054)	0.308 (0.025)	0.093 (0.011)				
N277903	MF	10A	0.514 (0.022)	-1.508 (0.063)	0.000 (0.000)				

Table D-2

IRT Parameters for Mathematics Items
Measurement Scale, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
M010731	MH	8A	1.121 (0.066)	0.665 (0.038)	0.254 (0.014)				
M010931	MH	10A	0.909 (0.071)	1.297 (0.049)	0.238 (0.013)				
M017501	MD	2	0.713 (0.034)	-1.091 (0.097)	0.162 (0.041)				
M018101	MD	8	1.028 (0.059)	0.816 (0.036)	0.189 (0.013)				
M020301	MF	7A	0.923 (0.029)	1.105 (0.029)	0.000 (0.000)				
M039101	MC	2	0.503 (0.027)	-1.355 (0.142)	0.161 (0.046)				
M039301	MC	4A	0.852 (0.025)	0.731 (0.025)	0.000 (0.000)				
M039401	MC	5	0.718 (0.041)	-0.272 (0.087)	0.196 (0.033)				
M039501	MC	6	0.897 (0.041)	-0.239 (0.051)	0.132 (0.023)				
M039601	MC	7	0.699 (0.046)	0.806 (0.056)	0.148 (0.019)				
M040461	MI	2D	0.446 (0.008)	-1.069 (0.021)	0.000 (0.000)	-0.812 (0.069)	-1.828 (0.099)	2.640 (0.086)	
M040801	MI	6	0.948 (0.071)	1.420 (0.046)	0.190 (0.011)				
M041001	MI	8	1.457 (0.077)	1.192 (0.025)	0.100 (0.007)				
M042701	MM	2	0.944 (0.042)	-1.503 (0.075)	0.151 (0.040)				
M042801	MM	3	0.850 (0.039)	-1.657 (0.089)	0.160 (0.045)				
M047101	MK	12	1.404 (0.082)	1.868 (0.047)	0.190 (0.006)				
M047201	MK	13	0.964 (0.061)	0.962 (0.040)	0.182 (0.013)				
M061906	MJ	6A	0.979 (0.046)	2.294 (0.067)	0.000 (0.000)				
M066001	ME	1	0.734 (0.057)	1.197 (0.056)	0.187 (0.017)				
M067601	MG	1	0.835 (0.059)	1.315 (0.046)	0.148 (0.012)				
M069001	ML	8A	0.557 (0.019)	1.712 (0.039)	0.000 (0.000)	0.912 (0.034)	-0.912 (0.069)		
M072101	MN	3A	0.695 (0.035)	-1.925 (0.124)	0.184 (0.053)				
M074201	MO	1	1.081 (0.044)	0.038 (0.033)	0.104 (0.015)				
M074301	MO	2A	0.824 (0.023)	-0.141 (0.021)	0.000 (0.000)				
M074801	MO	7A	0.731 (0.017)	0.350 (0.016)	0.000 (0.000)	0.067 (0.028)	-0.067 (0.031)		

BEST COPY AVAILABLE

Table D-3

IRT Parameters for Mathematics Items

Geometry and Spatial Sense Scale, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
M011231	MH	15A	1.298 (0.097)	2.119 (0.069)	0.233 (0.007)				
M017601	MD	3	0.369 (0.025)	-0.675 (0.167)	0.291 (0.035)				
M018001	MD	7	0.712 (0.064)	1.545 (0.064)	0.206 (0.016)				
M019801	MF	2A	0.511 (0.026)	2.573 (0.111)	0.000 (0.000)				
M019901	MF	3A	0.617 (0.021)	-0.766 (0.033)	0.000 (0.000)				
M020701	MF	11A	0.520 (0.022)	1.171 (0.051)	0.000 (0.000)				
M039801	MC	9	1.050 (0.104)	1.889 (0.073)	0.358 (0.009)				
M041201	MI	10A	0.374 (0.010)	0.787 (0.026)	0.000 (0.000)	1.296 (0.051)	0.104 (0.053)	-1.400 (0.077)	
M043401	MM	9A	2.322 (0.062)	0.258 (0.011)	0.000 (0.000)				
M043402	MM	10A	1.983 (0.053)	0.449 (0.012)	0.000 (0.000)				
M043403	MM	11A	1.142 (0.049)	2.035 (0.050)	0.000 (0.000)				
M046101	MK	2	0.674 (0.040)	-0.952 (0.134)	0.270 (0.048)				
M046201	MK	3	1.213 (0.065)	0.673 (0.031)	0.204 (0.012)				
M046401	MK	5	0.810 (0.049)	0.374 (0.058)	0.210 (0.021)				
M046701	MK	8	0.596 (0.063)	1.631 (0.082)	0.217 (0.020)				
M047401	MK	15	0.831 (0.044)	-1.907 (0.114)	0.235 (0.054)				
M061901	MJ	1A	0.632 (0.021)	-0.425 (0.029)	0.000 (0.000)				
M061902	MJ	2A	1.469 (0.037)	-0.215 (0.014)	0.000 (0.000)				
M061903	MJ	3A	1.836 (0.049)	-0.545 (0.014)	0.000 (0.000)				
M061904	MJ	4A	0.848 (0.031)	1.669 (0.044)	0.000 (0.000)				
M068003	MG	7A	0.839 (0.029)	1.091 (0.033)	0.000 (0.000)				
M068004	MG	8A	0.197 (0.006)	1.788 (0.059)	0.000 (0.000)	-1.395 (0.117)	1.687 (0.143)	-0.603 (0.173)	0.312 (0.212)
M074501	MO	4A	0.516 (0.015)	0.740 (0.026)	0.000 (0.000)	0.806 (0.034)	-0.806 (0.045)		
M074901	MO	8A	0.589 (0.015)	0.910 (0.025)	0.000 (0.000)	-0.017 (0.034)	0.017 (0.044)		
N214331	MH	1A	0.851 (0.045)	-2.018 (0.117)	0.247 (0.056)				

Table D-4

IRT Parameters for Mathematics Items

Data Analysis, Statistics, and Probability Scale, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
M017801	MD	5	1.048 (0.062)	0.720 (0.035)	0.216 (0.014)				
M020201	MF	6A	0.694 (0.021)	-0.154 (0.025)	0.000 (0.000)				
M040001	MC	11A	1.077 (0.029)	0.258 (0.018)	0.000 (0.000)				
M040101	MC	12	0.621 (0.052)	0.361 (0.100)	0.265 (0.030)				
M040601	MI	4	0.973 (0.044)	-0.111 (0.044)	0.144 (0.019)				
M041101	MI	9	2.468 (0.097)	1.435 (0.026)	0.246 (0.006)				
M043101	MM	6	1.158 (0.070)	0.602 (0.035)	0.263 (0.014)				
M043201	MM	7A	0.648 (0.021)	-0.941 (0.035)	0.000 (0.000)				
M046601	MK	7A	1.281 (0.036)	0.585 (0.016)	0.000 (0.000)				
M047001	MK	11	2.143 (0.085)	1.437 (0.026)	0.152 (0.006)				
M047301	MK	14A	1.258 (0.033)	-0.292 (0.017)	0.000 (0.000)				
M061905	MJ	5A	1.009 (0.031)	0.811 (0.022)	0.000 (0.000)				
M066901	ME	10A	0.315 (0.006)	0.745 (0.021)	0.000 (0.000)	-1.131 (0.073)	-1.734 (0.132)	1.811 (0.140)	1.054 (0.097)
M068601	ML	4A	0.943 (0.054)	0.216 (0.047)	0.218 (0.019)				
MC69101	ML	9A	0.377 (0.008)	1.248 (0.023)	0.000 (0.000)	-2.642 (0.120)	4.269 (0.123)	-0.437 (0.073)	-1.190 (0.114)
M072301	MN	6A	0.633 (0.041)	-0.165 (0.100)	0.202 (0.033)				
N250231	MH	11A	0.899 (0.049)	0.089 (0.051)	0.180 (0.021)				

BEST COPY AVAILABLE

Table D-5

IRT Parameters for Mathematics Items

Algebra and Functions Scale, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
M010331	MH	4A	0.851 (0.060)	0.251 (0.069)	0.333 (0.023)				
M018301	MD	10	1.662 (0.081)	0.845 (0.019)	0.125 (0.008)				
M018701	MD	14	0.903 (0.127)	2.411 (0.146)	0.156 (0.009)				
M019701	MF	1A	0.604 (0.019)	-0.433 (0.030)	0.000 (0.000)				
M020401	MF	8A	0.550 (0.019)	0.171 (0.030)	0.000 (0.000)				
M039701	MC	8	1.130 (0.085)	1.270 (0.038)	0.203 (0.010)				
M040501	MI	3	0.771 (0.048)	-0.141 (0.082)	0.253 (0.029)				
M043501	MM	12A	0.320 (0.010)	1.128 (0.030)	0.000 (0.000)	0.824 (0.060)	-0.313 (0.078)	0.123 (0.095)	-0.635 (0.117)
M066201	ME	3	1.163 (0.056)	0.181 (0.035)	0.197 (0.015)				
M066301	ME	4A	0.374 (0.007)	-0.179 (0.024)	0.000 (0.000)	-2.887 (0.086)	2.887 (0.085)		
M066501	ME	6A	0.808 (0.019)	0.880 (0.017)	0.000 (0.000)	-0.238 (0.028)	0.238 (0.033)		
M066601	ME	7A	0.558 (0.015)	0.848 (0.023)	0.000 (0.000)	-0.043 (0.035)	0.043 (0.042)		
M067701	MG	2	1.092 (0.056)	0.110 (0.042)	0.230 (0.017)				
M067901	MG	4A	0.614 (0.013)	1.164 (0.023)	0.000 (0.000)	-1.594 (0.057)	1.594 (0.063)		
M072201	MN	4A	0.354 (0.009)	-0.548 (0.027)	0.000 (0.000)	-8.308 (0.398)	8.308 (0.397)		
M072202	MN	5A	0.826 (0.019)	0.720 (0.015)	0.000 (0.000)	-0.142 (0.026)	0.142 (0.030)		
M072701	MN	10A	0.299 (0.013)	1.945 (0.075)	0.000 (0.000)	0.091 (0.074)	-0.017 (0.113)	-0.074 (0.160)	
M074401	MO	3	0.897 (0.060)	0.618 (0.046)	0.235 (0.017)				

Table D-6

IRT Parameters for Mathematics Items

Number Sense, Properties, and Operations Scale, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)
M011131	MH	13A	0.625 (0.035)	-1.483 (0.139)	0.210 (0.049)			
M012431	MH	3A	0.855 (0.039)	-0.334 (0.053)	0.115 (0.022)			
M012531	MH	4A	0.813 (0.048)	0.560 (0.044)	0.130 (0.017)			
M012931	MH	8A	1.060 (0.074)	0.917 (0.038)	0.226 (0.013)			
M013431	MH	15A	1.006 (0.052)	0.006 (0.045)	0.156 (0.020)			
M013531	MH	16A	0.939 (0.066)	1.134 (0.041)	0.104 (0.012)			
M013631	MH	17A	1.663 (0.079)	0.649 (0.020)	0.078 (0.008)			
M017401	MD	1	0.274 (0.027)	-4.650 (0.499)	0.231 (0.061)			
M017701	MD	4	1.001 (0.043)	-1.046 (0.059)	0.147 (0.028)			
M017901	MD	6	1.203 (0.050)	-0.897 (0.046)	0.146 (0.024)			
M018201	MD	9	0.599 (0.031)	-0.537 (0.089)	0.131 (0.030)			
M018401	MD	11	1.142 (0.061)	-0.644 (0.062)	0.315 (0.027)			
M018501	MD	12	2.375 (0.123)	0.537 (0.018)	0.245 (0.010)			
M018601	MD	13	0.683 (0.052)	1.004 (0.054)	0.138 (0.018)			
M020001	MF	4A	0.595 (0.021)	-0.389 (0.031)	0.000 (0.000)			
M020101	MF	5A	1.331 (0.036)	-0.496 (0.018)	0.000 (0.000)			
M020501	MF	9A	0.820 (0.024)	-0.367 (0.024)	0.000 (0.000)			
M046001	MK	1A	0.418 (0.021)	-2.490 (0.119)	0.000 (0.000)			
M046301	MK	4	0.943 (0.045)	-1.058 (0.074)	0.197 (0.034)			
M046501	MK	6	0.917 (0.056)	-0.184 (0.070)	0.312 (0.026)			
M046801	MK	9A	0.574 (0.021)	-1.204 (0.047)	0.000 (0.000)			
M046901	MK	10A	0.881 (0.030)	-1.537 (0.040)	0.000 (0.000)			
M049901	MC	1	0.684 (0.036)	-0.443 (0.081)	0.136 (0.030)			
M050001	MC	2	1.333 (0.050)	-0.299 (0.028)	0.092 (0.014)			
M050101	MC	3	0.979 (0.049)	0.333 (0.037)	0.127 (0.016)			
M050301	MC	5	1.263 (0.087)	1.154 (0.032)	0.182 (0.010)			
M051101	MC	13A	0.302 (0.011)	0.755 (0.033)	0.000 (0.000)	0.844 (0.066)	-0.442 (0.077)	-0.402 (0.093)
M051201	MM	1A	0.514 (0.021)	-1.475 (0.061)	0.000 (0.000)			
M051501	MM	4	0.915 (0.087)	1.524 (0.057)	0.198 (0.013)			
M051601	MM	5A	0.839 (0.025)	-0.628 (0.027)	0.000 (0.000)			
M051901	MM	8	1.706 (0.070)	0.638 (0.017)	0.065 (0.007)			
M052401	MI	2A	0.939 (0.030)	0.880 (0.025)	0.000 (0.000)			
M052901	MI	7A	0.754 (0.024)	0.036 (0.024)	0.000 (0.000)			
M053001	MI	8A	0.931 (0.032)	1.042 (0.028)	0.000 (0.000)			
M066401	ME	5	0.771 (0.052)	0.076 (0.077)	0.271 (0.027)			
M067801	MG	3	0.751 (0.038)	-1.334 (0.108)	0.211 (0.043)			
M069201	ML	1A	1.405 (0.084)	0.910 (0.027)	0.191 (0.010)			
M069501	ML	4A	0.621 (0.035)	-0.388 (0.092)	0.138 (0.032)			
M069601	ML	5A	0.775 (0.030)	1.342 (0.042)	0.000 (0.000)			
M069901	ML	8A	0.680 (0.019)	1.230 (0.028)	0.000 (0.000)	-0.514 (0.041)	0.514 (0.052)	
M073001	MN	3A	1.192 (0.054)	0.001 (0.035)	0.169 (0.016)			
M073101	MN	4A	1.071 (0.096)	1.003 (0.049)	0.396 (0.014)			
M073402	MN	7A	2.010 (0.088)	1.489 (0.029)	0.171 (0.006)			

Table D-6 (continued)

IRT Parameters for Mathematics Items

Number Sense, Properties, and Operations Scale, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)
M073601	MN	9B	0.583 (0.014)	1.164 (0.023)	0.000 (0.000)	-0.131 (0.038)	-0.434 (0.064)	0.566 (0.071)
M073602	MN	9A	0.845 (0.102)	1.005 (0.081)	0.471 (0.020)			
M075901	MO	8A	0.549 (0.059)	1.187 (0.086)	0.167 (0.026)			
N202831	MH	12A	0.681 (0.037)	-2.021 (0.143)	0.224 (0.055)			

406

407

Table D-7

IRT Parameters for Mathematics Items
Measurement Scale, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)
M012331	MH	2A	0.750 (0.039)	-1.560 (0.114)	0.208 (0.049)			
M013331	MH	14A	0.885 (0.045)	-1.310 (0.091)	0.200 (0.043)			
M017501	MD	2	0.349 (0.026)	-3.192 (0.274)	0.159 (0.052)			
M018101	MD	8	0.571 (0.030)	-0.546 (0.099)	0.121 (0.034)			
M019101	MD	18	1.344 (0.087)	1.767 (0.049)	0.186 (0.007)			
M019201	MD	19	1.494 (0.083)	1.623 (0.039)	0.156 (0.007)			
M020301	MF	7A	1.066 (0.030)	-0.491 (0.020)	0.000 (0.000)			
M047101	MK	12	1.048 (0.047)	0.149 (0.035)	0.113 (0.016)			
M047201	MK	13	0.767 (0.036)	-0.935 (0.079)	0.132 (0.034)			
M047901	MK	18A	1.074 (0.041)	1.537 (0.037)	0.000 (0.000)			
M050501	MC	7	0.972 (0.076)	0.683 (0.057)	0.383 (0.018)			
M050901	MC	11A	0.978 (0.032)	1.159 (0.029)	0.000 (0.000)			
M051301	MM	2A	0.432 (0.023)	-2.490 (0.121)	0.000 (0.000)			
M052201	MM	11A	0.671 (0.017)	0.947 (0.019)	0.000 (0.000)	0.802 (0.029)	-0.455 (0.042)	-0.348 (0.055)
M052301	MI	1	1.146 (0.066)	0.822 (0.033)	0.190 (0.012)			
M061907	MJ	5A	0.892 (0.028)	0.786 (0.025)	0.000 (0.000)			
M061908	MJ	6A	0.840 (0.041)	2.230 (0.076)	0.000 (0.000)			
M068008	MG	9A	0.406 (0.019)	2.177 (0.080)	0.000 (0.000)	0.448 (0.053)	-0.448 (0.099)	
M069401	ML	3A	1.076 (0.047)	-0.925 (0.055)	0.151 (0.029)			
M069701	ML	6A	0.649 (0.016)	1.158 (0.025)	0.000 (0.000)	-0.384 (0.037)	0.384 (0.047)	
M069801	ML	7A	0.907 (0.057)	1.230 (0.040)	0.088 (0.011)			
M072801	MN	1A	0.592 (0.046)	0.248 (0.107)	0.225 (0.033)			
M073301	MN	6A	1.323 (0.090)	1.381 (0.038)	0.244 (0.009)			
M075201	MO	1A	0.565 (0.042)	-0.330 (0.143)	0.237 (0.043)			
M075401	MO	3A	0.513 (0.014)	0.080 (0.025)	0.000 (0.000)	1.149 (0.039)	-1.149 (0.040)	
M075601	MO	5A	0.473 (0.010)	0.196 (0.021)	0.000 (0.000)	-1.584 (0.059)	1.584 (0.060)	
M076001	MO	9A	0.491 (0.011)	1.371 (0.027)	0.000 (0.000)	-1.987 (0.082)	1.330 (0.102)	0.657 (0.086)

BEST COPY AVAILABLE

Table D-8

IRT Parameters for Mathematics Items
Geometry and Spatial Sense Scale, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)
M012731	MH	6A	0.627 (0.066)	1.737 (0.083)	0.177 (0.018)			
M012831	MH	7A	1.090 (0.055)	0.531 (0.032)	0.135 (0.013)			
M017601	MD	3	0.510 (0.031)	-1.602 (0.174)	0.262 (0.051)			
M018001	MD	7	0.766 (0.047)	-0.239 (0.087)	0.255 (0.032)			
M019001	MD	17	0.758 (0.049)	0.722 (0.053)	0.145 (0.019)			
M019601	MD	21	0.724 (0.060)	1.385 (0.059)	0.128 (0.016)			
M019801	MF	2A	0.781 (0.025)	-0.873 (0.030)	0.000 (0.000)			
M019901	MF	3A	0.635 (0.026)	-1.779 (0.062)	0.000 (0.000)			
M020901	MF	11A	0.611 (0.022)	0.455 (0.031)	0.000 (0.000)			
M021001	MF	12A	0.830 (0.025)	0.004 (0.022)	0.000 (0.000)			
M021301	MF	15A	1.429 (0.040)	-0.350 (0.016)	0.000 (0.000)			
M021302	MF	16A	1.390 (0.040)	-0.457 (0.017)	0.000 (0.000)			
M046101	MK	2	0.664 (0.040)	-2.300 (0.165)	0.265 (0.062)			
M046201	MK	3	1.064 (0.051)	-0.585 (0.055)	0.209 (0.027)			
M046401	MK	5	0.929 (0.051)	-0.847 (0.084)	0.272 (0.037)			
M046701	MK	8	1.191 (0.063)	0.055 (0.041)	0.258 (0.019)			
M048001	MK	19A	1.515 (0.082)	1.419 (0.032)	0.111 (0.006)			
M051001	MC	12A	0.520 (0.023)	1.578 (0.065)	0.000 (0.000)			
M051801	MM	7	1.262 (0.091)	1.604 (0.047)	0.259 (0.009)			
M052001	MM	9	1.132 (0.082)	1.312 (0.040)	0.195 (0.010)			
M052601	MI	4	0.624 (0.043)	0.459 (0.078)	0.154 (0.027)			
M061901	MJ	1A	0.624 (0.024)	-1.467 (0.052)	0.000 (0.000)			
M061902	MJ	4A	1.323 (0.043)	-1.276 (0.027)	0.000 (0.000)			
M061903	MJ	2A	1.273 (0.046)	-1.586 (0.033)	0.000 (0.000)			
M061904	MJ	3A	0.960 (0.028)	0.031 (0.020)	0.000 (0.000)			
M068003	MG	5A	0.530 (0.010)	-0.432 (0.020)	0.000 (0.000)	-2.110 (0.070)	2.110 (0.068)	
M068005	MG	6A	0.479 (0.010)	-0.588 (0.023)	0.000 (0.000)	-1.484 (0.061)	1.484 (0.057)	
M068006	MG	7A	0.414 (0.009)	0.543 (0.025)	0.000 (0.000)	-1.783 (0.066)	1.783 (0.069)	
M068007	MG	8	0.592 (0.038)	0.340 (0.079)	0.119 (0.027)			
M068201	MG	10A	0.338 (0.021)	1.758 (0.111)	0.000 (0.000)			
M075801	MO	7A	0.664 (0.020)	1.109 (0.027)	0.000 (0.000)	0.376 (0.031)	-0.376 (0.045)	

BEST COPY AVAILABLE

Table D-9

IRT Parameters for Mathematics Items

Data Analysis, Statistics, and Probability Scale, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)
M012631	MH	5A	1.689 (0.087)	0.515 (0.025)	0.244 (0.011)			
M013031	MH	9A	1.110 (0.039)	1.317 (0.030)	0.000 (0.000)			
M013131	MH	10A	0.927 (0.033)	1.251 (0.033)	0.000 (0.000)			
M017801	MD	5	0.967 (0.046)	-0.689 (0.064)	0.194 (0.030)			
M018901	MD	16	0.728 (0.083)	1.766 (0.080)	0.186 (0.015)			
M020201	MF	6A	0.432 (0.023)	-2.676 (0.128)	0.000 (0.000)			
M020801	MF	10A	0.768 (0.032)	1.712 (0.053)	0.000 (0.000)			
M021101	MF	13A	1.026 (0.028)	-0.090 (0.019)	0.000 (0.000)			
M046601	MK	7A	1.064 (0.031)	-0.929 (0.025)	0.000 (0.000)			
M047001	MK	11	1.110 (0.049)	-0.019 (0.037)	0.146 (0.017)			
M047301	MK	14A	1.092 (0.041)	-1.805 (0.041)	0.000 (0.000)			
M047801	MK	17	1.205 (0.060)	0.714 (0.027)	0.109 (0.011)			
M050261	MC	4E	0.674 (0.017)	-1.471 (0.030)	0.000 (0.000)	-0.481 (0.055)	0.481 (0.041)	
M050401	MC	6	0.805 (0.046)	-0.221 (0.075)	0.212 (0.029)			
M051401	MM	3	1.026 (0.042)	-0.985 (0.052)	0.113 (0.026)			
M052701	MI	5	1.030 (0.055)	0.467 (0.038)	0.175 (0.015)			
M052801	MI	6	0.378 (0.115)	4.864 (0.959)	0.170 (0.016)			
M053101	MI	9A	0.692 (0.018)	1.146 (0.020)	0.000 (0.000)	0.355 (0.031)	0.087 (0.042)	-0.441 (0.055)
M061905	MJ	7A	0.453 (0.020)	-0.432 (0.043)	0.000 (0.000)			
M067101	ME	2	0.846 (0.041)	-0.165 (0.056)	0.140 (0.023)			
M067501	ME	11A	0.643 (0.018)	1.694 (0.029)	0.000 (0.000)	1.309 (0.028)	-1.309 (0.070)	
M070001	ML	9A	0.296 (0.014)	1.109 (0.055)	0.000 (0.000)	0.597 (0.066)	-0.597 (0.086)	
M072901	MN	2A	0.501 (0.012)	-0.510 (0.023)	0.000 (0.000)	-0.556 (0.048)	0.556 (0.043)	
M0732CL	MN	5F	0.360 (0.011)	-0.274 (0.024)	0.000 (0.000)	1.129 (0.069)	-0.100 (0.058)	-1.028 (0.059)
M073501	MN	8A	0.141 (0.017)	3.460 (0.417)	0.000 (0.000)			

Table D-10

IRT Parameters for Mathematics Items
Algebra and Functions Scale, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)
M012231	MH	1A	0.486 (0.038)	-3.718 (0.271)	0.162 (0.052)			
M013231	MH	11A	1.006 (0.079)	1.578 (0.049)	0.139 (0.010)			
M013731	MH	18A	1.116 (0.087)	1.287 (0.044)	0.142 (0.011)			
M018301	MD	10	0.977 (0.040)	-0.673 (0.048)	0.108 (0.024)			
M018701	MD	14	1.351 (0.070)	0.138 (0.035)	0.256 (0.016)			
M018801	MD	15	0.808 (0.053)	0.467 (0.059)	0.202 (0.022)			
M019301	MD	20	1.143 (0.077)	1.114 (0.038)	0.182 (0.011)			
M019701	MF	1A	0.545 (0.024)	-1.762 (0.070)	0.000 (0.000)			
M020401	MF	8A	0.629 (0.021)	-0.447 (0.030)	0.000 (0.000)			
M021201	MF	14A	0.910 (0.027)	0.265 (0.021)	0.000 (0.000)			
M047601	MK	15	1.337 (0.052)	0.280 (0.023)	0.069 (0.010)			
M047701	MK	16	1.199 (0.094)	1.569 (0.048)	0.258 (0.009)			
M050601	MC	8	1.165 (0.052)	0.501 (0.028)	0.096 (0.011)			
M050701	MC	9	1.318 (0.056)	-0.011 (0.029)	0.128 (0.015)			
M050801	MC	10A	0.837 (0.025)	-0.162 (0.022)	0.000 (0.000)			
M051701	MM	6	1.310 (0.065)	0.447 (0.030)	0.177 (0.013)			
M052101	MM	10A	0.929 (0.027)	0.351 (0.021)	0.000 (0.000)			
M052501	MI	3	1.130 (0.067)	1.015 (0.034)	0.163 (0.011)			
M066201	ME	3	0.938 (0.040)	-1.341 (0.066)	0.128 (0.033)			
M066301	ME	4A	0.636 (0.028)	-2.127 (0.076)	0.000 (0.000)			
M066501	ME	6A	0.561 (0.014)	-0.490 (0.021)	0.000 (0.000)	-0.156 (0.042)	0.156 (0.037)	
M066601	ME	7A	0.431 (0.012)	-0.969 (0.032)	0.000 (0.000)	-0.462 (0.059)	0.462 (0.048)	
M067001	ME	1	1.035 (0.066)	0.561 (0.046)	0.285 (0.017)			
M067201	ME	8B	0.483 (0.010)	0.960 (0.026)	0.000 (0.000)	-1.783 (0.064)	1.783 (0.070)	
M067202	ME	8A	2.041 (0.123)	0.990 (0.030)	0.471 (0.009)			
M067301	ME	9	1.106 (0.059)	0.619 (0.033)	0.147 (0.013)			
M067401	ME	10	0.755 (0.052)	1.262 (0.050)	0.108 (0.014)			
M067701	MG	2	0.760 (0.039)	-1.403 (0.107)	0.193 (0.047)			
M067901	MG	4A	0.645 (0.012)	-0.572 (0.018)	0.000 (0.000)	-1.434 (0.054)	1.434 (0.051)	
M068101	MG	1	0.836 (0.039)	-0.711 (0.069)	0.140 (0.031)			
M069301	ML	2A	0.601 (0.023)	1.159 (0.044)	0.000 (0.000)			
M075301	MO	2A	1.049 (0.021)	-0.335 (0.017)	0.000 (0.000)	1.405 (0.029)	-1.405 (0.022)	
M075501	MO	4A	1.275 (0.058)	0.197 (0.030)	0.148 (0.014)			
M0757CL	MO	6E	0.420 (0.014)	0.243 (0.028)	0.000 (0.000)	0.542 (0.046)	-0.542 (0.050)	

BEST COPY AVAILABLE

Appendix E

STATE ASSESSMENT PROGRAM REPORTING SUBGROUPS; COMPOSITE AND DERIVED COMMON BACKGROUND VARIABLES; AND COMPOSITE AND DERIVED REPORTING VARIABLES

REPORTING SUBGROUPS FOR THE 1996 STATE ASSESSMENT

Results for the 1996 State Assessment were reported for student subgroups defined by gender, race/ethnicity, type of location, parents' level of education, participation in the National School Lunch Program, and eligibility of Title I funding. The following explains how each of these subgroups was derived.

DSEX (Gender)

The variable SEX is the gender of the student being assessed, as taken from school records. For a few students, data for this variable was missing and was imputed by ETS after the assessment. The resulting variable DSEX contains a value for every student and is used for gender comparisons among students.

DRACE (Race/ethnicity)

The variable DRACE is an imputed definition of race/ethnicity, derived from up to three sources of information. This variable is used for race/ethnicity subgroup comparisons. Two items from the student demographics questionnaire were used in the determination of derived race/ethnicity:

<u>Demographic Item Number 2:</u>

2. If you are Hispanic, what is your Hispanic background?

- ⬭ I am not Hispanic
- ⬭ Mexican, Mexican American, or Chicano
- ⬭ Puerto Rican
- ⬭ Cuban
- ⬭ Other Spanish or Hispanic background

Students who responded to item number 2 by filling in the second, third, fourth, or fifth oval were considered Hispanic. For students who filled in the first oval, did not respond to the item, or provided information that was illegible or could not be classified, responses to item number 1 were examined in an effort to determine race/ethnicity. Item number 1 read as follows:

Demographic Item Number 1:

1. Which best describes you?

   - ⬭ White (not Hispanic)
   - ⬭ Black (not Hispanic)
   - ⬭ Hispanic ("Hispanic" means someone who is Mexican, Mexican American, Chicano, Puerto Rican, Cuban, or from some other Spanish or Hispanic background.)
   - ⬭ Asian or Pacific Islander ("Asian or Pacific Islander" means someone who is Chinese, Japanese, Korean, Filipino, Vietnamese, or from some other Asian or Pacific Island background.)
   - ⬭ American Indian or Alaskan Native ("American Indian or Alaskan Native" means someone who is from one of the American Indian tribes, or one of the original people of Alaska.)
   - ⬭ Other (What?) ________

Students' race/ethnicity was then assigned to correspond with their selection. For students who filled in the sixth oval ("Other"), provided illegible information or information that could not be classified, or did not respond at all, race/ethnicity as provided from school records was used.

Derived race/ethnicity could not be determined for students who did not respond to background items 1 or 2 and for whom race/ethnicity was not provided by the school.

An exception in this definition of race/ethnicity was made for Hawaii. Students from Hawaii who specified Asian or Pacific Islander for Demographic Item Number 1 were categorized in the Asian or Pacific Islander race/ethnicity classification, no matter what response they gave for Demographic Item Number 2.

TOL8 (Type of Location)
TOL5
TOL3

The variable TOL8 is used by NAEP to provide information about the type of location in which schools are located. The variable is defined using population size information from the 1990 Census and the definitions of Metropolitan Statistical Areas (MSAs) as of June 1995. There are eight categories for TOL8:

1	Large Central City	a central city of an MSA with a population greater than or equal to 400,000, or a population density greater than or equal to 6,000 persons per square mile
2	Midsize Central City	a central city of an MSA but not designated as a large city
3	Urban Fringe of Large City	a place within an MSA of a large central city and defined as urban by the U.S. Bureau of Census
4	Urban Fringe of a Midsize City	a place within an MSA of a midsize central city and defined as urban by the U.S. Bureau of Census
5	Large Town	a place not within an MSA, but with a population greater than or equal to 25,000 and defined as urban by the U.S. Bureau of Census
6	Small Town	a place not within an MSA, with a population less than 25,000, but greater than or equal to 2,500 and defined as urban by the U.S. Bureau of Census
7	Rural MSA	a place within an MSA with a population of less than 2,500 and defined as rural by the U.S. Bureau of the Census
8	Rural NonMSA	a place not within an MSA with a population of less than 2,500 and defined as rural by the U.S. Bureau of the Census

The variable TOL5 collapses the information provided in the variable TOL8 to five levels:

1 Large Central City
2 Midsize Central City
3 Urban Fringe of Large City, Urban Fringe of Midsize City, and Large Town
4 Small Town
5 Rural MSA and Rural NonMSA

The variable TOL3 is used extensively in the NAEP reports. TOL3 collapses TOL8 to three levels:

1	Central City	(Large Central City and Midsize Central City) This category includes central cities of all MSAs. Central City is a geographic term and is not synonymous with "inner city."
2	Urban Fringe/Large Town	(Urban Fringe of Large City, Urban Fringe of Midsize City, and Large Town) An Urban Fringe includes all densely settled places and areas within MSAs that are classified as urban by the Bureau of the Census. A Large Town is defined

		as a place outside MSAs with a population greater than or equal to 25,000.
3	Rural/Small Town	(Small Town, Rural MSA, and Rural NonMSA) Rural includes all places and areas with a population of less than 2,500 that are classified as rural by the Bureau of the Census. A Small Town is defined as a place outside MSAs with a population of less than 25,000 but greater than or equal to 2,500.

PARED (Parents' education level)

The variable PARED is derived from responses to two questions, B003501 and B003601, in the student demographic questionnaire. Students were asked to indicate the extent of their mother's education (B003501—How far in school did your mother go?) by choosing one of the following:

- ⬭ She did not finish high school.
- ⬭ She graduated from high school.
- ⬭ She had some education after high school.
- ⬭ She graduated from college.
- ⬭ I don't know.

Students were asked to provide the same information about the extent of their father's education (B003601—How far in school did your father go?) by choosing one of the following:

- ⬭ He did not finish high school.
- ⬭ He graduated from high school.
- ⬭ He had some education after high school.
- ⬭ He graduated from college.
- ⬭ I don't know.

The information was combined into one parental education reporting category (PARED) as follows: If a student indicated the extent of education for only one parent, that level was included in the data. If a student indicated the extent of education for both parents, the higher of the two levels was included in the data. For students who did not know the level of education for both parents or did not know the level of education for one parent and did not respond for the other, the parental education level was classified as unknown. If the student did not respond for both parents, the student was recorded as having provided no response.

REGION (Region of the country)

Results for each state were compared to the appropriate regional results from the national component of the assessment. Jurisdictions were grouped into four geographical regions—Northeast, Southeast, Central, and West—as shown in Table E-1. All 50 states and the District of Columbia are listed, with the participants in the State Assessment shown in italic type. Territories were not assigned to a region. The part of Virginia that is included in the Washington, DC, metropolitan statistical area is included in the Northeast region; the remainder of the state is included in the Southeast region.

Table E-1
NAEP Geographic Regions

NORTHEAST	SOUTHEAST	CENTRAL	WEST
Connecticut	*Alabama*	Illinois	*Alaska*
Delaware	*Arkansas*	*Indiana*	*Arizona*
District of	*Florida*	*Iowa*	*California*
Columbia	*Georgia*	Kansas	*Colorado*
Maine	*Kentucky*	*Michigan*	*Hawaii*
Maryland	*Louisiana*	*Minnesota*	Idaho
Massachusetts	*Mississippi*	*Missouri*	*Montana*
New Hampshire	*North Carolina*	*Nebraska*	*Nevada*
New Jersey	*South Carolina*	*North Dakota*	*New Mexico*
New York	*Tennessee*	Ohio	Oklahoma
Pennsylvania	*Virginia*	South Dakota	*Oregon*
Rhode Island	*West Virginia*	*Wisconsin*	*Texas*
Vermont			*Utah*
Virginia			*Washington*
			Wyoming

IEP (Individualized Education Plan)[1]

The variable IEP comes from the student booklet cover. A value of 1 indicates that a student has an individualized education plan while a value of 2 indicates no individualized education program.

[1] A student identified on the Administration Schedule as a student with a disability (SD) or an equivalent classification may be excluded from the assessment if: 1) the student is mainstreamed less than 50% of the time in academic subjects and is judged incapable of participating meaningfully in the assessment, or 2) the Individualized Education Plan (IEP) team or equivalent group has determined that the student is incapable of participating meaningfully in the assessment. SD/LEP students meeting the above criteria should be assessed if, in the judgment of school staff, they are capable of taking the assessment.

LEP (Limited English Proficiency)

The variable LEP comes from the student booklet cover. A value of 1 indicates that a student is considered to have limited English proficiency while a value of 2 indicates that the student does not have limited English proficiency.

TITLE1

The variable TITLE1 comes from the student booklet cover. A value of 1 indicates that a student is eligible for Title 1 funding and a value of 2 indicates that the student is not eligible for Title 1 funding.

SLUNCH
SLUNCH1

The variable SLUNCH is provided by Westat, Inc. and is used to determine if a student participates in the National School Lunch Program. The values for this variable are as follow:

1 not eligible
2 eligible for reduced price lunch
3 eligible for free lunch
4 no information available
5 school refused to provide information

The variable SLUNCH1 collapses the information provided in the variable SLUNCH to three levels:

1 eligible for free or reduced price lunch
2 not eligible for free or reduced price lunch
3 no information available

SCHTYPE

The variable SCHTYPE is provided by Westat, Inc. and is used to determine the type of school that a student attended. The values for this variable are as follow:

1 Public
2 Private
3 Catholic
4 Bureau of Indian Affairs (BIA)
5 Department of Defense Education Activity (DoDEA) schools

VARIABLES DERIVED FROM THE STUDENT, TEACHER, AND SCHOOL QUESTIONNAIRES

Several variables were formed from the systematic combination of response values for one or more items from either the student demographic questionnaire, the student mathematics background questionnaire, the teacher questionnaire, or the school questionnaire.

HOMEEN2 (Home environment—Articles [of 4] in the home)

The variable HOMEEN2 was created from the responses to student demographic items B000901 (Does your family get a newspaper regularly?), B000903 (Is there an encyclopedia in your home?), B000904 (Are there more than 25 books in your home?), and B000905 (Does your family get any magazines regularly?). The values for this variable were derived as follows:

1	0-2 types	The student responded to at least two items and answered Yes to two or fewer.
2	3 types	The student answered Yes to three items.
3	4 types	The student answered Yes to four items.
8	Omitted	The student answered fewer than two items.

VARIABLES DERIVED FROM MATHEMATICS ITEMS

MATTAKE

The variable MATTAKE is available for the grade 8 sample. This variable was created from items M812501 through M812507 in order to provide maximum utility of this data. For some analyses this variable was used to interpret these items as a single response item. When a student responded to more than one prompt MATTAKE was coded as a multiple response, however when the student responded to only one prompt the recoding was as follows:

1 I am not taking mathematics this year
2 Eighth-grade mathematics
3 Prealgebra
4 Algebra
5 Integrated or sequential mathematics
6 Applied mathematics (technical preparation)
7 Other mathematics class

MATEXP

The variable MATEXP is available for the grade 8 sample. This variable was created from items M812601 through M812609 in order to provide maximum utility of this data. For some analyses this variable was used to interpret these items as a single response item. When a student responded to more than one prompt MATEXP was coded as a multiple response, however when the student responded to only one prompt the recoding was as follows:

1 I do not expect to take mathematics class in ninth grade
2 Basic, general, business, or consumer mathematics
3 Applied mathematics (technical preparation)
4 Prealgebra
5 Algebra I or elementary algebra
6 Geometry
7 Integrated or sequential mathematics
8 Other mathematics class
9 I don't know

BKSCOR (Booklet-level score)

The booklet-level score is a student-level score based on the sum of the number correct for dichotomous items plus the sum of the scores on the polytomous items, where the score for a polytomous item starts from 0 for the unacceptable category. Thus, for a 4-point extended constructed-response item, scores of "no response", "off-task", and "unsatisfactory" are assigned an item score of 0. Scores of "partial", "essential", and "extensive" are assigned item scores of 1, 2, and 3, respectively. The score is computed based on all cognitive items in an individual's assessment booklet.

LOGIT (Logit percent correct within booklet)

In order to compute the LOGIT score, a percent correct within booklet was first computed. This score was based on the ratio of the booklet score (BKSCOR) over the maximum booklet score. The percent correct score was set to .0001 if no items were answered correctly; if BKSCOR equaled the maximum booklet score, the percent correct score was set to .9999. A logit score, LOGIT, was calculated for each student by the following formula:

$$\mathrm{LOGIT} = \ln\left[\frac{PCTCOR}{1 - PCTCOR}\right]$$

LOGIT was then restricted to a value x, such that $-3 \le x \le 3$. After computing LOGIT for each student, the mean and standard deviation was calculated for each booklet using the reporting sample as the first step in standardizing the logit scores. The standardized logit score, ZLOGIT, was then calculated for each student by the following formula:

$$\mathrm{ZSCORE} = \left[\frac{LOGIT\ -\ mean\ LOGIT}{standard\ deviation}\right]$$

NORMIT (Normit Gaussian score)
SCHNORM (School-level mean Gaussian score)

The normit score is a student-level Gaussian score based on the inverse normal transformation of the mid-percentile rank of a student's number-correct booklet score within that booklet. The normit scores were used to decide collapsing of variables, finalize conditioning coding, and check the results of scaling.

The number-correct is based on the number of dichotomous items answered correctly plus the score obtained on extended constructed-response items. The distributions of normit scores were constructed from the reporting sample using the overall reporting weight. The minimum and maximum normits were set to -3.5 and +3.5, respectively. The mid-percentile rank is based on the formula:

$$\frac{CF(i) + CF(i-1)}{2N}$$

where CF(i) is the cumulative frequency at i items correct and N is the total sample size. If i = 0 then

$$\frac{CF(0) + \frac{CF(1)}{2}}{2N}$$

A school-level normit, SCHNORM was also created; this was the mean normit across all main assessment mathematics booklets administered in a school. These school-level mean normit scores were used in conditioning procedures to take into account differences in school proficiency. For each school, the weighted mean (the within school modular student weight, corrected for student nonresponse) of the normits for the students in that school was calculated. Each student was then assigned that mean as his or her school-level mean normit score value.

VARIABLES RELATED TO PROFICIENCY SCALING

Proficiency Score Variables

Item response theory (IRT) was used to estimate average mathematics proficiency for each jurisdiction and for various subpopulations, based on students' performance on the set of mathematics items they received. IRT provides a common scale on which performance can be reported for the nation, jurisdiction, and subpopulations, even when all students do not answer the same set of questions. This common scale makes it possible to report on relationships between students' characteristics (based on their responses to the background questions) and their overall performance in the assessment.

A scale ranging from 0 to 500 was created to report performance for each of the five mathematics content strands: *number sense, properties, and operations*; *measurement*; *geometry and spatial sense*; *data analysis, statistics, and probabilities*; and *algebra and functions*. Each content strand scale was based on the distribution of student performance across all three grades assessed in the 1996 national assessment (grades 4, 8, and 12) and had a mean of 250 and a standard deviation of 50. A composite scale was created as an overall measure of students' mathematics proficiency. The composite scale was a weighted average of the five content strand scales, where the weight for each content strand was proportional to the relative importance assigned to the content strand as specified in the mathematics objectives. An additional scale was created for the items designed to measure estimation abilities. Although the items comprising each scale were identical to those used for the national program, the item parameters for the State Assessment scales were estimated from the combined data from all jurisdictions participating in the State Assessment.

Scale proficiency estimates were obtained for all students assessed in the State Assessment. The NAEP methods use random draws ("plausible values") from estimated proficiency distributions to compute population statistics. Plausible values are not optimal estimates of individual proficiency; instead, they serve as intermediate values to be used in estimating population characteristics. Chapter 8 provides further details on the computation and use of plausible values.

The proficiency score (plausible value) variables are provided on the student data files for each of the scales and are named as shown in Table E-2.

Table E-2
Scaling Variables for the 1996 State Assessment Samples

Mathematics Scale	Data Variables
Numbers Sense, Properties, and Operations	MRPS11 to MRPS15
Measurement	MRPS21 to MRPS25
Geometry	MRPS31 to MRPS35
Data Analysis, Statistics, and Probability	MRPS41 to MRPS45
Algebra and Functions	MRPS51 to MRPS55
Composite	MRPCM1 to MRPCM5

QUALITY EDUCATION DATA VARIABLES (QED)

The data files contain several variables obtained from information supplied by Quality Education Data, Inc. (QED). QED maintains and updates annually lists of schools showing grade span, total enrollment, instructional dollars per pupil, and other information for each school. These data variables are retained on both the school and student files and are identified in the data layouts by "(QED)" in the SHORT LABEL field.

Most of the QED variables are defined sufficiently in the data codebooks. Explanations of others are provided below.

ORSHPT is the Orshansky Percentile, an indicator of relative wealth that specifies the percentage of school-age children in a district who fall below the poverty line.

IDP represents, at the school district level, dollars per student spent for textbooks and supplemental materials. The range code for instructional dollars spent per pupil excluding teacher salaries are:

0 = Unclassified
1 = Under $10
2 = $10-49
3 = $50-99
4 = $100-149
5 = $150-299
6 = $300-399
7 = $400-499
8 = $500-999
9 = $1000 +

ADULTED indicates whether or not adult education courses are offered at the school site.

URBAN defines the school's urbanization: urban (central city); suburban (area surrounding central city, but still located within the counties constituting the metropolitan statistical area); or rural (area outside any metropolitan statistical area).

Appendix F

SETTING THE NAEP ACHIEVEMENT LEVELS FOR THE 1996 MATHEMATICS ASSESSMENT

Mary Lyn Bourque
National Assessment Governing Board

Introduction

Since 1984, NAEP has reported the performance of students in the nation and for specific subpopulations on a 0-to-500 proficiency scale. The history and development of the scale and the anchoring procedure used to interpret specific points on that scale is described elsewhere in this report.

The achievement levels reported in 1996 were first developed in 1992 through a process described in more detail in the following sections of this chapter. The levels were based on the mathematics assessment framework and item pools developed for the 1990 and 1992 assessments. Although the National Assessment Governing Board (NAGB) updated this framework in preparation for the 1996 assessment, the differences in test and item specifications were not large enough to warrant a new mathematics scale. Therefore, a decision was made by the Board to retain the same levels as reported for the 1990 and 1992 assessments, thus allowing a third point of comparison for the short-term mathematics trend.

History of the Achievement Levels Development 1990 - 1992

The 1988 legislation[1] created an independent board, the National Assessment Governing Board (NAGB), responsible for setting policy for the NAEP program. The Board has a statutory mandate to identify "appropriate achievement goals for each . . . grade in each subject area to be tested under the National Assessment." Consistent with this directive, and striving to achieve one of the primary mandates of the statute "to improve the form and use of NAEP results," the Board set performance standards (called achievement levels by NAGB) for the National Assessment in 1990 and again in 1992. The 1994 legislation (Public Law 103-382) continued the policy Board with slightly increased membership, and a continued mandate to set student performance standards on each age and grade tested.

The 1990 trial, initiated in December 1989 with the dissemination of a draft policy statement (NAGB, 1989) and culminating 22 months later in the publication of the NAGB report, *The Levels of Mathematics Achievement* (Bourque & Garrison, 1991), consisted of two phases: the main study and a replication-validation study. Although there were slight differences between the two phases, there were many common elements. Both phases used a modified (iterative/empirical) Angoff (1971) procedure for arriving at the levels; both focused on estimating performance levels based on a review of the 1990 NAEP mathematics item pool; and both phases employed a set of policy definitions for Basic, Proficient, and Advanced (NAGB, 1990) as the criteria for making the item ratings. However, the 1990 process was

---

[1]Public Law 100-297. (1988). National assessment of educational progress improvement act (Article No. USC 1221). Washington, DC.

evaluated by a number of different groups (see Hambleton & Bourque, 1991) who identified technical flaws in the 1990 process. These evaluations influenced NAGB's decision to set the levels again in 1992 and to not use the 1990 levels as benchmarks for progress toward the national goals during the coming decade. However, it is interesting to note that the 1990 and 1992 processes produced remarkably similar results.

In September 1991 NAGB contracted with American College Testing (ACT) to convene the panels of judges that would recommend the levels on the 1992 NAEP assessments in reading, writing, and mathematics. While the 1992 level-setting activities were not unlike those undertaken by NAGB in 1990, there were significant improvements made in the process for 1992. There was a concerted effort to bring greater technical expertise to the process: The contractor selected by NAGB has a national reputation for setting standards in a large number of certification and licensure exams; an internal and external advisory team monitored all the technical decisions made by the contractor throughout the process; and state assessment directors periodically provided their expertise and technical assistance at key stages in the project.

Setting achievement levels is a method for setting standards on the NAEP assessment that identifies what students should know and be able to do at various points along the proficiency scale. The initial policy definitions of the achievement levels were presented to panelists along with an illustrative framework for more indepth development and operationalization of the levels. Panelists were asked to determine descriptions/definitions of the three levels from the specific framework developed for the NAEP assessment with respect to the content and skills to be assessed. The operationalized definitions were refined throughout the level-setting process, as well as validated with a supplementary group of judges subsequent to the level-setting meetings. Panelists were also asked to develop a list of illustrative tasks associated with each of the levels, after which sample items from the NAEP item pool were identified to exemplify the full range of performance of the intervals between levels. The emphasis in operationalizing the definitions and in identifying and selecting exemplar items and papers was to represent the full range of performance from the lower level to the next higher level. The details of the implementation procedures are outlined in the remainder of this appendix.

Preparing for the 1992 Mathematics Level-Setting Meeting

It is important for the planning of any standard-setting effort to know how various process elements interact with each other. For example, panelists interact with pre-meeting materials, the meeting materials (i.e., the assessment questions, rating forms, rater feedback, and so forth), each other, and the project staff. All of these elements combine to promote or degrade what has been called intrajudge consistency and interjudge consensus (Friedman & Ho, 1990).

Previous research has conceptualized the effects of two major kinds of interaction: people interacting with text (Smith & Smith, 1988) and people interacting with each other (Curry, 1987; Fitzpatrick, 1989). To assess the effects of textual and social interaction and adjust the standard setting procedures accordingly, a pilot study was conducted as the first phase of the 1992 initiative.

Reading was chosen as the single content area to be pilot-tested since it combined all of the various features found in the other NAEP assessments, including multiple-choice, short constructed-response, and extended constructed-response items. The pilot study provided the opportunity to implement and evaluate all aspects of the operational plan—background materials, meeting materials, study design, meeting logistics, staff function, and participant function.

The overall pilot effort was quite successful. The level-setting process worked well, and the pilot allowed the contractor to make improvements in the design before implementation activities began. For example, schedule changes were made that allowed the panelists more time to operationalize the policy definitions before beginning the item-rating task. Also, the feedback mechanisms used to inform panelists about interjudge and intrajudge consistency data were improved for clarity and utility to the entire process.

The Mathematics Level-Setting Panel

Sixty-nine panelists representing 32 jurisdictions (31 states and the District of Columbia) from the 424 nominees were invited to participate in the level-setting process. They represented mathematics teachers at grades 4, 8, and 12, nonteacher educators, and members of the noneducator (general public) community. The group was balanced by gender, race/ethnicity, NAEP regions of the country, community type (low SES, not low SES), district size, and school type (public/private). One panelist was unable to attend due to a family emergency, resulting in 68 participants: 24 at grade 4 and 22 at grades 8 and 12.

Process for Developing the Achievement Levels

The four-and-one-half day session began with a brief overview of NAEP and NAGB, a presentation on the policy definitions of the achievement levels, a review of the NAEP mathematics assessment framework, and a discussion of factors that influence item difficulty. The purpose of the presentation was to focus panelists' attention on the mathematics framework and to emphasize the fact that panelists' work was directly related to the NAEP assessment, not to the whole domain of mathematics.

All panelists completed and self-scored an appropriate grade-level form of the NAEP assessment. The purpose of this exercise was to familiarize panelists with the test content and scoring protocols before beginning to develop the preliminary operationalized descriptions of the three levels.

Working in small groups of five or six, panelists expanded and operationalized the policy definitions of Basic, Proficient, and Advanced in terms of specific mathematical skills, knowledge, and behaviors that were judged to be appropriate expectations for students in each grade, and were in accordance with the current mathematics assessment framework.

The policy definitions are as follows:

Basic — This level, below proficient, denotes partial mastery of the knowledge and skills that are fundamental for proficient work at each grade—4, 8, and 12.

Proficient — This central level represents solid academic performance for each grade tested—4, 8, and 12. Students reaching this level have demonstrated competency over challenging subject matter and are well prepared for the next level of schooling.

Advanced This higher level signifies superior performance beyond proficient grade-level mastery at grades 4, 8, and 12.

The small groups were allowed to brainstorm about what student performance *should* be, using the framework and their experience in completing the NAEP assessment as guides[2]. A comprehensive listing of grade-level descriptors was developed, and panelists were asked to identify the five that best described what students *should* be able to do at each of the levels. Those descriptors appearing with the greatest frequency were compiled into a discussion list for the grade-level groups. Additions, deletions, and modifications were made as a result of discussions, and the groups reached general agreement that the final list of descriptors represented what students *should* be able to do at each achievement level.

Panelists next received two hours of training in the Angoff method. Training was customized to reflect the unique item formats of the particular subject area assessment. Once a conceptual consensus was reached about the characteristics of *marginally* acceptable examinees at each of the three levels, practice items from the released pool were rated by the panelists according to the process defined in the contractor's plan. For multiple-choice and short constructed-response items, panelists were asked to rate each item for the expected probability of a correct response for a group of *marginally* acceptable examinees at the Basic, Proficient, and Advanced levels. For extended constructed-response items, panelists were asked to review 20 to 25 student response papers and select three papers, one for each achievement level, that typified *marginally* acceptable examinee performance for that level.

Following training in the Angoff method, the judges began the rating process, inspecting and rating each item in the pool for the expected probabilities of answering the item correctly at each level. Panelists completed three rounds of item ratings. For Round 1, panelists first answered the items in each section, then reviewed their answers using scoring keys and protocols. This process helped ensure that panelists would be thoroughly familiar with each item, including the foils and scoring rubrics, before rating the items. Panelists provided item ratings/paper selections for all three achievement levels, one item at a time, for all the items in a section, then proceeded to the next set of items, for which the process was repeated. During Round 1, panelists used their lists of descriptors and other training materials for guidance in the rating process.

Following Round 1, item response theory (IRT) was used to convert the rating results[3] for each rater to a latent ability scale represented by the Greek letter theta (θ). This θ scale was the same scale used to calibrate the NAEP items evaluated by each panelist. In order to provide meaningful feedback about item ratings, a special *relative scale* was constructed, which was a linear transformation of the theta scale having a mean of 75 and standard deviation of 15. Before Round 2 of the rating process, panelists were given interjudge consistency information using this relative scale. This information allowed panelists to see on the scale where their individual mean item ratings were, relative to the mean for the group and to the means for other panelists. Reasons for extreme mean ratings, including the possibility that some panelists misinterpreted the item rating task, were discussed briefly.

Before Round 2, panelists were also given item difficulty data. This information was presented as the percentage of students who answered each item correctly during the actual NAEP administration, for

[2]The panelists also reviewed about half the item pool (the half they would not be rating later) so the descriptors could be further modified if appropriate.

[3]Because the IRT item parameters were not available for the polytomously scored (extended constructed-response) items, these items (five at grade 4, six each at grades 8 and 12) were not included in the following discussion of results.

items scored "correct" or "incorrect" (i.e., multiple-choice and short constructed-response items), and as the percentage of students receiving scores of 1, 2, 3, and 4 for the extended constructed-response items[4]. Panelists were told that this item difficulty information should be used as a reality check. For items on which item ratings differed substantially from the item difficulty value, panelists were asked to reexamine the item to determine if they had misinterpreted the item or misjudged its difficulty. Results of the data analysis, and panelists' own evaluations, indicated that the item difficulty information was perceived as very useful but had little impact on panelists' ratings.

For Round 2, panelists reviewed the same set of items they had rated in Round 1 and, using the interjudge consistency information, the item difficulty information, and the information provided prior to Round 1, they either confirmed their initial item ratings or adjusted their ratings to reflect the additional information. About one-third of Round 1 item ratings were adjusted during Round 2.

Following Round 2, panelists' ratings were reanalyzed and additional information was presented to panelists concerning intrajudge variability prior to Round 3. For each panelist, the intrajudge variability information consisted of those items that they had rated differently than items having similar difficulty, taking into consideration the panelist's aggregated item ratings. That is, the panelists' aggregated item ratings were converted to the theta (θ) scale. All items rated by the panelists were then analyzed in terms of the panelist's achievement level (θ) in comparison to actual student performance on the items. The observed item rating from each panelist was contrasted to an expected item rating. Those items with large differences between observed and expected ratings were identified. Panelists were given this information and asked to review each of these items and decide if their Round 2 ratings still accurately reflected their best judgments of the items. The intrajudge consistency data was to be used to flag items for reconsideration in the final round of rating.

For Round 3, panelists reviewed the same set of items they rated in Rounds 1 and 2 using both the new intrajudge variability information and the information made available during Rounds 1 and 2. In addition, panelists could discuss, within their small groups, ratings of specific items about which they were unsure. About 20 percent of the item ratings were adjusted during Round 3.

Process of Selecting Exemplar Items

Following the standard-setting meeting, a series of procedures was implemented to select exemplar items. First, expected and empirical p-values were computed for each item in the released item pool. Expected p-values were based on predicted performance at the cut-off score for each achievement level and empirical p-values were based on the average performance of all students responding to the item. Items that did not have expected p-values ≥ 0.51 for any of the levels were deleted from the item pool. Second, items were compared to the operationalized descriptions of the levels. Items that did not match the content of the descriptions were deleted from the item pool. Third, the remaining items were classified as possible Basic, Proficient, or Advanced exemplars based on content match. Fourth, the validation panel reviewed the items and recommended a set of items to serve as exemplars for the levels. The final set of items was reviewed and approved by NAGB at their May 1992 meeting. These procedures are described in detail below.

[4] The percentages presented to the raters summed to 100 percent, but this excluded the percentages—around 80 percent, in some cases—of students who wrote responses that were judged to be "off-task," those who "skipped" that question and continued beyond that question, and those who, apparently, "never reached" that question.

Using the standard-setting ratings, expected p-values were computed for each item at the cut point for each achievement level. The criteria described below were applied to the scale-level results and an analysis was conducted to delineate items that could serve as exemplars for each achievement level (Basic, Proficient, Advanced). More specifically, for an item to be chosen as a possible exemplar for the Basic achievement level:

1. The expected p-value for students at the cut point for the Basic level of achievement had to be greater than 0.51;

2. The content of the item had to match the content of the operationalized description of Basic; and

3. The empirical p-value for the item had to be higher than empirical p-values for items selected as exemplars for the Proficient level.

As an example:

Grade 4 Basic Level Item M022801

Level	Basic	Proficient	Advanced
Scale point	211	248	280
Expected p-value	0.70	0.82	0.94
Empirical p-value = 0.52			

For an item to be chosen as a possible exemplar for the Proficient achievement level:

1. The expected p-value for students at the cut-off score for the Proficient level of achievement had to be greater than 0.51;

2. The content of the item had to match the content of the operationalized description of Proficient; and

3. The empirical p-value for the item had to be lower than empirical p-values for Basic exemplar items, but higher than student p-values for Advanced exemplar items.

As an example:

Grade 4 Proficient Level Item M022001

Level	Basic	Proficient	Advanced
Scale point	211	248	280
Expected p-value	0.37	0.58	0.76
Empirical p-value = 0.35			

For an item to be chosen as a possible exemplar for the Advanced achievement level:

1. The expected p-value for students at the cut-point for the Advanced level of achievement had to be greater than 0.51;

2. The content of the item had to match the content of the operationalized description of Advanced; and

3. The empirical p-value for the item had to be lower than empirical p-values for Proficient exemplar items.

As an example:

Grade 4 Advanced Level Item M023101

Level	Basic	Proficient	Advanced
Scale point	211	248	280
Expected p-value	0.29	0.43	0.61
Empirical p-value = 0.22			

The analysis procedures described above yielded 31 items as possible grade 4 exemplars, 43 items as possible grade 8 exemplars, and 37 items as possible grade 12 exemplars, as follows:

Possible Exemplar Items by Grade and Achievement Level

Grade	Basic	Proficient	Advanced
4	9	14	8
8	23	15	5
12	14	16	7

For grade 4, the possible exemplars represented 49 percent of the released item pool. For grades 8 and 12, the possible exemplars represented 54 percent of the released item pool for each grade.

Process for Validating the Levels

Eighteen mathematics educators participated in the item selection and content validation process. Ten of the panelists were mathematics teachers who had participated in the original achievement levels-setting process and who had been identified as outstanding panelists by grade group facilitators during this meeting. The other eight panelists represented the National Council of Teachers of Mathematics, the Mathematical Sciences Education Board, and state-level mathematics curriculum supervisors. To the extent possible, the group was balanced by race/ethnicity, gender, community type, and region of the country.

The two-and-one-half day meeting began by briefing panelists on the purpose of the meeting. They first reviewed the operationalized descriptions of the achievement levels for consistency with the NAGB policy definitions of Basic, Proficient, and Advanced and with the NAEP *Mathematics Objectives*. Next, they reviewed the operationalized descriptions of the achievement levels for qualities such as within- and across-grade consistency, grade-level appropriateness, and utility for increasing the public's understanding of the NAEP mathematics results. Finally, working first in grade level (4, 8, and 12) groups of six panelists each, then as a whole group, panelists revised the operationalized descriptions to provide more within- and across-grade consistency and to align the language of the description more closely with the language of the NCTM *Standards*. Both the original descriptions and the revised descriptions are included later in this appendix.

On the third day, panelists again split into grade-level groups of six panelists each and reviewed the possible exemplar items. The task was to select a set of items, for each achievement level for their grade, that would best communicate to the public the levels of mathematics ability and the types of skills needed to perform in mathematics at that level.

After selecting sets of items for their grades, the three grade-level groups met as a whole group to review item selection. During this process, cross-grade items that had been selected as exemplars by two grade groups (three such items were selected by grade groups 4 and 8) were assigned to one grade by whole-group consensus. In addition, items were evaluated by the whole group for overall quality. Two items were rejected by the group during this process due to possible bias. This process yielded 14 items as recommended exemplars for grade 4, 11 items as recommended exemplars for grade 8, and 14 items as recommended exemplars for grade 12.

Mapping Panelists' Ratings to the NAEP Scales

The process of mapping panelists' ratings to the NAEP scales made significant use of *item response theory* (IRT). IRT provides statistically sophisticated methods for determining the expected performance of examinees on particular test items in terms of an appropriate measurement scale. The same measurement scale simultaneously describes the characteristics of the test items and the performance of the examinees. Once the item characteristics are set, it is possible to precisely determine how examinees are likely to perform on the test items at different points of the measurement scale.

The panelists' ratings of the NAEP test items were likewise linked, by definition, to the expected performance of examinees at the theoretical achievement level cut points. It was therefore feasible to use the IRT item characteristics to calculate the values on the measurement scale corresponding to each achievement level. This was done by averaging the item ratings over panelists for each achievement level and then simply using the item characteristics to find the corresponding achievement level cut points on the IRT measurement scale. This process was repeated for each of the NAEP content strands within each grade (4, 8, and 12).

In the final stage in the mapping process, the achievement level cut points on the IRT measurement scale were combined over content strands and rescaled to the NAEP score scale. Weighted averages of the achievement level cut points were computed. The weighting constants accounted for the measurement precision of the test items evaluated by the panelists, the proportion of items belonging to each NAEP content strand, and the linear NAEP scale transformation. These weighted averages produced the final cut points for the Basic, Proficient, and Advanced achievement levels within each grade.

Evaluation of the Mathematics Levels

The 1992 mathematics achievement levels used here to report the 1996 NAEP data were evaluated under a Congressional mandate by the National Academy of Education (NAE). A series of research studies were mounted by the NAE (National Academy of Education, 1993) to look at various aspects of the validity of the level-setting process, and the levels adopted by NAGB. Several of these studies focused specifically on the mathematics achievement levels, and were conducted for the Academy by staff at the Learning Research and Development Center at the University of Pittsburgh. Based on these studies, the Academy's 1993 policy report concluded that the achievement levels in mathematics were flawed and should not be continued. The more recent report from the Academy (National Academy of Education, 1997) concluded that the current achievement levels raised serious concerns about their reliability and validity, were not reasonable (i.e., were set too high), and in the final analysis, should be abandoned by the end of the century.

While NAGB did not agree with the earlier policy report and continues to disagree with the more recent one, and while the Board's contractor and its technical advisors do not believe the weight of the evidence supported the NAEP conclusions, the Board believes that standards-based reporting is responsive to the needs of the users of NAEP data, is an important aspect of the national reform movement, and assists in making NAEP data more useful and understandable to the public. The Board is committed to making improvements in the process, and will continue to support further investigation into the validity of the levels through additional research.

Figure F-1

Final Description of 1992 Mathematics Achievement Levels

GRADE 4

The NAEP content strands include: (1) number sense, properties, and operations; (2) measurement; (3) geometry; (4) data analysis, statistics, and probability; (5) algebra and functions. (Note: At the fourth-grade level, algebra and functions are treated in informal and exploratory ways, often through the study of patterns.) Skills are cumulative across levels—from Basic to Proficient to Advanced.

BASIC. Fourth-grade students performing at the **basic level** *should show some evidence of understanding the mathematical concepts and procedures in the five NAEP content strands.*

Specifically, fourth graders performing at the basic level should be able to estimate and use basic facts to perform simple computations with whole numbers; show some understanding of fractions and decimals; and solve simple real-world problems in all NAEP content strands. Students at this level should be able to use—though not always accurately—four-function calculators, rulers, and geometric shapes. Their written responses are often minimal and presented without supporting information.

PROFICIENT. Fourth-grade students performing at the **proficient level** *should consistently apply integrated procedural knowledge and conceptual understanding to problem solving in the five NAEP content strands.*

Specifically, fourth graders performing at the proficient level should be able to use whole numbers to estimate, compute, and determine whether results are reasonable. They should have a conceptual understanding of fractions and decimals; be able to solve real-world problems in all NAEP content strands; and use four-function calculators, rulers, and geometric shapes appropriately. Students performing at the proficient level should employ problem-solving strategies such as identifying and using appropriate information. Their written solutions should be organized and presented both with supporting information and explanations of how they were achieved.

ADVANCED. Fourth-grade students performing at the **advanced level** *should apply integrated procedural knowledge and conceptual understanding to complex and nonroutine real-world problem solving in the five NAEP content strands.*

Specifically, fourth graders performing at the advanced level should be able to solve complex and nonroutine real-world problems in all NAEP content strands. They should display mastery in the use of four-function calculators, rulers, and geometric shapes. These students are expected to draw logical conclusions and justify answers and solution processes by explaining why, as well as how, they were achieved. They should go beyond the obvious in their interpretations and be able to communicate their thoughts clearly and concisely.

Figure F-1 (continued)
Final Description of 1992 Mathematics Achievement Levels

GRADE 8

NAEP content strands: (1) number sense, properties, and operations; (2) measurement; (3) geometry; (4) data analysis, statistics, and probability; (5) algebra and functions. Skills are cumulative across all levels—from Basic to Proficient to Advanced.

BASIC. Eighth-grade students performing at the **basic level** *should exhibit evidence of conceptual and procedural understanding in the five NAEP content strands.* This level of performance signifies an understanding of arithmetic operations—including estimation—on whole numbers, decimals, fractions, and percents.

Eighth graders performing at the basic level should complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. They should be able to solve problems in all NAEP content strands through the appropriate selection and use of strategies and technological tools—including calculators, computers, and geometric shapes. Students at this level also should be able to use fundamental algebraic and informal geometric concepts in problem solving.

As they approach the proficient level, students at the basic level should be able to determine which of available data are necessary and sufficient for correct solutions and use them in problem solving. However, these eighth graders show limited skill in communicating mathematically.

PROFICIENT. Eighth-grade students performing at the **proficient level** *should apply mathematical concepts and procedures consistently to complex problems in the five NAEP content strands.*

They should be able to conjecture, defend their ideas, and give supporting examples. They should understand the connections between fractions, percents, decimals, and other mathematical topics such as algebra and functions. Students at this level are expected to have a thorough understanding of basic-level arithmetic operations—an understanding sufficient for problem solving in practical situations.

Quantity and spatial relationships in problem solving and reasoning should be familiar to them, and they should be able to convey underlying reasoning skills beyond the level of arithmetic. They should be able to compare and contrast mathematical ideas and generate their own examples. These students should make inferences from data and graphs; apply properties of informal geometry; and accurately use the tools of technology. Students at this level should understand the process of gathering and organizing data and be able to calculate, evaluate, and communicate results within the domain of statistics and probability.

Figure F-1 (continued)

Final Description of 1992 Mathematics Achievement Levels

ADVANCED. Eighth-grade students at the **advanced level** *should be able to reach beyond the recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles in the five NAEP content strands.*

They should be able to probe examples and counter examples in order to shape generalizations from which they can develop models. Eighth graders performing at the advanced level should use number sense and geometric awareness to consider the reasonableness of an answer. They are expected to use abstract thinking to create unique problem-solving techniques and explain the reasoning processes underlying their conclusions.

GRADE 12

NAEP content strands: (1) number sense, properties, and operations; (2) measurement; (3) geometry; (4) data analysis, statistics, and probability; (5) algebra and functions. Skills are cumulative across levels—from Basic to Proficient to Advanced.

BASIC. Twelfth-grade students at the **basic level** *should demonstrate procedural and conceptual knowledge in solving problems in the five NAEP content strands.*

They should be able to use estimation to verify solutions and determine the reasonableness of results as applied to real-world problems. They are expected to use algebraic and geometric reasoning strategies to solve problems. Twelfth graders performing at the basic level should recognize relationships presented in verbal, algebraic, tabular, and graphical forms; and demonstrate knowledge of geometric relationships and corresponding measurement skills.

Twelfth graders at the basic level should be able to apply statistical reasoning in the organization and display of data and in reading tables and graphs. They also should be able to generalize from patterns and examples in the areas of algebra, geometry, and statistics. At this level, they should use correct mathematical language and symbols to communicate mathematical relationships and reasoning processes; and use calculators appropriately to solve problems.

PROFICIENT. Twelfth-grade students at the **proficient level** *should consistently integrate mathematical concepts and procedures to the solutions of more complex problems in the five NAEP content strands.*

Twelfth graders performing at the proficient level should demonstrate an understanding of algebraic, statistical, and geometric and spatial reasoning. They should be able to perform algebraic operations involving polynomials; justify geometric relationships; and judge and defend the reasonableness of answers as applied to real-world situations. These students should be able to analyze and interpret data in tabular and graphical form; understand and use elements of the function concept in symbolic, graphical, and tabular form; and make conjectures, defend ideas, and give supporting examples.

Figure F-1 (continued)

Final Description of 1992 Mathematics Achievement Levels

ADVANCED. Twelfth-grade students at the **advanced level** *should consistently demonstrate the integration of procedural and conceptual knowledge and the synthesis of ideas in the five NAEP content strands.*

They should understand the function concept; and be able to compare and apply the numeric, algebraic, and graphical properties of functions. They should apply their knowledge of algebra, geometry, and statistics to solve problems in more advanced areas of continuous and discrete mathematics.

Twelfth graders performing at the advanced level should be able to formulate generalizations and create models through probing examples and counterexamples. They are expected to communicate their mathematical reasoning through the clear, concise, and correct use of mathematical symbolism and logical thinking.

Figure F-2
Draft Descriptions of the Achievement Levels
Prepared by the Original Level-Setting Panel

Fourth-Grade Draft Descriptions

BASIC. The Basic level signifies some evidence of conceptual and procedural understanding in the five NAEP content strands of *number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions*. Understanding simple facts and single-step operations are included at this level, as is the ability to perform simple computations with whole numbers. This level shows a partial mastery of estimation, basic fractions, and decimals relating to money or the number line; it shows an ability to solve simple real-world problems involving measurement, probability, statistics, and geometry. At this level, there is a partial mastery of tools such as four-function calculators and manipulatives (geometric shapes and rulers). Written responses are often minimal, perhaps with a partial response and lack of supportive information.

PROFICIENT. The Proficient level signifies consistent demonstration of the integration of procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands of *number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions*. The Proficient level indicates an ability to perform computation and estimation with whole numbers, to identify fractions, and to work with decimals involving money or the number line. Solving real-world problems involving measurement, probability, statistics, and geometry is an important part of this level. This level signifies the ability to use, as tools, four-function calculators, rulers, and manipulatives (geometric shapes). It includes the ability to identify and use pertinent/appropriate information in problem settings. The ability to make connections between and among skills and concepts emerges at this level. Clear and organized written presentations, with supportive information, are typical. And, there is an ability to explain how the solution was achieved.

ADVANCED. The Advanced level signifies the integration of procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands of *number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions*. This is evidenced by divergent and elaborate written responses. The Advanced level indicates an ability to solve multistep and nonroutine real-world problems involving measurement, probability, statistics, and geometry, and an ability to perform complex tasks involving multiple steps and variables. Tools are mastered, including four-function calculators, rulers, and manipulatives (geometric shapes). This level signifies the ability to apply facts and procedures by explaining *why* as well as *how*. Interpretations extend beyond obvious connections and thoughts are communicated clearly and concisely. At this level, logical conclusions can be drawn and complete justifications can be provided for answers and/or solution processes.

Figure F-2 (continued)
Draft Descriptions of the Achievement Levels
Prepared by the Original Level-setting Panel

Eighth-Grade Draft Descriptions

BASIC. Basic students should begin to describe objects, to process accurately and elaborate relationships, to compare and contrast, to find patterns, to reason from graphs, and to understand spatial reasoning. This level of partial mastery signifies an understanding of arithmetic operations on whole numbers, decimals, fractions, and percents, including estimation. Problems that are already set up are generally solved correctly, as are one-step problems. However, problems involving the use of available data, and determinations of what is necessary and sufficient to solve the problem, are generally quite difficult. Students should select appropriate problem-solving tools, including calculators, computers, and manipulatives (geometric shapes) to solve problems from the five content strands. Students should also be able to use elementary algebraic concepts and elementary geometric concepts to solve problems. This level indicates familiarity with the general characteristics of measurement. Students at this level may demonstrate limited ability to communicate mathematical ideas.

PROFICIENT. Proficient students apply mathematical concepts consistently to more complex problems. They should make conjectures, defend their ideas, and give supporting examples. They have developed the ability to relate the connections between fractions, percents, and decimals, as well as other mathematical topics. The Proficient level denotes a thorough understanding of the arithmetic operations listed at the Basic level. This understanding is sufficient to permit applications to problem solving in practical situations. Quantity and spatial relationships are familiar situations for problem solving and reasoning, and this level signifies an ability to convey the underlying reasoning skills beyond the level of arithmetic. Ability to compare and contrast mathematical ideas and generating examples is within the Proficient domain. Proficient students can make inferences from data and graphs; they understand the process of gathering and organizing data, calculating and evaluating within the domain of statistics and probability, and communicating the results. The Proficient level includes the ability to apply the properties of elementary geometry. Students at this level should accurately use the appropriate tools of technology.

ADVANCED. The Advanced level is characterized by the ability to go beyond recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles. Generalization often takes shape through probing examples and counterexamples and can be focused toward creating models. Mathematical concepts and relationships are frequently communicated with mathematical language, using symbolic representations where appropriate. Students at the Advanced level consider the reasonableness of an answer, with both number sense and geometric awareness. Their abstract thinking ability allows them to create unique problem-solving techniques and explain the reasoning processes they followed in reaching a conclusion. These students can probe through examples and counterexamples that allow generalization and description of assumptions with models and elegant mathematical language.

Figure F-2 (continued)
Draft Descriptions of the Achievement Levels
Prepared by the Original Level-setting Panel

Twelfth-Grade Draft Descriptions

BASIC. This level represents understanding of fundamental algebraic operations with real numbers, including the ability to solve two-step computational problems. It also signifies an understanding of elementary geometrical concepts such as area, perimeter, and volume, and the ability to make measurements of length, weight, capacity, and time. Also included at the Basic level is the ability to comprehend data in both tabular and graphical form and to translate between verbal, algebraic, and graphical forms of linear expression. Students at this level should be able to use a calculator appropriately.

PROFICIENT. This level represents mastery of fundamental algebraic operations and concepts with real numbers, and an understanding of complex numbers. It also represents understanding of polynomials and their graphs up to the second degree, including conic sections. The elements of plane, solid, and coordinate geometry should be understood at the Proficient level. The Proficient level includes the ability to apply concepts and formulas to problem solving. Students at this level should demonstrate critical thinking skills. The Proficient level also represents the ability to judge the reasonableness of answers and the ability to analyze and interpret data in both tabular and graphical form. Basic algebraic concepts, measurement, and constructive geometry concepts are mastered at this level.

ADVANCED. The Advanced level represents mastery of trigonometric, exponential, logarithmic, and composite functions, zeros and inverses of functions, polynomials of the third degree and higher, rational functions, and graphs of all of these. In addition, the Advanced level represents mastery of topics in discrete mathematics including matrices and determinants, sequences and series, and probability and statistics, as well as topics in analytic geometry. The Advanced level also signifies the ability to successfully apply these concepts to a variety of problem-solving situations.

Figure F-3

Revised Draft Descriptions of the Achievement Levels
Recommended by the Follow-Up Validation Panel

Revised Fourth-Grade Draft Descriptions

BASIC. Basic students exhibit some evidence of conceptual and procedure understanding in the five NAEP content strands. At the fourth grade level, algebra and functions are treated in informal and exploratory ways often through the study of patterns. Basic students estimate and use basic facts to perform simple computations with whole numbers. These students show some understanding of fractions and decimals. They solve simple real world problems in all areas. These students use, although not always accurately, four-function calculators, rulers, and geometric shapes. Written responses are often minimal and lack supporting information.

PROFICIENT. Proficient students consistently integrate procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands. Using whole numbers they estimate, compute, and determine whether their results are reasonable. They have a conceptual understanding of fractions and decimals. Solving real world problems in all areas is important at this level. Proficient students appropriately use four-function calculators, rulers and geometric shapes. These students use problem solving strategies such as identifying and using appropriate information. [Problem-solving strategies include identification and use of appropriate information.] They present organized written solutions with supporting information and explain how they were achieved.

ADVANCED. Advanced students integrate procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands. They solve complex and nonroutine real-world problems in all areas. They have mastered the use of tools such as four-function calculators, rulers and geometric shapes. Advanced students draw logical conclusions and justify answers and solution processes by explaining the "why" as well as the "how." Interpretations extend beyond obvious connections and thoughts are communicated clearly and concisely.

Revised Eighth-Grade Draft Descriptions

BASIC. Basic students exhibit evidence of conceptual and procedural understanding. These students compare and contrast, find patterns, reason from graphs, and understand spatial reasoning. This level of performance signifies an understanding of arithmetic operations, including estimation, on whole numbers, decimals, fractions, and percents. Students complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. As students approach the proficient level, they will solve problems involving the use of available data, and determine what is necessary and sufficient for a correct solution. Students use problem solving strategies and select appropriate tools, including calculators, computers, and manipulatives (geometric shapes) to solve problems from the five content strands. Students use fundamental algebraic and informal geometric concepts to solve problems. Students at this level demonstrate limited skills in communicating mathematically.

Figure F-3 (continued)
Revised Draft Descriptions of the Achievement Levels
Recommended by the Follow-Up Validation Panel

PROFICIENT. Proficient students apply mathematical concepts and procedures consistently to complex problems. They make conjectures, defend their ideas, and give supporting examples. They have developed the ability to relate the connections between fractions, percents, and decimals, as well as other mathematical topics, such as algebra and functions. The proficient level denotes a thorough understanding of the arithmetic operations listed at the basic level. This understanding is sufficient to permit applications to problem solving in practical situations. Quantity and spatial relationships are familiar situations for problem solving and reasoning, and students at this level convey the underlying reasoning skills beyond the level of arithmetic. Proficient students compare and contrast mathematical ideas and generate their own examples. These students make inferences from data and graphs; they understand the process of gathering and organizing data, calculating, evaluating, and communicating the results within the domain of statistics and probability. Proficient students apply the properties of informal geometry, and accurately use the appropriate tools of technology.

ADVANCED. Advanced students go beyond recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles. Generalization often takes shape through probing examples and counter examples and can be used to create models. Mathematical concepts and relationships are frequently communicated with mathematical language, using symbolic representations where appropriate. Students at the advanced level consider the reasonableness of an answer, with both number sense and geometric awareness. Their abstract thinking allows them to create unique problem solving techniques and explain the reasoning processes they followed in reaching a conclusion. These students probe examples and counter examples that allow generalization and description of assumptions with models and elegant mathematical language.

Revised Twelfth-Grade Draft Descriptions

BASIC. Basic students demonstrate procedural and conceptual knowledge in solving problems in the five NAEP content strands. They use estimation to verify solutions and determine the reasonableness of the results to real world problems. Algebraic and geometric reasoning strategies are used to solve problems. These students recognize relationships in verbal, algebraic, tabular, and graphical forms. Basic students demonstrate knowledge of geometric relationships as well as corresponding measurement skills. Statistical reasoning is applied to the organization and display of data and to reading tables and graphs. These students generalize from patterns and examples in the areas of algebra, geometry, and statistics. They communicate mathematical relationships and reasoning processes with correct mathematical language and symbolic representations. Calculators are used appropriately to solve problems.

PROFICIENT. Proficient students integrate mathematical concepts and procedures consistently to more complex problems in the five NAEP content strands. They demonstrate an understanding of algebraic reasoning, geometric and spatial reasoning, and statistical reasoning as applied to other areas of mathematics. They perform algebraic operations involving polynomials, justify geometric relationships, and judge and defend the reasonableness of answers in real world situations. These students analyze and interpret data in tabular and graphical form. Proficient students understand and use elements of the function

Figure F-3 (continued)

Revised Draft Descriptions of the Achievement Levels
Recommended by the Follow-Up Validation Panel

concept in symbolic, graphical and tabular form. They make conjectures, defend their ideas, and give supporting examples.

ADVANCED. Advanced students consistently demonstrate the integration of procedural and conceptual knowledge, as well as the synthesis of ideas, in the five NAEP content strands. Advanced students understand the function concept, and they compare and apply the numeric. algebraic, and graphical properties of functions. They apply and connect their knowledge of algebra, geometry, and statistics to solve problems in more advanced areas of continuous and discrete mathematics. Advanced students formulate generalizations using examples and counter examples to create models. In communicating their mathematical reasoning, these students demonstrate clear, concise, and correct use of mathematical symbolism and logical thinking.

Figure F-4

Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Marge Blizard
Blizard Professional Cleaning
Franklin, Connecticut

Christopher Chomyak
The Episcopal Church
Calais, Maine

Janet Green
Met Life
Crownsville, Maryland

Mary Norman
Dekalb County Board of Education
Decatur, Georgia

Janice Wamsley
Alcorn School System
Glen, Mississippi

Ronald Higgins
Walla Walla School District
Walla Walla, Washington

Leona Lee
Baltimore City Public Schools
Baltimore, Maryland

Lisa Bietau
USD 383 Manhattan Public Schools
Manhattan, Kansas

Marsha Davis
Alcorn County Schools
Corinth, Mississippi

Jean Bush Ragin
Patterson High School
Baltimore, Maryland

Bill Oldham
Harding University
Searcy, Arkansas

George Shell
Retired Principal
Draper, Utah

Marsha Stovey
Detroit Public Schools
Detroit, Michigan

Vance Morris
Dekalb County Board of Education
Atlanta, Georgia

Carol Ballentine
Duval County Schools
Jacksonville, Florida

Tami Harvey, ESD
Audiometric Technician
Burns, Oregon

Laurence Payne
Greater Houston Coalition
for Educational Excellence
Houston, Texas

Cheryl Yunk
USD 383
Manhattan, Kansas

Kirby Gchachu
Zuni Public School District
Zuni, New Mexico

Corliss Hubert
Rutherford Board of Education
Englewood, New Jersey

Figure F-4 (continued)

Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Joyce Dunn
Alcorn County Schools
Corinth, Mississippi

Gloria Moran
Williams Junior High
Bridgewater, Massachusetts

Charles Jackson
Blairsville, Pennsylvania

Cassandra Turner
Internal Revenue Service
Miami, Florida
Jack Deal
Bethel Park School District
Pittsburgh, Pennsylvania

Ninfa Rivera
Lyford CISD
Raymondville, Texas

Gerald Zeringue
Garrity Construction Company
Harvey, Louisiana

Linda Brown
Van Zile Elementary School
Detroit, Michigan

Judy Bibb
Lonoke High School
Cabot, Arkansas

David Rank
School District of Greenville
Greenville, South Carolina

John Sweeney
Freed-Haideman University
Henderson, Tennessee

Nancy Pejouhy
Woodstock Union High School
Woodstock, Vermont

Jim Trefzger
Parkland College
Champaign, Illinois

Joanne Greaver
Jefferson County Public Schools
Louisville, Kentucky

Ellie Cucinatto
Bridgewater Public Schools
Bridgewater, Massachusetts

Lillie Carr
Pender County Schools
Teachey, North Carolina

Eric Cain
IBM
Metairie, Louisiana

Phillip Stroup
Butler County MR/DD
Seven Mile, Ohio

Mike Gobel
Walla Walla School District
Walla Walla, Washington

Juanita Tietze
Retired Principal
Canton, Ohio

Bill Cramer, Jr.
Cramer & Mallon, Attorneys at Law
Burns, Oregon

Figure F-4 (continued)

Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Norma Newman
Ysleta Independent School District
El Paso, Texas

William Rickenbach
Bethel Park School District
Bethel Park, Pennsylvania

Violet Cosgrove
Retired
Glen Burnie, Maryland

Danny McDougal
Pre-Mc, Inc.
Allen, Oklahoma

Bill Anderson
Administration Eagle Union
Zionsville, Indiana

Dan Thompson
Thompson Construction Company
Trinidad, Colorado

Nancy Gallagher
West Penn Power Company
Kittanning, Pennsylvania

William Hawes
The Hawes Company
Tucker, Georgia

Zhining Qin
Minnesota Department of Education
St. Paul, Minnesota

Charles McGee
Greenville County School District
Greenville, South Carolina

Barbara Bayne
Greenville County School District
Greenville, South Carolina

Landa McLaurin
Baltimore City Schools
Baltimore, Maryland

Nancy Potempa
St. Xavier University
Mokena, Illinois

Florencetine Jasmin
Baltimore City Public Schools
Baltimore, Maryland

Jeane Joyner
Dept. of Public Instruction
Raleigh, North Carolina

Carolyn Craig
State Department of Education
Jackson, Mississippi

Mary Bennion
SFUSD
San Francisco, California

Bill Eyestone
Walla Walla School District
Walla Walla, Washington

Mary Gahn
New York Board of Education
Westbury, New York

Barbara Faltz-Jackson
Baltimore City Public Schools
Baltimore, Maryland

Figure F-4 (continued)

Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Florence Kelly
Manville Board of Education
Manville, New Jersey

Philip Brach
Univ. of the District of Columbia
Washington, D.C.

Larry Brown
Oil industry (Self-Employed)
Allen, Oklahoma

W. Garry Quast
Slippery Rock University
Slippery Rock, Pennsylvania

Carl Springfels
Consultant (Self-Employed)
Miami Shores, Florida

Anna Maria Golan
Santa Ana Unified
Fountain Valley, California

Ricardo Suarez
Lyford CISD
Raymondville, Texas

Figure F-5

Meeting Participants, NAEP Mathematics Achievement Level-Setting Follow-up Validation Meeting, Nantucket, Massachusetts, July 17-19, 1992

Charles Allen
Michigan Department of Education
Lansing, Michigan

Linda Brown
Van Zile Elementary School
Clinton Township, Michigan

Ellie Cucinatto
Bridgewater Public Schools
Bridgewater, Massachusetts

Jack Deal
Bethel Park School District
Pittsburgh, Pennsylvania

Paula Duckett
River Terrace Community School Board
Washington, DC

Edward Esty
SRI International
Washington, D.C.

Barbara Faltz-Jackson
Baltimore Public Schools
Baltimore, Maryland

Joan Ferini-Mundy
University of New Hampshire
Durham, New Hampshire

Marilyn Hala
National Council of Teachers of Mathematics
Washington, D.C.

Florence Kelly
Largo Public Schools
Largo, Florida
Henry Kepner
University of Wisconsin at Milwaukee
Milwaukee, Wisconsin

Charles McGee
Greenville Public Schools
Greenville, South Carolina

Landa McLaurin
Baltimore City Schools
Baltimore, Maryland

Gloria Moran
Williams Junior High School
Bridgewater, Massachusetts

Jo Ann Mosier
Kentucky Department of Education
Frankfort, Kentucky

Mary Norman
DeKalb County Board of Education
Decatur, Georgia

David Rank
Greenville Public Schools
Greenville, South Carolina

Sharon Steglein
Minnesota Department of Education
St. Paul, Minnesota

Appendix G

CORRECTION OF THE NAEP PROGRAM DOCUMENTATION ERROR IN THE 1992 STATE MATHEMATICS RESULTS

Frank Jenkins and Edward Kulick
Educational Testing Service

In April 1995, results from the 1994 Trial State Assessment in reading were released as part of the report *1994 NAEP Reading: A First Look* (Williams, Reese, Campbell, Mazzeo, & Phillips, 1995). Subsequently, ETS/NAEP research scientists discovered an error in the documentation for the ETS version of the PARSCALE program, which is used to compute NAEP scale score results. The error affected how omitted responses were treated in the IRT scaling of the extended constructed-response items that received partial-credit scoring (i.e., could have several partially correct categories) in analyses of 1992 and 1994 assessment data. The error affected only polytomous items; omitted multiple-choice and omitted short constructed responses were treated appropriately.

The conventional treatment in NAEP subjects has been to treat omitted responses (blank responses to an item that are followed by valid responses to items that appear later in the test) as the lowest possible score category in the production of NAEP scale scores. In contrast, not-reached responses (blank responses that are not followed by any further student responses) are treated as missing data. As a result of the documentation error, for a number of the partial credit (or polytomous) constructed-response items and across several subject areas, *all* blank responses (both omitted and not-reached responses) to affected items were treated as missing—a *reasonable* model for treating omits but one that does *not* conform to the *conventional* practice in NAEP.

The error occurred because of a documentation error in the description of one of the PARSCALE control parameters, designated as POMIT. The program permits the analyst to choose two different ways of treating blank responses for partial credit items: (a) as missing data, and (b) as incorrect, i.e. a valid response falling in the lowest score category. The documentation indicates that by setting POMIT= −1, the treatment in (a) occurs. By setting POMIT=0 or POMIT=1, the treatment in (b) is supposed to occur. The POMIT=1 setting is the program default. In reality, POMIT=1 and POMIT= −1 operate equivalently, treating blank responses as missing data.

The error appears to have been introduced in 1992 when the programs BILOG and PARSCALE were merged to form the ETS version of PARSCALE. Verification of the accuracy of existing documentation, modifications to internal program diagnostics, and more systematic testing procedures for any and all changes to NAEP-related programs were implemented immediately to reduce the likelihood of experiencing this kind of error in subsequent NAEP cycles.

The PARSCALE documentation error affected a number of the NAEP scales constructed since 1992. Specifically, the 1992 national and state mathematics results were affected by the error. Results from these two assessments have been released to the public in a number of NAEP publications. The data has also been available to the public through NCES's secondary-use data files.

NCES and ETS felt that the most technically correct plan of action would be to recalculate all affected NAEP scales, no matter how slight the change, and to issue revised results. ETS was therefore instructed by NCES to recalculate all affected scales.

In recomputing the cutpoints for the achievement levels, an additional error (the information weighting error) was discovered in the procedures used by American College Testing (ACT) in 1992 to "map" the achievement-level cutpoints onto the NAEP scale. The procedures contained an incorrectly derived formula. Details can be found in Appendix I of the *Technical Report of the NAEP 1994 Trial State Assessment in Reading* (Mazzeo, Allen, & Kline, 1995). ACT used revised procedures with the correct formula to map the achievement-level cutpoints for the 1994 U.S. history and geography scales and the 1996 science scales. The error in the procedures affected achievement-level cutpoints for the 1990 mathematics national assessment at all grade levels (grades 4, 8, and 12) and the 1990 Trial State Assessment in mathematics, which was only at grade 8. This error also affected the 1992 mathematics results for the nation and the states. The information weighting error added a source of error to results in addition to the error associated problem with defining omits. Note that the proficiency estimates for 1990 mathematics are correct and did not have to be recalculated; only the cutpoints for the achievement levels were affected. For this reason, the achievement level almanac for 1990 state mathematics is not included in this appendix.

The information documenting the original analysis of the 1992 data that appears in the *Technical Report of the NAEP 1992 Trial State Assessment Program in Mathematics* (Johnson, Mazzeo, & Kline, 1993) is substantially in agreement with the revised 1994 analysis. The transformation constants for the revised analysis are provided in Table G-1. The information in the other sections of the technical report for the 1996 state mathematics assessment refer only to the revised analysis of the 1994 Trial State Assessment data.

Table G-1
Transformation Constants for the 1992 Trial State Assessment in Mathematics

	Grade 4		Grade 8	
Scale	k_1	k_2	k_1	k_2
Numbers and Operations	214.59	34.16	268.76	34.60
Measurement	221.40	33.28	262.82	43.95
Geometry	220.55	28.59	260.44	33.81
Data Analysis, Statistics, and Probability	217.80	32.66	264.58	39.93
Algebra and Functions	217.91	29.00	264.23	36.13
Estimation	205.41	35.52	267.14	28.14

As shown by Tables G-3 through G-5, all jurisdictions had average scores that were adjusted upward slightly as a result of the revision of results. For grade 4, Tables G-3 and G-4 indicate that average scores increased from .9 to 1.5 points on the proficiency scale. Accordingly, average scores in all the percentiles go up in a similar fashion. Since all jurisdictions were affected in a similar manner, there is little change in the ranking of the jurisdictions. With regard to achievement level results, Tables G-7 and G-8 indicate that although the average scale scores moved up when revised, the percent of students at or above the advanced, proficient and basic achievement levels went down slightly as a result of the two revisions. For the advanced level, percentages for the jurisdictions went down 0 to .8 percent, while for the below basic level, percentages went up .6 to 1.7 percent. Since the scale scores uniformly moved up, the shift in achievement level percentages must be due to the shift upward of the achievement level cutpoints as result of the information weighting error (see Table G-2). Similar results are evident for grade 8.

Tables G-5 and G-6 indicate that average scores for jurisdictions went up from .6 to 1 point as a result of the revision of scale scores, with similar slight upward adjustments occurring at every listed percentile. This change is somewhat less than what was demonstrated for grade 4 and again the ranking of the jurisdictions did not show much change. Tables G-9 and G-10 list the original and revised eighth-grade results for the achievement-level percentages. These tables also list values for 1990, since the Trial State Assessment was administered only at grade 8 and not grade 4 that year. The effects of the revision of the 1992 results are similar to those for grade 4. Although revised means were greater for every jurisdiction, the percentage above the three achievement levels were slightly smaller while percentages below the basic achievement level were slightly larger. As with grade 4, this reflects the upward shift of the achievement-level cutpoints as a result of the information weighting error (see Table G-2).

For grade 8, there is the question of the effect of the revisions on the 1990 to 1992 trend. All of the 17 jurisdictions that had significant trends in average scale scores in the original analysis also had significant trends in the revised analysis. In addition, seven jurisdictions that did not have significant trends in the original analysis had significant trends in revision. A number of changes in the percent of students at or above the achievement levels occurred due to the combination of the revision of scale scores and achievement level cutpoints for the 1992 data. As a result, more differences across the two years were significant. For 15 jurisdictions, there was an increase in the percent of students at or above an achievement level from 1990 to 1992 that did not change when the analysis was redone. There were nine jurisdictions where there was a significant trend upward in the percent of students at or above an achievement level only after revision. For only one jurisdiction was a trend no longer significant after revision (the percent at or above advanced for Michigan).

Table G-2

Original and Revised ACT Achievement Level Cut Scores for 1992 Mathematics

		Basic	Proficient	Advanced
Grade 4	Original	211	248	280
	Revised	214	249	282
Grade 8	Original	256	294	331
	Revised	262	299	333

In summary, while changes in average scale score, in percent of students at or above an achievement level, and in 1990 to 1992 trends in these statistics did occur, the meaning of the results were constant for most jurisdictions. An exception was that seven jurisdictions had significant differences in mean scale score from 1990 to 1992 that did not appear in the 1992 state reports. Also, 10 jurisdictions had changes in the percent of students at or above at least one achievement level.

Table G-3

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Original Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	206.9(1.6)	32.0(0.6)	165.3(1.7)	184.2(1.5)	206.8(2.4)	230.1(1.7)	248.8(1.8)
Arizona	213.8(1.1)	31.3(0.5)	171.8(2.1)	192.6(1.7)	215.4(1.3)	235.6(1.3)	253.3(2.3)
Arkansas	208.7(0.9)	30.9(0.6)	167.1(1.3)	187.4(1.1)	210.0(1.3)	230.4(1.0)	247.9(1.5)
California	207.1(1.6)	36.6(0.8)	157.6(2.4)	183.0(2.7)	209.3(1.3)	232.7(1.5)	252.9(1.9)
Colorado	219.8(1.0)	31.2(0.4)	178.8(1.7)	199.5(1.0)	221.0(1.4)	241.0(1.4)	259.2(1.4)
Connecticut	225.8(1.2)	32.1(0.7)	183.6(2.2)	204.6(1.6)	227.0(1.7)	248.2(1.7)	265.8(1.3)
Delaware	216.6(0.8)	32.4(0.7)	174.6(1.5)	193.7(1.0)	216.4(1.0)	239.4(1.5)	258.9(1.4)
District of Columbia	191.2(0.5)	32.8(0.4)	151.7(0.7)	169.0(0.7)	189.5(0.7)	210.9(0.9)	233.2(2.2)
Florida	212.4(1.5)	32.6(0.8)	169.6(2.5)	191.2(2.0)	213.6(1.8)	234.5(1.4)	253.6(2.6)
Georgia	214.3(1.3)	32.8(0.6)	171.3(2.0)	191.8(1.2)	215.2(1.3)	237.3(1.7)	256.8(2.0)
Hawaii	212.8(1.3)	34.0(0.7)	167.5(1.7)	190.1(1.6)	214.1(1.9)	236.8(1.2)	256.3(2.1)
Idaho	220.3(1.0)	28.1(0.5)	183.4(1.4)	201.7(2.5)	221.9(0.9)	240.0(0.7)	255.6(1.2)
Indiana	219.7(1.1)	28.3(0.5)	183.6(1.2)	199.9(1.7)	219.7(1.2)	239.3(1.2)	256.2(1.0)
Iowa	229.0(1.1)	29.6(0.5)	190.5(2.2)	210.0(1.1)	230.5(0.8)	249.4(0.7)	265.8(1.1)
Kentucky	213.6(1.0)	29.8(0.6)	175.6(1.7)	193.3(1.1)	213.1(1.1)	233.9(0.9)	252.6(1.7)
Louisiana	202.8(1.4)	32.2(0.9)	160.4(2.3)	181.3(1.6)	203.1(2.0)	225.1(3.2)	244.0(1.5)
Maine	230.7(1.0)	28.3(0.7)	194.0(1.9)	212.2(1.2)	231.9(1.8)	250.5(1.0)	265.1(1.3)
Maryland	216.1(1.3)	35.2(0.8)	169.5(2.0)	191.5(2.6)	217.6(2.2)	241.1(1.2)	260.5(1.6)
Massachusetts	225.5(1.2)	31.2(0.7)	184.4(1.5)	205.3(1.5)	227.0(1.3)	247.1(1.4)	264.0(1.1)
Michigan	218.6(1.8)	32.9(1.0)	174.3(3.3)	197.9(2.3)	221.1(1.8)	241.8(1.5)	258.9(1.6)
Minnesota	227.5(0.9)	31.1(0.6)	185.9(3.8)	207.7(1.2)	229.5(1.0)	249.4(0.9)	265.8(1.0)
Mississippi	200.1(1.1)	31.8(0.6)	159.2(1.7)	178.3(1.0)	200.2(1.3)	222.4(1.2)	240.7(1.8)
Missouri	221.0(1.2)	30.3(0.7)	181.6(2.9)	201.2(1.4)	221.8(1.5)	242.1(1.2)	259.7(1.4)
Nebraska	224.2(1.3)	30.8(0.6)	183.3(1.9)	203.8(1.7)	225.8(1.1)	245.5(1.4)	262.4(1.6)
New Hampshire	228.6(1.2)	28.7(0.5)	191.6(1.6)	210.0(1.2)	229.2(1.4)	248.6(1.3)	264.6(2.5)
New Jersey	226.1(1.5)	31.4(0.9)	184.6(2.8)	205.6(1.9)	227.9(1.6)	248.3(1.1)	265.0(2.3)
New Mexico	211.8(1.5)	30.2(0.7)	172.5(2.5)	191.1(1.8)	212.3(1.0)	232.2(1.7)	250.7(2.5)
New York	217.2(1.3)	32.8(0.9)	173.3(3.2)	195.9(1.4)	218.5(1.8)	240.1(1.7)	258.4(1.6)
North Carolina	211.4(1.1)	33.1(0.6)	167.7(1.6)	188.2(1.4)	212.7(1.3)	234.6(1.3)	253.0(1.2)
North Dakota	227.6(0.8)	26.9(0.6)	192.8(2.8)	210.2(1.9)	228.3(0.8)	246.3(0.8)	261.0(1.1)
Ohio	217.5(1.2)	31.4(0.8)	177.2(2.7)	196.4(1.5)	218.0(1.3)	239.1(2.3)	257.7(1.4)
Oklahoma	219.0(1.0)	27.4(0.6)	183.7(1.5)	200.9(1.2)	219.2(1.1)	237.2(1.4)	253.8(2.2)
Pennsylvania	223.2(1.4)	31.4(0.7)	181.0(1.8)	202.5(1.9)	224.8(1.8)	245.7(1.6)	262.0(2.3)
Rhode Island	214.0(1.6)	32.0(0.9)	171.9(3.1)	193.2(2.9)	215.7(1.8)	235.9(2.0)	253.7(2.2)
South Carolina	211.1(1.1)	31.8(0.6)	170.7(1.3)	189.1(1.2)	210.3(1.2)	233.3(1.4)	252.9(2.4)
Tennessee	209.4(1.4)	30.8(0.6)	169.3(2.0)	188.3(1.9)	210.3(1.7)	230.8(1.5)	248.5(1.9)
Texas	216.6(1.3)	31.3(0.8)	176.6(2.2)	196.3(1.5)	217.0(1.6)	237.9(1.6)	256.5(2.7)
Utah	222.8(1.0)	29.3(0.6)	184.8(1.6)	203.7(0.9)	223.8(1.3)	242.8(0.8)	259.8(0.9)
Virginia	219.6(1.3)	32.6(0.7)	177.5(1.4)	197.4(1.6)	219.8(1.1)	241.9(1.8)	261.7(2.8)
West Virginia	213.9(1.1)	30.1(0.6)	174.9(1.5)	193.9(1.4)	214.1(1.2)	234.3(1.4)	252.2(1.8)
Wisconsin	227.7(1.1)	29.6(0.7)	188.5(2.1)	208.7(1.0)	229.4(1.2)	248.3(1.3)	264.2(1.3)
Wyoming	224.2(1.0)	27.2(0.5)	189.1(2.1)	206.8(1.9)	225.1(1.2)	242.9(1.3)	258.2(1.2)
Guam	191.1(0.8)	34.3(0.6)	147.1(1.8)	167.5(0.9)	191.4(1.1)	213.8(1.4)	235.3(1.3)
Virgin Islands	178.0(1.2)	28.3(0.7)	140.4(1.8)	159.2(2.2)	178.7(1.3)	197.2(2.2)	213.8(2.4)

Table G-4

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Revised Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	208.3(1.6)	31.3(0.6)	167.7(1.4)	186.2(1.8)	208.4(2.2)	231.1(1.5)	249.3(2.4)
Arizona	215.3(1.1)	30.3(0.5)	174.4(1.8)	194.6(2.3)	216.9(1.3)	236.5(0.9)	253.4(1.4)
Arkansas	210.2(0.9)	30.1(0.6)	169.7(1.5)	189.5(1.1)	211.5(1.2)	231.4(1.1)	248.5(1.5)
California	208.4(1.6)	36.0(0.8)	159.8(1.9)	184.6(2.3)	210.7(1.5)	233.5(1.3)	253.1(2.6)
Colorado	221.0(1.0)	30.3(0.4)	181.2(1.8)	201.4(1.0)	222.3(0.9)	241.7(1.2)	259.1(0.8)
Connecticut	226.8(1.1)	31.0(0.7)	185.8(2.2)	206.4(1.3)	228.3(1.5)	248.5(0.9)	265.3(1.6)
Delaware	217.9(0.8)	31.4(0.7)	177.0(1.4)	195.7(1.3)	217.9(0.8)	240.1(1.4)	258.8(1.4)
District of Columbia	192.6(0.5)	32.6(0.4)	153.2(0.8)	170.7(1.1)	191.0(0.6)	211.8(1.2)	234.4(1.4)
Florida	213.7(1.5)	31.8(0.7)	171.7(2.1)	193.0(1.8)	215.2(1.5)	235.3(1.4)	253.8(3.1)
Georgia	215.6(1.2)	31.9(0.6)	173.7(1.7)	193.7(1.4)	216.7(1.4)	238.2(1.4)	256.8(1.2)
Hawaii	214.1(1.3)	33.2(0.6)	170.0(1.5)	191.8(2.3)	215.5(1.3)	237.5(1.1)	256.5(1.9)
Idaho	221.6(1.0)	27.2(0.5)	185.6(1.9)	203.5(1.9)	223.3(1.2)	240.7(0.7)	255.5(1.1)
Indiana	221.0(1.0)	27.4(0.5)	186.0(1.3)	201.7(1.3)	221.2(0.9)	240.1(1.2)	256.3(1.0)
Iowa	229.9(1.0)	28.6(0.5)	192.7(2.3)	211.8(1.4)	231.6(0.9)	249.7(0.7)	265.4(1.5)
Kentucky	215.0(1.0)	28.9(0.6)	178.2(1.5)	195.2(1.0)	214.7(1.0)	234.9(1.0)	252.8(1.3)
Louisiana	204.1(1.5)	31.8(1.1)	162.9(2.5)	183.3(2.0)	204.8(1.4)	226.4(2.4)	244.5(1.4)
Maine	231.6(1.0)	27.4(0.7)	196.2(1.9)	213.8(1.3)	232.8(1.3)	250.8(1.0)	264.6(1.2)
Maryland	217.3(1.3)	34.3(0.8)	171.8(1.7)	193.4(2.2)	219.0(1.5)	242.0(1.7)	260.5(1.2)
Massachusetts	226.6(1.2)	30.2(0.6)	186.7(1.2)	207.2(1.5)	228.3(1.4)	247.6(1.6)	263.6(1.7)
Michigan	219.9(1.7)	31.9(1.0)	176.8(3.1)	199.9(2.8)	222.5(1.7)	242.5(1.6)	258.7(1.6)
Minnesota	228.5(0.9)	30.0(0.5)	188.3(4.1)	209.4(1.1)	230.6(0.9)	249.6(1.1)	265.3(1.4)
Mississippi	201.8(1.1)	31.1(0.6)	161.7(1.5)	180.5(1.4)	202.1(1.6)	223.8(1.2)	241.6(1.2)
Missouri	222.2(1.2)	29.3(0.7)	184.0(1.7)	203.1(1.4)	223.1(1.4)	242.7(1.1)	259.5(1.6)
Nebraska	225.3(1.2)	29.7(0.6)	185.7(1.8)	205.7(1.8)	227.0(1.3)	246.0(1.3)	262.1(1.8)
New Hampshire	229.7(1.2)	27.6(0.5)	193.8(1.1)	211.7(1.2)	230.3(1.3)	248.9(1.3)	264.1(2.3)
New Jersey	227.1(1.5)	30.3(0.9)	186.9(3.1)	207.4(1.7)	229.1(1.5)	248.7(1.0)	264 6(1.9)
New Mexico	213.3(1.4)	29.3(0.6)	175.0(2.9)	193.2(2.1)	213.9(1.2)	233.3(2.1)	250.9(1.8)
New York	218.4(1.2)	32.0(0.9)	175.7(2.2)	197.6(1.0)	220.0(1.7)	240.8(1.6)	258.3(1.0)
North Carolina	212.9(1.1)	32.2(0.6)	170.4(1.1)	190.4(1.4)	214.3(1.3)	235.5(1.6)	253.0(1.2)
North Dakota	228.7(0.8)	25.9(0.5)	195.0(2.4)	212.0(1.1)	229.4(0.8)	246.7(0.8)	260.8(1.4)
Ohio	218.7(1.2)	30.5(0.8)	179.5(1.8)	198.2(1.5)	219.4(0.9)	239.8(1.7)	257.4(1.1)
Oklahoma	220.3(1.0)	26.5(0.6)	186.0(1.7)	202.8(0.9)	220.6(1.2)	238.0(1.4)	253.9(1.9)
Pennsylvania	224.3(1.3)	30.4(0.7)	183.4(1.9)	204.3(1.5)	226.0(1.7)	246.1(1.8)	261.7(1.8)
Rhode Island	215.4(1.5)	31.0(0.9)	174.4(2.8)	195.3(3.0)	217.3(1.9)	236.8(1.7)	253.8(3.0)
South Carolina	212.5(1.1)	31.0(0.6)	173.0(1.3)	191.2(1.1)	211.9(1.2)	234.2(1.4)	253.1(1.8)
Tennessee	210.9(1.4)	29.9(0.6)	171.8(2.3)	190.5(2.1)	212.0(1.6)	231.9(1.4)	248.8(1.4)
Texas	217.9(1.2)	30.3(0.8)	179.0(2.4)	198.3(1.4)	218.5(1.5)	238.7(1.8)	256.5(2.3)
Utah	224.0(1.0)	28.3(0.6)	187.0(1.6)	205.6(1.2)	225.1(1.3)	243.3(1.0)	259.8(1.0)
Virginia	220.8(1.3)	31.7(0.7)	179.8(1.3)	199.3(1.5)	221.2(1.4)	242.5(1.9)	261.3(2.2)
West Virginia	215.3(1.1)	29.3(0.5)	177.3(1.4)	195.8(1.6)	215.6(1.1)	235.2(1.4)	252.3(1.6)
Wisconsin	228.7(1.1)	28.5(0.7)	190.8(1.9)	210.4(0.7)	230.5(1.3)	248.6(1.2)	263.6(1.8)
Wyoming	225.4(0.9)	26.2(0.5)	191.3(1.6)	208.6(1.4)	226.4(1.2)	243.5(0.9)	258.2(0.9)
Guam	192.8(0.8)	33.7(0.6)	149.6(1.4)	169.6(1.2)	193.2(1.1)	215.4(1.3)	236.2(1.7)
Virgin Islands	178.9(1.2)	28.8(0.7)	140.7(2.3)	159.9(2.2)	179.8(1.7)	198.3(1.2)	215.0(2.5)

Table G-5

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Original Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	251.3(1.7)	35.8(1.2)	205.5(1.9)	226.8(1.8)	250.6(2.0)	275.7(1.7)	298.8(2.0)
Arizona	264.6(1.3)	32.8(0.7)	222.1(1.6)	242.8(1.3)	265.0(1.9)	286.9(1.2)	306.5(1.3)
Arkansas	255.4(1.2)	34.3(0.6)	210.9(1.6)	232.9(1.2)	256.2(1.2)	278.8(1.6)	298.6(1.6)
California	260.1(1.7)	38.7(1.1)	208.8(2.7)	233.7(2.6)	261.4(1.8)	287.9(1.7)	308.8(2.5)
Colorado	271.7(1.1)	33.1(0.6)	227.6(1.6)	250.1(1.2)	273.3(1.1)	295.0(1.2)	313.3(1.2)
Connecticut	273.1(1.1)	36.0(0.9)	224.3(2.6)	248.8(1.7)	275.4(0.8)	299.2(1.0)	318.4(1.4)
Delaware	262.1(1.0)	35.7(0.7)	216.4(1.8)	238.7(0.9)	262.4(1.3)	286.6(1.5)	307.0(1.4)
District of Columbia	233.9(0.9)	36.5(1.0)	188.6(1.0)	208.7(1.2)	233.3(1.8)	257.2(2.8)	280.2(1.7)
Florida	259.1(1.5)	36.8(0.8)	210.3(3.0)	234.0(1.6)	260.1(2.0)	284.8(1.7)	306.5(2.0)
Georgia	258.5(1.2)	34.6(0.6)	213.8(1.5)	234.7(1.5)	259.4(1.3)	282.9(2.1)	303.1(1.5)
Hawaii	256.6(0.9)	37.8(0.7)	208.2(1.5)	230.9(1.0)	257.5(1.6)	282.8(1.0)	304.7(1.3)
Idaho	274.4(0.8)	30.5(0.5)	234.9(1.1)	254.5(0.9)	275.2(1.2)	295.7(0.8)	313.0(1.1)
Indiana	269.4(1.2)	33.9(0.6)	225.3(1.5)	246.8(1.2)	269.8(1.3)	292.7(1.9)	313.1(2.9)
Iowa	282.8(1.0)	30.0(0.6)	243.9(2.1)	262.5(1.4)	283.7(1.1)	303.9(1.5)	320.6(1.6)
Kentucky	261.4(1.1)	34.3(0.6)	216.4(1.7)	238.5(1.6)	262.0(1.0)	284.6(1.3)	305.4(2.8)
Louisiana	249.1(1.7)	34.0(0.9)	204.6(2.6)	226.4(2.2)	249.7(1.6)	272.1(2.0)	293.0(1.8)
Maine	278.0(1.0)	30.7(0.8)	239.1(2.3)	258.2(1.2)	278.6(1.1)	299.0(1.7)	316.4(1.3)
Maryland	264.2(1.3)	39.2(0.9)	212.9(1.8)	236.9(2.3)	265.0(1.3)	292.4(1.6)	313.5(1.6)
Massachusetts	272.1(1.1)	34.2(0.7)	228.6(1.4)	248.6(2.2)	272.9(2.0)	296.8(1.6)	315.7(1.7)
Michigan	266.6(1.4)	35.4(0.6)	220.0(1.4)	243.1(2.3)	268.3(1.6)	291.7(2.9)	311.2(2.3)
Minnesota	281.8(1.0)	31.9(0.5)	240.0(1.4)	260.2(1.4)	282.9(1.3)	304.3(1.4)	322.3(1.4)
Mississippi	245.5(1.2)	34.8(0.6)	200.6(1.2)	221.3(1.3)	245.4(1.2)	270.0(1.6)	290.9(2.0)
Missouri	270.4(1.2)	32.7(0.7)	227.9(2.9)	248.5(1.8)	271.8(1.4)	292.8(1.6)	311.5(1.3)
Nebraska	277.0(1.1)	32.4(0.6)	234.0(1.7)	256.4(1.2)	279.1(1.4)	299.7(1.0)	316.9(1.5)
New Hampshire	277.6(1.0)	30.4(0.7)	237.9(1.1)	257.7(0.8)	278.0(0.9)	298.5(1.1)	315.9(2.0)
New Jersey	271.2(1.6)	36.0(0.9)	222.2(1.9)	247.0(2.0)	272.9(1.9)	296.8(2.2)	317.1(1.6)
New Mexico	258.8(0.9)	32.3(0.7)	217.1(2.0)	237.4(0.9)	259.3(1.0)	280.9(1.0)	300.2(1.3)
New York	265.7(2.1)	39.4(1.3)	213.2(3.1)	240.9(2.7)	268.3(1.8)	292.7(1.4)	314.5(2.4)
North Carolina	257.6(1.2)	35.4(0.8)	212.3(2.6)	233.6(1.3)	258.5(1.2)	282.0(1.4)	302.7(1.5)
North Dakota	282.6(1.2)	28.3(0.6)	244.9(1.2)	263.7(1.4)	284.3(1.0)	302.0(1.4)	318.0(1.7)
Ohio	267.4(1.5)	34.4(0.9)	222.0(1.9)	244.4(2.0)	269.1(1.6)	291.6(1.4)	310.4(1.5)
Oklahoma	267.4(1.2)	32.3(0.6)	225.9(1.3)	247.1(1.4)	268.3(1.1)	290.1(1.4)	307.7(1.5)
Pennsylvania	270.7(1.5)	34.5(0.9)	225.1(2.3)	247.9(1.5)	272.2(1.4)	295.0(1.1)	314.5(1.8)
Rhode Island	265.1(0.7)	33.4(0.5)	220.9(1.2)	242.8(1.1)	266.7(1.2)	288.5(1.7)	306.9(1.1)
South Carolina	260.0(1.0)	35.3(0.7)	215.2(1.3)	235.2(1.1)	259.2(1.2)	284.6(1.7)	306.7(1.5)
Tennessee	258.0(1.4)	33.9(0.7)	214.0(2.1)	234.9(1.5)	258.2(1.6)	282.1(1.4)	301.6(1.5)
Texas	263.8(1.3)	37.2(0.7)	215.8(2.7)	237.5(1.2)	263.9(1.9)	289.4(2.3)	312.0(1.5)
Utah	273.6(0.7)	32.0(0.8)	231.6(1.2)	252.8(1.7)	274.9(0.8)	296.1(1.2)	313.7(1.2)
Virginia	267.1(1.2)	35.4(0.7)	221.4(1.5)	243.0(1.7)	267.4(1.7)	291.4(1.6)	313.4(1.5)
West Virginia	258.2(1.0)	31.1(0.6)	217.8(1.5)	237.0(1.0)	258.4(1.7)	280.5(1.1)	298.2(1.8)
Wisconsin	277.3(1.5)	33.2(0.7)	233.1(2.6)	256.7(2.1)	279.1(1.5)	300.6(1.5)	317.8(1.4)
Wyoming	274.4(0.9)	29.6(0.5)	236.5(1.0)	254.1(1.2)	275.2(1.2)	294.9(1.2)	312.1(1.1)
Guam	234.3(1.0)	39.2(0.8)	183.8(2.1)	207.1(1.8)	233.4(1.6)	261.4(2.5)	286.2(3.7)
Virgin Islands	221.8(1.1)	30.1(0.6)	183.1(1.2)	201.2(1.6)	221.4(1.2)	242.1(1.5)	260.2(1.6)

Table G-6

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Revised Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	252.2(1.7)	35.5(1.2)	206.8(1.8)	227.9(1.9)	251.6(1.7)	276.5(1.7)	299.2(2.3)
Arizona	265.4(1.3)	32.4(0.6)	223.3(2.3)	243.9(1.4)	265.9(1.8)	287.6(1.1)	306.8(1.2)
Arkansas	256.3(1.2)	33.9(0.6)	212.1(1.7)	234.1(1.4)	257.2(1.2)	279.5(1.4)	299.0(1.2)
California	260.9(1.7)	38.3(1.1)	210.1(1.8)	234.8(2.8)	262.3(1.4)	288.5(2.2)	309.0(2.2)
Colorado	272.4(1.0)	32.7(0.6)	228.8(1.8)	251.1(1.1)	274.1(1.2)	295.4(1.1)	313.5(1.1)
Connecticut	273.7(1.1)	35.6(0.9)	225.4(2.6)	249.8(1.4)	276.1(0.9)	299.6(0.8)	318.4(1.3)
Delaware	262.9(1.0)	35.3(0.7)	217.7(2.4)	239.7(1.2)	263.3(1.2)	287.2(1.7)	307.3(1.5)
District of Columbia	234.9(0.9)	36.2(0.9)	189.9(1.1)	210.0(1.2)	234.3(1.9)	258.1(2.1)	280.8(1.6)
Florida	259.9(1.5)	36.4(0.8)	211.5(2.9)	235.1(1.7)	260.9(1.9)	285.5(1.5)	306.7(1.8)
Georgia	259.4(1.2)	34.3(0.6)	215.0(1.4)	235.8(1.2)	260.3(1.3)	283.6(2.1)	303.3(1.3)
Hawaii	257.4(0.9)	37.3(0.6)	209.4(2.5)	232.0(0.9)	258.3(1.4)	283.4(1.0)	305.0(1.6)
Idaho	275.1(0.7)	30.1(0.5)	236.1(1.1)	255.4(1.0)	276.0(1.0)	296.1(0.9)	313.1(1.1)
Indiana	270.1(1.1)	33.5(0.6)	226.4(1.4)	247.8(1.5)	270.6(1.5)	293.2(1.5)	313.4(3.2)
Iowa	283.4(1.0)	29.5(0.6)	245.0(2.6)	263.4(1.2)	284.3(1.3)	304.2(1.8)	320.6(1.3)
Kentucky	262.2(1.1)	33.9(0.6)	217.6(1.8)	239.5(1.6)	262.9(1.1)	285.2(1.4)	305.6(2.3)
Louisiana	250.0(1.7)	33.7(0.8)	205.8(2.7)	227.4(1.9)	250.6(1.8)	272.9(1.8)	293.5(1.5)
Maine	278.6(1.0)	30.3(0.8)	240.3(2.0)	259.1(1.1)	279.4(1.3)	299.4(1.5)	316.5(1.7)
Maryland	264.8(1.3)	38.9(0.9)	214.1(2.6)	237.9(2.1)	265.9(0.9)	292.9(1.2)	313.6(1.9)
Massachusetts	272.8(1.0)	33.8(0.7)	229.7(1.4)	249.6(2.2)	273.7(1.3)	297.2(1.6)	315.7(1.5)
Michigan	267.4(1.4)	35.0(0.6)	221.2(1.1)	244.1(2.1)	269.1(1.4)	292.3(2.3)	311.4(2.2)
Minnesota	282.4(1.0)	31.5(0.5)	241.1(1.7)	261.1(1.2)	283.6(1.4)	304.5(1.3)	322.2(1.6)
Mississippi	246.5(1.2)	34.5(0.6)	201.8(1.1)	222.5(1.1)	246.4(1.3)	270.8(1.5)	291.4(1.3)
Missouri	271.1(1.2)	32.3(0.7)	229.0(2.3)	249.6(1.9)	272.6(1.3)	293.3(1.7)	311.6(1.4)
Nebraska	277.7(1.1)	32.0(0.5)	235.2(1.8)	257.3(1.2)	279.8(1.5)	300.1(1.3)	317.0(1.2)
New Hampshire	278.2(1.0)	30.0(0.7)	239.0(1.3)	258.6(0.7)	278.7(0.8)	298.9(1.3)	316.0(1.7)
New Jersey	271.9(1.6)	35.6(0.9)	223.4(2.0)	248.0(2.3)	273.6(1.8)	297.2(2.0)	317.0(2.1)
New Mexico	259.6(0.9)	31.9(0.7)	218.4(2.7)	238.5(1.1)	260.1(0.9)	281.6(1.1)	300.6(1.0)
New York	266.4(2.1)	39.0(1.3)	214.6(3.3)	241.9(2.5)	269.2(1.9)	293.3(1.5)	314.6(2.0)
North Carolina	258.4(1.2)	35.1(0.8)	213.4(2.1)	234.6(1.8)	259.3(0.9)	282.6(1.2)	302.9(2.0)
North Dakota	283.2(1.1)	27.9(0.6)	246.0(1.3)	264.6(1.3)	284.9(1.0)	302.3(1.5)	317.9(1.6)
Ohio	268.1(1.5)	34.2(0.9)	223.1(2.3)	245.4(1.8)	269.9(1.5)	292.2(1.0)	310.6(1.6)
Oklahoma	268.1(1.1)	31.9(0.6)	227.0(1.1)	248.1(1.3)	269.1(1.1)	290.7(1.5)	308.1(1.3)
Pennsylvania	271.4(1.5)	34.1(0.9)	226.2(2.5)	248.9(1.3)	273.0(1.3)	295.4(1.2)	314.6(1.9)
Rhode Island	265.9(0.7)	33.1(0.5)	222.0(0.9)	243.8(1.2)	267.6(1.1)	289.1(1.5)	307.1(1.1)
South Carolina	260.8(1.0)	34.9(0.7)	216.4(1.6)	236.3(1.2)	260.0(1.3)	285.2(1.7)	307.0(1.7)
Tennessee	258.8(1.4)	33.5(0.7)	215.3(2.2)	236.0(1.5)	259.1(1.6)	282.8(1.8)	301.9(1.7)
Texas	264.6(1.3)	36.8(0.7)	217.0(2.0)	238.6(1.3)	264.8(1.6)	290.0(1.9)	312.0(2.1)
Utah	274.3(0.7)	31.6(0.8)	232.7(1.3)	253.8(1.3)	275.7(0.9)	296.6(1.2)	313.9(1.2)
Virginia	267.9(1.2)	35.0(0.6)	222.5(1.7)	244.0(1.7)	268.2(1.7)	291.9(1.6)	313.5(1.8)
West Virginia	259.1(1.0)	30.8(0.6)	219.0(1.8)	238.1(1.1)	259.4(1.4)	281.1(0.9)	298.6(1.5)
Wisconsin	277.9(1.5)	32.7(0.7)	234.3(2.3)	257.6(2.1)	279.8(1.3)	300.9(1.4)	317.9(1.2)
Wyoming	275.1(0.9)	29.2(0.5)	237.6(1.1)	255.1(1.1)	276.0(1.2)	295.4(1.0)	312.2(1.3)
Guam	235.1(1.0)	39.2(0.9)	184.5(1.9)	208.1(3.3)	234.3(1.9)	262.4(1.7)	286.7(1.8)
Virgin Islands	222.8(1.1)	30.0(0.6)	184.2(1.7)	202.2(1.8)	222.4(1.5)	243.0(1.6)	260.9(2.0)

BEST COPY AVAILABLE

Table G-7

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Original Results

	N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	2605	1.9(0.1) [3%]	206.9(1.6)	0.6(0.2)	10.5(1.3)	44.7(2.2)	55.3(2.2)
Arizona	2741	1.8(0.0) [2%]	213.8(1.1)	1.2(0.3)	13.5(0.9)	55.2(1.7)	44.8(1.7)
Arkansas	2621	1.2(0.0) [4%]	208.7(0.9)	0.6(0.2)	10.0(0.8)	48.8(1.3)	51.2(1.3)
California	2412	12.3(0.3) [3%]	207.1(1.6)	1.6(0.5)	12.7(1.2)	48.0(2.0)	52.0(2.0)
Colorado	2906	1.7(0.1) [3%]	219.8(1.0)	2.1(0.4)	18.2(1.1)	62.5(1.4)	37.5(1.4)
Connecticut	2600	1.2(0.0) [3%]	225.8(1.2)	3.7(0.6)	25.2(1.4)	68.8(1.5)	31.2(1.5)
Delaware	2040	0.3(0.0) [0%]	216.6(0.8)	2.3(0.4)	17.0(0.8)	56.2(1.0)	43.8(1.0)
District of Columbia	2399	0.2(0.0) [0%]	191.2(0.5)	1.0(0.2)	5.5(0.3)	24.9(1.0)	75.1(1.0)
Florida	2828	5.4(0.2) [3%]	212.4(1.5)	1.5(0.4)	13.5(1.4)	53.4(2.0)	46.6(2.0)
Georgia	2766	3.4(0.1) [4%]	214.3(1.3)	1.5(0.4)	15.7(1.2)	54.9(1.7)	45.1(1.7)
Hawaii	2625	0.5(0.0) [2%]	212.8(1.3)	1.5(0.4)	15.2(1.0)	53.7(1.8)	46.3(1.8)
Idaho	2784	0.6(0.0) [3%]	220.3(1.0)	1.1(0.3)	16.1(1.1)	64.2(1.7)	35.8(1.7)
Indiana	2593	2.7(0.1) [3%]	219.7(1.1)	1.5(0.3)	16.2(1.1)	61.6(1.6)	38.4(1.6)
Iowa	2770	1.3(0.0) [4%]	229.0(1.1)	3.1(0.5)	27.0(1.3)	74.1(1.4)	25.9(1.4)
Kentucky	2703	1.8(0.1) [4%]	213.6(1.0)	1.4(0.5)	12.9(1.1)	52.7(1.5)	47.3(1.5)
Louisiana	2792	2.2(0.1) [3%]	202.8(1.4)	0.6(0.2)	7.9(0.8)	40.5(2.0)	59.5(2.0)
Maine	1898	0.6(0.0) [3%]	230.7(1.0)	3.0(0.6)	28.3(1.5)	76.3(1.3)	23.7(1.3)
Maryland	2844	2.0(0.1) [3%]	216.1(1.3)	2.8(0.4)	18.9(1.2)	56.8(1.6)	43.2(1.6)
Massachusetts	2549	2.1(0.1) [4%]	225.5(1.2)	3.1(0.5)	24.0(1.5)	69.7(1.6)	30.3(1.6)
Michigan	2412	4.1(0.1) [4%]	218.6(1.8)	1.7(0.5)	19.1(1.7)	62.1(2.2)	37.9(2.2)
Minnesota	2640	2.1(0.1) [4%]	227.5(0.9)	3.4(0.5)	26.8(1.2)	71.8(1.4)	28.2(1.4)
Mississippi	2712	1.4(0.0) [3%]	200.1(1.1)	0.4(0.1)	6.5(0.7)	37.3(1.3)	62.7(1.3)
Missouri	2509	2.1(0.1) [5%]	221.0(1.2)	1.9(0.3)	19.3(1.3)	63.6(1.6)	36.4(1.6)
Nebraska	2327	0.7(0.0) [3%]	224.2(1.3)	2.6(0.5)	22.5(1.7)	68.1(1.8)	31.9(1.8)
New Hampshire	2265	0.5(0.0) [3%]	228.6(1.2)	3.0(0.6)	25.7(1.7)	73.8(1.6)	26.2(1.6)
New Jersey	2231	2.8(0.1) [4%]	226.1(1.5)	3.2(0.7)	25.3(1.6)	69.9(2.1)	30.1(2.1)
New Mexico	2342	0.8(0.1) [6%]	211.8(1.5)	1.0(0.4)	11.4(1.3)	51.6(1.9)	48.4(1.9)
New York	2284	6.7(0.2) [3%]	217.2(1.3)	2.0(0.3)	17.4(1.3)	58.8(1.9)	41.2(1.9)
North Carolina	2884	3.0(0.1) [3%]	211.4(1.1)	1.6(0.4)	13.2(0.9)	52.1(1.6)	47.9(1.6)
North Dakota	2193	0.3(0.0) [4%]	227.6(0.8)	1.8(0.3)	22.9(1.1)	74.2(1.2)	25.8(1.2)
Ohio	2637	4.9(0.1) [3%]	217.5(1.2)	1.9(0.3)	16.8(1.1)	58.8(1.7)	41.2(1.7)
Oklahoma	2254	1.6(0.0) [3%]	219.0(1.0)	1.2(0.4)	14.4(1.1)	61.5(1.6)	38.5(1.6)
Pennsylvania	2740	4.6(0.2) [4%]	223.2(1.4)	2.6(0.5)	22.5(1.5)	66.4(1.9)	33.6(1.9)
Rhode Island	2390	0.4(0.0) [5%]	214.0(1.6)	1.6(0.4)	13.8(1.2)	55.8(2.2)	44.2(2.2)
South Carolina	2771	1.8(0.1) [3%]	211.1(1.1)	1.2(0.3)	13.3(1.1)	49.3(1.5)	50.7(1.5)
Tennessee	2708	2.4(0.1) [3%]	209.4(1.4)	0.7(0.2)	10.2(1.0)	49.0(2.1)	51.0(2.1)
Texas	2623	9.0(0.3) [4%]	216.6(1.3)	1.8(0.5)	15.5(1.3)	57.6(1.7)	42.4(1.7)
Utah	2799	1.3(0.0) [2%]	222.8(1.0)	1.9(0.3)	19.5(1.1)	67.4(1.6)	32.6(1.6)
Virginia	2786	2.8(0.1) [3%]	219.6(1.3)	3.1(0.7)	19.4(1.6)	60.3(1.4)	39.7(1.4)
West Virginia	2786	0.9(0.0) [4%]	213.9(1.1)	1.3(0.3)	12.8(1.0)	54.1(1.6)	45.9(1.6)
Wisconsin	2780	2.1(0.1) [4%]	227.7(1.1)	3.0(0.5)	25.3(1.4)	72.4(1.3)	27.6(1.3)
Wyoming	2605	0.3(0.0) [3%]	224.2(1.0)	1.5(0.3)	19.4(1.2)	70.1(1.4)	29.9(1.4)
Guam	1933	0.1(0.0) [0%]	191.1(0.8)	0.4(0.1)	4.9(0.5)	28.0(1.2)	72.0(1.2)
Virgin Islands	905	0.1(0.0) [0%]	178.0(1.2)	0.0(0.0)	0.4(0.2)	11.8(1.6)	88.2(1.6)

Table G-8

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Revised Results

	N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	2605	1.9(0.1) [3%]	208.3(1.6)	0.5(0.1)	10.1(1.2)	43.0(2.1)	57.0(2.1)
Arizona	2741	1.8(0.0) [2%]	215.3(1.1)	0.8(0.2)	13.1(0.9)	53.5(1.6)	46.5(1.6)
Arkansas	2621	1.2(0.0) [4%]	210.2(0.9)	0.4(0.2)	9.7(0.7)	46.9(1.5)	53.1(1.5)
California	2412	12.3(0.3) [3%]	208.4(1.6)	1.3(0.4)	12.4(1.2)	46.4(1.9)	53.6(1.9)
Colorado	2906	1.7(0.1) [3%]	221.0(1.0)	1.5(0.4)	17.5(1.0)	60.8(1.4)	39.2(1.4)
Connecticut	2600	1.2(0.0) [3%]	226.8(1.1)	2.9(0.5)	24.4(1.4)	67.3(1.6)	32.7(1.6)
Delaware	2040	0.3(0.0) [0%]	217.9(0.8)	1.8(0.3)	16.5(0.9)	54.6(1.0)	45.4(1.0)
District of Columbia	2399	0.2(0.0) [0%]	192.6(0.5)	0.9(0.2)	5.5(0.3)	23.1(0.9)	76.9(0.9)
Florida	2828	5.4(0.2) [3%]	213.7(1.5)	1.2(0.3)	13.3(1.4)	51.6(1.7)	48.4(1.7)
Georgia	2766	3.4(0.1) [4%]	215.6(1.2)	1.1(0.3)	15.3(1.2)	53.1(1.7)	46.9(1.7)
Hawaii	2625	0.5(0.0) [2%]	214.1(1.3)	1.1(0.2)	14.6(0.9)	51.9(1.8)	48.1(1.8)
Idaho	2784	0.6(0.0) [3%]	221.6(1.0)	0.7(0.3)	15.7(1.0)	62.7(1.7)	37.3(1.7)
Indiana	2593	2.7(0.1) [3%]	221.0(1.0)	1.0(0.2)	15.6(1.1)	59.8(1.7)	40.2(1.7)
Iowa	2770	1.3(0.0) [4%]	229.9(1.0)	2.3(0.4)	26.0(1.2)	72.4(1.5)	27.6(1.5)
Kentucky	2703	1.8(0.1) [4%]	215.0(1.0)	1.0(0.3)	12.6(1.2)	50.9(1.5)	49.1(1.5)
Louisiana	2792	2.2(0.1) [3%]	204.1(1.5)	0.4(0.2)	7.6(0.8)	38.8(2.0)	61.2(2.0)
Maine	1898	0.6(0.0) [3%]	231.6(1.0)	2.4(0.5)	27.4(1.5)	74.8(1.5)	25.2(1.5)
Maryland	2844	2.0(0.1) [3%]	217.3(1.3)	2.2(0.3)	18.4(1.2)	55.1(1.6)	44.9(1.6)
Massachusetts	2549	2.1(0.1) [4%]	226.6(1.2)	2.4(0.5)	23.3(1.5)	68.5(1.6)	31.5(1.6)
Michigan	2412	4.1(0.1) [4%]	219.9(1.7)	1.2(0.4)	18.5(1.7)	60.5(2.2)	39.5(2.2)
Minnesota	2640	2.1(0.1) [6%]	228.5(0.9)	2.5(0.4)	25.9(1.3)	70.6(1.6)	29.4(1.6)
Mississippi	2712	1.4(0.0) [3%]	201.8(1.1)	0.3(0.1)	6.3(0.6)	35.8(1.3)	64.2(1.3)
Missouri	2509	2.1(0.1) [5%]	222.2(1.2)	1.3(0.3)	18.6(1.3)	62.1(1.7)	37.9(1.7)
Nebraska	2327	0.7(0.0) [3%]	225.3(1.2)	2.0(0.5)	21.8(1.6)	66.6(1.8)	33.4(1.8)
New Hampshire	2265	0.5(0.0) [3%]	229.7(1.2)	2.1(0.4)	24.9(1.6)	72.3(1.6)	27.7(1.6)
New Jersey	2231	2.8(0.1) [4%]	227.1(1.5)	2.5(0.6)	24.6(1.5)	68.2(2.1)	31.8(2.1)
New Mexico	2342	0.8(0.1) [6%]	213.3(1.4)	0.6(0.2)	11.1(1.3)	49.8(2.0)	50.2(2.0)
New York	2284	6.7(0.2) [3%]	218.4(1.2)	1.5(0.3)	17.0(1.3)	57.0(1.8)	43.0(1.8)
North Carolina	2884	3.0(0.1) [3%]	212.9(1.1)	1.2(0.3)	12.7(0.8)	50.3(1.6)	49.7(1.6)
North Dakota	2193	0.3(0.0) [4%]	228.7(0.8)	1.3(0.3)	22.2(1.1)	72.5(1.3)	27.5(1.3)
Ohio	2637	4.9(0.1) [3%]	218.7(1.2)	1.4(0.3)	16.1(1.2)	57.0(1.7)	43.0(1.7)
Oklahoma	2254	1.6(0.0) [3%]	220.3(1.0)	0.8(0.3)	14.0(1.2)	59.5(1.7)	40.5(1.7)
Pennsylvania	2740	4.6(0.2) [4%]	224.3(1.3)	2.0(0.4)	21.8(1.5)	64.9(2.0)	35.1(2.0)
Rhode Island	2390	0.4(0.0) [5%]	215.4(1.5)	1.2(0.4)	13.3(1.1)	54.2(2.2)	45.8(2.2)
South Carolina	2771	1.8(0.1) [3%]	212.5(1.1)	0.9(0.3)	12.8(1.1)	47.6(1.7)	52.4(1.7)
Tennessee	2708	2.4(0.1) [3%]	210.9(1.4)	0.5(0.2)	9.9(1.0)	47.3(2.0)	52.7(2.0)
Texas	2623	9.0(0.3) [4%]	217.9(1.2)	1.2(0.3)	15.0(1.2)	55.7(1.6)	44.3(1.6)
Utah	2799	1.3(0.0) [2%]	224.0(1.0)	1.4(0.3)	19.0(1.1)	65.6(1.7)	34.4(1.7)
Virginia	2786	2.8(0.1) [3%]	220.8(1.3)	2.3(0.5)	18.8(1.5)	58.6(1.4)	41.4(1.4)
West Virginia	2786	0.9(0.0) [4%]	215.3(1.1)	1.0(0.3)	12.2(0.9)	52.4(1.5)	47.6(1.5)
Wisconsin	2780	2.1(0.1) [4%]	228.7(1.1)	2.2(0.4)	24.5(1.4)	70.9(1.4)	29.1(1.4)
Wyoming	2605	0.3(0.0) [3%]	225.4(0.9)	1.0(0.3)	18.7(1.1)	68.6(1.4)	31.4(1.4)
Guam	1933	0.1(0.0) [0%]	192.8(0.8)	0.3(0.2)	4.7(0.5)	26.3(1.4)	73.7(1.4)
Virgin Islands	905	0.1(0.0) [0%]	178.9(1.2)	0.0(0.0)	0.5(0.2)	10.6(1.4)	89.4(1.4)

BEST COPY AVAILABL

Table G-9

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Original Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	1992	2522	2.0(0.1) [3%]	251.3(1.7)	1.1(0.3)	12.3(1.1)	44.3(2.0)	55.7(2.0)
	1990	2531	2.2(0.1) [3%]	252.9(1.1)	1.1(0.2)	11.7(0.8)	47.2(1.6)	52.8(1.6)
Arizona	1992	2617	1.7(0.1) [4%]	264.6(1.3)>	1.8(0.4)	18.8(1.4)	61.4(1.8)>	38.6(1.8)<
	1990	2558	1.8(0.1) [3%]	259.6(1.3)	1.5(0.4)	16.1(1.1)	54.8(1.8)	45.2(1.8)
Arkansas	1992	2556	1.2(0.0) [2%]	255.4(1.2)	1.0(0.3)	12.9(1.0)	50.2(1.7)	49.8(1.7)
	1990	2669	1.5(0.0) [2%]	256.2(0.9)	0.9(0.2)	12.4(1.0)	51.2(1.3)	48.8(1.3)
California	1992	2516	12.5(0.3) [3%]	260.1(1.7)	2.6(0.7)	19.7(1.4)	55.1(2.0)	44.9(2.0)
	1990	2424	14.2(0.4) [3%]	256.3(1.3)	2.0(0.4)	15.9(1.3)	50.9(1.6)	49.1(1.6)
Colorado	1992	2799	1.6(0.0) [2%]	271.7(1.1)>	2.5(0.5)	26.2(1.3)>	69.2(1.3)>	30.8(1.3)<
	1990	2675	1.7(0.0) [2%]	267.4(0.9)	2.2(0.4)	21.6(1.0)	64.3(1.1)	35.7(1.1)
Connecticut	1992	2613	1.2(0.0) [3%]	273.1(1.1)>	4.1(0.6)	30.1(1.1)>	68.9(1.4)	31.1(1.4)
	1990	2672	1.4(0.0) [3%]	269.9(1.0)	3.9(0.4)	26.2(1.1)	65.9(1.3)	34.1(1.3)
Delaware	1992	1934	0.3(0.0) [0%]	262.1(1.0)	2.5(0.4)	18.5(1.1)	57.0(1.2)	43.0(1.2)
	1990	2110	0.3(0.0) [0%]	260.7(0.9)	2.1(0.5)	18.6(0.9)	54.5(1.3)	45.5(1.3)
Dist of Columbia	1992	1816	0.2(0.0) [0%]	233.9(0.9)>	0.7(0.2)	5.6(1.0)	26.0(1.3)>	74.0(1.3)<
	1990	2135	0.2(0.0) [0%]	231.4(0.9)	0.8(0.2)	3.8(0.7)	21.1(1.0)	78.9(1.0)
Florida	1992	2549	4.6(0.2) [3%]	259.1(1.5)	1.8(0.4)	17.6(1.3)	54.7(1.9)	45.3(1.9)
	1990	2534	5.5(0.2) [3%]	255.3(1.2)	1.7(0.4)	14.8(1.0)	49.2(1.4)	50.8(1.4)
Georgia	1992	2589	3.1(0.1) [4%]	258.5(1.2)	1.4(0.3)	15.9(1.0)	53.5(1.5)	46.5(1.5)
	1990	2766	3.7(0.1) [4%]	258.8(1.3)	2.6(0.5)	17.2(1.3)	53.4(1.5)	46.6(1.5)
Hawaii	1992	2454	0.5(0.0) [0%]	256.6(0.9)>	2.2(0.4)	16.5(0.8)	51.2(1.2)>	48.8(1.2)<
	1990	2551	0.5(0.0) [0%]	251.0(0.8)	1.8(0.3)	14.3(0.8)	45.3(1.0)	54.7(1.0)
Idaho	1992	2615	0.7(0.0) [2%]	274.4(0.8)>	2.5(0.4)	26.9(1.2)	73.4(1.1)	26.6(1.1)
	1990	2716	0.8(0.0) [1%]	271.4(0.8)	1.5(0.4)	23.0(1.4)	70.1(1.2)	29.9(1.2)
Indiana	1992	2659	3.0(0.1) [3%]	269.4(1.2)	3.0(0.4)	23.8(1.3)	65.8(1.5)	34.2(1.5)
	1990	2569	3.2(0.1) [3%]	267.3(1.2)	2.9(0.6)	20.6(1.2)	63.2(1.6)	36.8(1.6)
Iowa	1992	2816	1.4(0.1) [4%]	282.8(1.0)>	4.7(0.7)	37.2(1.4)>	81.3(1.2)>	18.7(1.2)<
	1990	2474	1.5(0.1) [4%]	278.0(1.1)	3.8(0.5)	30.4(1.5)	76.3(1.1)	23.7(1.1)
Kentucky	1992	2756	1.8(0.1) [3%]	261.4(1.1)>	1.9(0.4)	16.7(1.1)	57.3(1.3)>	42.7(1.3)<
	1990	2680	2.1(0.1) [4%]	257.1(1.2)	1.2(0.2)	13.5(0.9)	50.5(1.8)	49.5(1.8)
Louisiana	1992	2582	1.9(0.1) [4%]	249.1(1.7)	0.5(0.2)	9.6(1.2)	42.4(2.0)	57.6(2.0)
	1990	2572	2.2(0.1) [4%]	246.4(1.2)	0.6(0.2)	7.6(1.0)	38.6(1.7)	61.4(1.7)
Maine	1992	2464	0.6(0.0) [2%]	278.0(1.0)	3.7(0.6)	30.8(1.9)	77.5(1.3)	22.5(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Maryland	1992	2399	1.9(0.1) [3%]	264.2(1.3)	3.7(0.6)	23.8(1.3)	58.7(1.5)	41.3(1.5)
	1990	2794	2.2(0.0) [2%]	260.8(1.4)	3.1(0.6)	19.9(1.2)	55.8(1.7)	44.2(1.7)
Massachusetts	1992	2456	2.1(0.1) [4%]	272.1(1.1)	3.3(0.5)	27.9(1.4)	67.9(1.5)	32.1(1.5)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Michigan	1992	2616	4.2(0.1) [2%]	266.6(1.4)	2.6(0.5)	23.1(1.7)	63.2(1.6)	36.8(1.6)
	1990	2587	4.8(0.1) [3%]	264.4(1.2)	2.4(0.4)	19.7(1.4)	60.3(1.4)	39.7(1.4)
Minnesota	1992	2471	2.0(0.1) [2%]	281.8(1.0)>	5.6(0.7)>	36.7(1.2)>	78.5(1.2)>	21.5(1.2)<
	1990	2584	2.4(0.1) [4%]	275.4(0.9)	3.7(0.4)	28.7(1.2)	73.9(1.3)	26.1(1.3)
Mississippi	1992	2498	1.4(0.0) [3%]	245.5(1.2)	0.5(0.2)	8.5(0.8)	38.3(1.5)	61.7(1.5)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Missouri	1992	2666	2.2(0.0) [2%]	270.4(1.2)	2.7(0.4)	23.7(1.3)	67.9(1.6)	32.1(1.6)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

Table G-9 (continued)

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Original Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Nebraska	1992	2285	0.8(0.0) [3%]	277.0(1.1)	3.6(0.5)	31.7(1.9)	75.4(1.2)	24.6(1.2)
	1990	2519	0.9(0.0) [2%]	275.7(1.0)	3.6(0.6)	29.9(1.4)	74.3(1.1)	25.7(1.1)
New Hampshire	1992	2535	0.5(0.0) [2%]	277.6(1.0)>	3.5(0.6)	30.0(1.5)>	76.8(1.0)>	23.2(1.0)<
	1990	2568	0.5(0.0) [1%]	273.1(0.9)	3.2(0.5)	25.0(1.2)	71.3(1.6)	28.7(1.6)
New Jersey	1992	2174	3.2(0.1) [4%]	271.2(1.6)	3.9(0.6)	27.6(1.4)	67.3(1.8)	32.7(1.8)
	1990	2710	3.5(0.1) [4%]	269.7(1.1)	3.9(0.5)	25.3(1.3)	64.5(1.6)	35.5(1.6)
New Mexico	1992	2561	0.8(0.0) [1%]	258.8(0.9)>	1.1(0.3)	13.8(1.0)	54.1(1.4)	45.9(1.4)
	1990	2643	0.8(0.0) [1%]	256.4(0.7)	1.2(0.3)	12.8(0.9)	50.7(1.3)	49.3(1.3)
New York	1992	2158	6.5(0.2) [3%]	265.7(2.1)	3.7(0.6)	23.8(1.6)>	62.5(2.3)	37.5(2.3)
	1990	2302	7.7(0.2) [2%]	260.8(1.4)	3.1(0.5)	18.8(1.0)	56.5(1.7)	43.5(1.7)
North Carolina	1992	2769	3.2(0.1) [3%]	257.6(1.2)>	1.5(0.3)	15.2(1.0)>	52.8(1.5)>	47.2(1.5)<
	1990	2843	3.6(0.1) [2%]	250.3(1.1)	0.8(0.4)	11.3(0.8)	44.4(1.4)	55.6(1.4)
North Dakota	1992	2314	0.3(0.0) [3%]	282.6(1.2)	3.8(0.6)	35.7(1.7)	82.4(1.3)	17.6(1.3)
	1990	2485	0.4(0.0) [4%]	281.1(1.2)	3.9(0.6)	33.8(2.0)	81.0(1.6)	19.0(1.6)
Ohio	1992	2535	5.4(0.2) [4%]	267.4(1.5)	2.4(0.5)	22.4(1.4)	64.3(2.0)	35.7(2.0)
	1990	2673	5.6(0.1) [2%]	264.0(1.0)	2.0(0.3)	18.5(1.2)	59.6(1.4)	40.4(1.4)
Oklahoma	1992	2141	1.5(0.0) [3%]	267.4(1.2)>	1.5(0.3)	21.1(1.2)>	65.2(2.0)	34.8(2.0)
	1990	2222	1.8(0.0) [2%]	263.2(1.3)	1.6(0.5)	16.9(1.3)	59.2(1.6)	40.8(1.6)
Pennsylvania	1992	2612	4.5(0.1) [3%]	270.7(1.5)	3.2(0.7)	25.9(1.5)	67.2(1.7)	32.8(1.7)
	1990	2528	5.4(0.2) [3%]	266.4(1.6)	2.3(0.4)	21.4(1.5)	62.9(2.0)	37.1(2.0)
Rhode Island	1992	2120	0.4(0.0) [0%]	265.1(0.7)>	1.8(0.3)	19.7(1.3)	62.0(1.2)>	38.0(1.2)<
	1990	2675	0.4(0.0) [2%]	260.0(0.6)	1.8(0.3)	18.3(1.0)	54.9(0.9)	45.1(0.9)
South Carolina	1992	2625	1.8(0.0) [2%]	260.0(1.0)	2.1(0.5)	18.0(1.1)	53.4(1.2)	46.6(1.2)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Tennessee	1992	2485	2.3(0.1) [3%]	258.0(1.4)	1.2(0.4)	14.7(1.2)	52.6(1.8)	47.4(1.8)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Texas	1992	2614	8.8(0.3) [3%]	263.8(1.3)>	3.6(0.6)	21.2(1.4)>	57.8(1.5)>	42.2(1.5)<
	1990	2542	10.2(0.3) [3%]	258.2(1.4)	2.0(0.4)	15.9(1.0)	52.0(1.7)	48.0(1.7)
Utah	1992	2726	1.2(0.0) [3%]	273.6(0.7)	2.7(0.5)	27.2(1.1)	72.1(1.3)	27.9(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Virginia	1992	2710	2.8(0.1) [4%]	267.1(1.2)	3.2(0.5)	22.9(1.2)	62.3(1.6)	37.7(1.6)
	1990	2661	3.0(0.1) [3%]	264.3(1.5)	4.1(0.8)	20.7(1.6)	57.7(1.6)	42.3(1.6)
West Virginia	1992	2690	0.9(0.0) [3%]	258.2(1.0)	0.7(0.2)	12.6(0.9)	52.9(1.5)	47.1(1.5)
	1990	2600	1.1(0.0) [3%]	255.9(1.0)	1.1(0.2)	12.1(0.9)	49.3(1.2)	50.7(1.2)
Wisconsin	1992	2814	2.3(0.1) [6%]	277.3(1.5)	3.9(0.6)	32.1(1.4)	75.6(1.9)	24.4(1.9)
	1990	2750	2.4(0.1) [3%]	274.5(1.3)	3.6(0.5)	28.8(1.5)	72.3(1.7)	27.7(1.7)
Wyoming	1992	2444	0.3(0.0) [2%]	274.4(0.9)>	2.4(0.5)	25.8(1.0)	73.0(1.3)	27.0(1.3)
	1990	2701	0.3(0.0) [1%]	272.1(0.7)	2.0(0.3)	23.6(1.0)	71.1(1.3)	28.9(1.3)
Guam	1992	1496	0.1(0.0) [1%]	234.3(1.0)>	0.6(0.2)	7.0(0.7)	29.5(1.4)	70.5(1.4)
	1990	1617	0.1(0.0) [0%]	231.8(0.7)	0.5(0.2)	5.2(0.6)	26.7(1.0)	73.3(1.0)
Virgin Islands	1992	1479	0.1(0.0) [0%]	221.9(1.1)>	0.0(0.1)	0.9(0.3)	12.7(1.0)	87.3(1.0)
	1990	1326	0.1(0.0) [0%]	218.7(0.9)	0.1(0.1)	0.9(0.4)	10.4(1.1)	89.6(1.1)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

Table G-10

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Revised Results

		N	WEIGHTED PCT	[CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	1992	2522	2.0(0.1)	[3%]	252.2(1.7)	0.9(0.3)	10.2(0.9)	38.8(1.9)	61.2(1.9)
	1990	2531	2.2(0.1)	[3%]	252.9(1.1)	1.0(0.2)	9.1(0.7)	40.3(1.7)	59.7(1.7)
Arizona	1992	2617	1.7(0.1)	[4%]	265.4(1.3)>	1.4(0.3)	15.1(1.3)	54.7(1.8)>	45.3(1.8)<
	1990	2558	1.8(0.1)	[3%]	259.6(1.3)	1.3(0.4)	12.7(0.9)	47.5(1.8)	52.5(1.8)
Arkansas	1992	2556	1.2(0.0)	[2%]	256.3(1.2)	0.7(0.2)	10.0(0.8)	44.3(1.8)	55.7(1.8)
	1990	2669	1.5(0.0)	[2%]	256.2(0.9)	0.7(0.2)	9.3(0.7)	43.9(1.2)	56.1(1.2)
California	1992	2516	12.5(0.3)	[3%]	260.9(1.7)>	2.2(0.7)	16.2(1.3)	50.4(1.9)	49.6(1.9)
	1990	2424	14.2(0.4)	[3%]	256.3(1.3)	1.7(0.3)	12.5(1.1)	44.6(1.7)	55.4(1.7)
Colorado	1992	2799	1.6(0.0)	[2%]	272.4(1.0)>	2.1(0.4)	21.6(1.2)>	63.9(1.4)>	36.1(1.4)<
	1990	2675	1.7(0.0)	[2%]	267.4(0.9)	1.9(0.4)	16.9(1.0)	57.5(1.2)	42.5(1.2)
Connecticut	1992	2613	1.2(0.0)	[3%]	273.7(1.1)>	3.2(0.6)	25.7(1.1)>	64.4(1.4)	35.6(1.4)
	1990	2672	1.4(0.0)	[3%]	269.9(1.0)	3.4(0.4)	21.7(0.9)	59.9(1.4)	40.1(1.4)
Delaware	1992	1934	0.3(0.0)	[0%]	262.9(1.0)	2.3(0.4)	15.1(1.0)	51.6(1.2)	48.4(1.2)
	1990	2110	0.3(0.0)	[0%]	260.7(0.9)	1.9(0.4)	14.2(0.8)	47.8(1.5)	52.2(1.5)
Dist of Columbia	1992	1816	0.2(0.0)	[0%]	234.9(0.9)>	0.6(0.2)	4.4(0.9)	21.8(1.1)>	78.2(1.1)<
	1990	2135	0.2(0.0)	[0%]	231.4(0.9)	0.8(0.2)	3.1(0.6)	16.6(1.0)	83.4(1.0)
Florida	1992	2549	4.6(0.2)	[3%]	259.9(1.5)>	1.5(0.3)	14.6(1.2)	48.8(1.9)>	51.2(1.9)<
	1990	2534	5.5(0.2)	[3%]	255.3(1.2)	1.4(0.3)	12.0(0.9)	42.7(1.4)	57.3(1.4)
Georgia	1992	2589	3.1(0.1)	[4%]	259.4(1.2)	1.1(0.3)<	12.7(0.9)	47.9(1.7)	52.1(1.7)
	1990	2766	3.7(0.1)	[4%]	258.8(1.3)	2.4(0.4)	13.8(1.2)	47.2(1.5)	52.8(1.5)
Hawaii	1992	2454	0.5(0.0)	[0%]	257.4(0.9)>	1.8(0.3)	13.5(0.7)	46.2(1.1)>	53.8(1.1)<
	1990	2551	0.5(0.0)	[0%]	251.0(0.8)	1.6(0.3)	11.7(0.7)	40.0(1.0)	60.0(1.0)
Idaho	1992	2615	0.7(0.0)	[2%]	275.1(0.7)>	2.1(0.3)	21.7(1.2)	67.9(1.0)>	32.1(1.0)<
	1990	2716	0.8(0.0)	[1%]	271.4(0.8)	1.2(0.3)	17.9(1.1)	63.4(1.2)	36.6(1.2)
Indiana	1992	2659	3.0(0.1)	[3%]	270.1(1.1)	2.6(0.4)	19.7(1.2)	59.9(1.5)	40.1(1.5)
	1990	2569	3.2(0.1)	[3%]	267.3(1.2)	2.5(0.5)	16.6(1.1)	56.4(1.5)	43.6(1.5)
Iowa	1992	2816	1.4(0.1)	[4%]	283.4(1.0)>	3.9(0.7)	31.2(1.3)>	76.4(1.3)>	23.6(1.3)<
	1990	2474	1.5(0.1)	[4%]	278.0(1.1)	3.3(0.5)	25.1(1.4)	70.0(1.2)	30.0(1.2)
Kentucky	1992	2756	1.8(0.1)	[3%]	262.2(1.1)>	1.6(0.3)	13.8(1.1)>	51.2(1.5)>	48.8(1.5)<
	1990	2680	2.1(0.1)	[4%]	257.1(1.2)	1.1(0.3)	10.5(0.8)	43.0(1.7)	57.0(1.7)
Louisiana	1992	2582	1.9(0.1)	[4%]	250.0(1.7)	0.5(0.2)	7.2(1.0)	36.6(1.9)	63.4(1.9)
	1990	2572	2.2(0.1)	[4%]	246.4(1.2)	0.5(0.2)	5.4(0.6)	31.7(1.6)	68.3(1.6)
Maine	1992	2464	0.6(0.0)	[2%]	278.6(1.0)	3.1(0.6)	25.5(1.5)	71.6(1.3)	28.4(1.3)
	1990	0	0.0(0.0)	[0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Maryland	1992	2399	1.9(0.1)	[3%]	264.8(1.3)>	3.2(0.5)	19.9(1.2)	53.9(1.4)	46.1(1.4)
	1990	2794	2.2(0.0)	[2%]	260.8(1.4)	2.6(0.5)	16.6(1.2)	49.7(1.6)	50.3(1.6)
Massachusetts	1992	2456	2.1(0.1)	[4%]	272.8(1.0)	2.8(0.5)	23.3(1.3)	62.8(1.5)	37.2(1.5)
	1990	0	0.0(0.0)	[0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Michigan	1992	2616	4.2(0.1)	[2%]	267.4(1.4)	2.2(0.4)	18.9(1.5)	57.9(1.7)	42.1(1.7)
	1990	2587	4.8(0.1)	[3%]	264.4(1.2)	2.1(0.4)	15.8(1.2)	53.3(1.7)	46.7(1.7)
Minnesota	1992	2471	2.0(0.1)	[2%]	282.4(1.0)>	4.7(0.6)	31.1(1.2)>	74.2(1.3)>	25.8(1.3)<
	1990	2584	2.4(0.1)	[4%]	275.4(0.9)	3.3(0.5)	23.3(1.2)	67.5(1.1)	32.5(1.1)
Mississippi	1992	2498	1.4(0.0)	[3%]	246.5(1.2)	0.3(0.1)	6.4(0.7)	33.4(1.6)	66.6(1.6)
	1990	0	0.0(0.0)	[0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Missouri	1992	2666	2.2(0.0)	[2%]	271.1(1.2)	2.3(0.4)	19.5(1.2)	62.5(1.6)	37.5(1.6)
	1990	0	0.0(0.0)	[0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

Table G-10 (continued)

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Revised Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Nebraska	1992	2285	0.8(0.0) [3%]	277.7(1.1)	2.9(0.5)	26.3(1.6)	70.2(1.3)	29.8(1.3)
	1990	2519	0.9(0.0) [2%]	275.7(1.0)	3.3(0.5)	24.4(1.2)	68.2(1.3)	31.8(1.3)
New Hampshire	1992	2535	0.5(0.0) [2%]	278.2(1.0)>	2.8(0.5)	24.9(1.4)>	71.2(1.3)>	28.8(1.3)<
	1990	2568	0.5(0.0) [1%]	273.1(0.9)	2.7(0.5)	20.3(1.2)	64.7(1.5)	35.3(1.5)
New Jersey	1992	2174	3.2(0.1) [4%]	271.9(1.6)	3.2(0.4)	23.7(1.3)	62.5(1.9)	37.5(1.9)
	1990	2710	3.5(0.1) [4%]	269.7(1.1)	3.4(0.5)	21.3(1.1)	58.2(1.5)	41.8(1.5)
New Mexico	1992	2561	0.8(0.0) [1%]	259.6(0.9)>	0.9(0.3)	10.9(0.8)	47.6(1.3)>	52.4(1.3)<
	1990	2643	0.8(0.0) [1%]	256.4(0.7)	1.0(0.3)	10.2(0.9)	43.2(1.2)	56.8(1.2)
New York	1992	2158	6.5(0.2) [3%]	266.4(2.1)>	3.2(0.5)	20.0(1.3)>	57.5(2.2)>	42.5(2.2)<
	1990	2302	7.7(0.2) [2%]	260.8(1.4)	2.7(0.4)	15.3(0.9)	49.9(1.7)	50.1(1.7)
North Carolina	1992	2769	3.2(0.1) [3%]	258.4(1.2)>	1.2(0.3)	12.1(1.0)>	47.0(1.4)>	53.0(1.4)<
	1990	2843	3.6(0.1) [2%]	250.3(1.1)	0.6(0.3)	8.7(0.7)	37.9(1.4)	62.1(1.4)
North Dakota	1992	2314	0.3(0.0) [3%]	283.2(1.1)	3.1(0.5)	29.5(1.6)	77.9(1.4)	22.1(1.4)
	1990	2485	0.4(0.0) [4%]	281.1(1.2)	3.6(0.6)	27.3(1.8)	75.4(1.6)	24.6(1.6)
Ohio	1992	2535	5.4(0.2) [4%]	268.1(1.5)>	1.9(0.4)	18.1(1.3)	58.8(2.1)	41.2(2.1)
	1990	2673	5.6(0.1) [2%]	264.0(1.0)	1.7(0.3)	14.8(1.1)	52.6(1.6)	47.4(1.6)
Oklahoma	1992	2141	1.5(0.0) [3%]	268.1(1.1)>	1.1(0.3)	16.9(1.1)	59.4(1.6)>	40.6(1.6)<
	1990	2222	1.8(0.0) [2%]	263.2(1.3)	1.3(0.4)	13.3(1.2)	52.0(1.8)	48.0(1.8)
Pennsylvania	1992	2612	4.5(0.1) [3%]	271.4(1.5)>	2.7(0.5)	21.5(1.5)	62.1(1.7)	37.9(1.7)
	1990	2528	5.4(0.2) [3%]	266.4(1.6)	2.0(0.4)	17.2(1.3)	56.0(2.0)	44.0(2.0)
Rhode Island	1992	2120	0.4(0.0) [0%]	265.9(0.7)>	1.4(0.3)	15.7(1.1)	56.4(1.2)>	43.6(1.2)<
	1990	2675	0.4(0.0) [2%]	260.0(0.6)	1.6(0.3)	14.5(0.7)	48.8(1.0)	51.2(1.0)
South Carolina	1992	2625	1.8(0.0) [2%]	260.8(1.0)	1.7(0.5)	14.9(1.0)	47.8(1.3)	52.2(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Tennessee	1992	2485	2.3(0.1) [3%]	258.8(1.4)	1.0(0.4)	11.6(1.0)	46.8(1.9)	53.2(1.9)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Texas	1992	2614	8.8(0.3) [3%]	264.6(1.3)>	3.2(0.6)	18.1(1.2)>	52.7(1.5)>	47.3(1.5)<
	1990	2542	10.2(0.3) [3%]	258.2(1.4)	1.6(0.3)	12.7(1.1)	45.5(1.6)	54.5(1.6)
Utah	1992	2726	1.2(0.0) [3%]	274.3(0.7)	2.3(0.4)	22.3(1.0)	66.8(1.2)	33.2(1.2)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Virginia	1992	2710	2.8(0.1) [4%]	267.9(1.2)	2.7(0.6)	19.2(1.1)	56.7(1.7)	43.3(1.7)
	1990	2661	3.0(0.1) [3%]	264.3(1.5)	3.7(0.8)	17.3(1.6)	51.6(1.7)	48.4(1.7)
West Virginia	1992	2690	0.9(0.0) [3%]	259.1(1.0)>	0.6(0.2)	9.8(0.8)	46.8(1.6)>	53.2(1.6)<
	1990	2600	1.1(0.0) [3%]	255.9(1.0)	0.9(0.2)	9.3(0.8)	41.8(1.1)	58.2(1.1)
Wisconsin	1992	2814	2.3(0.1) [6%]	277.9(1.5)	3.2(0.6)	27.0(1.4)	70.8(2.1)	29.2(2.1)
	1990	2750	2.4(0.1) [3%]	274.5(1.3)	3.1(0.4)	23.2(1.4)	65.7(1.6)	34.3(1.6)
Wyoming	1992	2444	0.3(0.0) [2%]	275.1(0.9)>	1.9(0.4)	21.0(1.1)	67.2(1.3)	32.8(1.3)
	1990	2701	0.3(0.0) [1%]	272.1(0.7)	1.7(0.2)	18.5(0.9)	63.7(1.3)	36.3(1.3)
Guam	1992	1496	0.1(0.0) [1%]	235.1(1.0)>	0.5(0.1)	5.6(0.6)>	25.3(1.4)	74.7(1.4)
	1990	1617	0.1(0.0) [0%]	231.8(0.7)	0.4(0.2)	3.8(0.4)	21.7(1.0)	78.3(1.0)
Virgin Islands	1992	1479	0.1(0.0) [0%]	222.8(1.1)>	0.0(0.1)	0.6(0.3)	9.4(0.9)	90.6(0.9)
	1990	1326	0.1(0.0) [0%]	218.7(0.9)	0.1(0.1)	0.7(0.3)	7.6(1.0)	92.4(1.0)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

BEST COPY AVAILABL

Appendix H

THE INFORMATION WEIGHTING ERROR

Susan C. Loomis, Luz Bay, and Wen-Hung Chen
American College Testing

The Error

In the process of recomputing the reading cutscores set in 1992 for the three achievement levels, an error in the information weighting function was detected. The error affected data for all achievement levels set in 1992: reading and mathematics. The Muraki information weighting function published in 1993 was used in the 1994 programs to compute achievement levels, so only 1992 levels are affected.

The procedures used for 1992 were printed and reported in numerous places. No one had detected an error. The psychometrician who developed the programs for the 1994 process used Muraki's information weighting function because he found it to be more straightforward than the 1992 procedure.

The 1992 equation[1] is as follows:

$$I_j(\theta) = D^2 a_j^{\,2} \sum_{c=1}^{m_j} \cdot$$

The 1994 equation is as follows:

$$I_j(\theta) = D^2 a_j^2 \sum_{c=1}^{m_j} [T_c - \overline{T}_j(\theta)]^2 P_{jc}(\theta) ,$$

where $\overline{T}$ is the expected score for item j or proficiency θ

$$\overline{T}_j(\theta) = \sum_{c=1}^{m_j} T_c P_{jc}(\theta) ,$$

and T_c is the score assigned to the response category c.

---

[1] Notations for this equation were modified to correspond to those of Equation 2. The reader will need to refer to the articles (Luecht, 1993, and Muraki, 1993) for a complete explanation of the equations.

Analysis of the Error: Magnitude

The differences in achievement levels reported for 1992 and the corrected achievement levels are due both to the error in item parameters and to the error in information weights. The cutscores and percentages of students scoring at or above each for each achievement level are reported in Tables H-1 and H-2. Data in Table H-1 are the previously reported (incorrect) data, and data in Table H-2 are the corrected data.

Table H-1

Mathematics Cutpoints and Percents At or Above as Reported

Grade		Basic	Proficient	Advanced
4	Cutpoint	211	248	280
	%≥92 Dist	61	18	2
8	Cutpoint	256	294	331
	%≥92 Dist	63	25	4
12	Cutpoint	287	334	366
	%≥92 Dist	64	16	2

Table H-2

Corrected Mathematics Cutpoints and Percents At or Above as Reported

Grade		Basic	Proficient	Advanced
4	Cutpoint	214	249	282
	%≥92 Dist	59	18	2
8	Cutpoint	262	299	333
	%≥92 Dist	58	21	3
12	Cutpoint	288	336	367
	%≥92 Dist	64	15	2

The corrected cutscores are consistently the same or higher than those previously reported. The maximum difference in cutscores originally reported and the corrected cutscores is found for grade 8 at the Basic level:

((original cutscore = 256) - (corrected cutscore = 262)) = -6 points.

The differences attributable to each error (parameter estimates and information weighting) appear to be rather small in most cases.

Table H-3 reports the differences in cutscores due to the two errors, examined one at a time. Relative to the *correct* data, the information weighting error generally resulted in a lower composite cutscore, and the recoding error resulting in incorrect item parameters generally resulted in an even lower composite cutscore.

Table H-3
Composite NAEP Scale Cutpoint Differences in Mathematics Due to Errors

Achievement Level Cutpoint	Information Weighting[1]	Item Parameters[2]
Grade 4		
Basic	-2	-5
Proficient	-1	-1
Advanced	-1	-1
Grade 8		
Basic	-4	-8
Proficient	-3	-2
Advanced	-1	-2
Grade 12		
Basic	0	-4
Proficient	-1	-2
Advanced	-1	-2

[1] Difference = Incorrect - Correct, based on correct item parameters. If the recoding of data had been correct, the cutpoints would have been in error by these amounts, due to the incorrect information weighting function.

[2] Difference = Incorrect - Correct, based on correct information weights. If the correct information weighting function had been used, the cutpoints would have been in error by these amounts due to the recoding error resulting in incorrect item parameters.

Table H-4 show comparisons of percentages of students who scored at or above each achievement level in 1992. The center bar on each of these graphs shows student performance relative to each achievement level in 1992 using both correct item parameters and correct information weights. The bar on the left shows student performance relative to achievement levels computed with the *correct* item parameters and *incorrect* information weights. The bar on the right shows student performance relative to achievement levels computed with the *incorrect* item parameters and the *correct* information weights.

Table H-4
NAEP Mathematics Achievement Levels:
Cutpoints and 1992 Distribution Data

GRADE 4

	Cutpoint			Percent At or Above Cutpoint		
	Basic	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
Correct Data, Incorrect Weight	212	248	281	62.2	19.7	2.1
Correct Data, Correct Weight	214	249	282	60	18.7	1.9
Incorrect Data, Correct Weight	209	248	281	65.6	19.7	2.1

GRADE 8

	Cutpoint			Percent At or Above Cutpoint		
	Basic	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
Correct Data, Incorrect Weight	258	296	332	62.6	24.4	3.6
Correct Data, Correct Weight	262	299	333	58.6	21.8	3.3
Incorrect Data, Correct Weight	254	297	331	66.5	23.5	3.8

GRADE 12

	Cutpoint			Percent At or Above Cutpoint		
	Basic	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
Correct Data, Incorrect Weight	288	335	366	64.8	16.1	1.9
Correct Data, Correct Weight	288	336	367	64.8	15.4	1.8
Incorrect Data, Correct Weight	284	334	364	68.7	16.9	2.3

Analysis of the Error: The Information Weighting Functions

Various analyses were conducted to determine what, if any, general conclusions could be drawn to help inform users of NAEP achievement levels data about the factors related to differences in cutscores due to the information weighting error.

Item ratings are collected from two groups of panelists at each grade level. These groups are called item rating groups, and panelists are assigned to an item rating group so that the two are as equivalent as possible in terms of panelist type (teacher, career educator, or general public; gender; race/ethnicity; and region of residence). These item rating groups rate slightly over half of all items at their grade level. Item rating pools are developed so that the items in each are as equivalent as possible in terms of item difficulty, item format (multiple choice, short constructed response, and extended constructed response), test time for the block, and so forth. Item blocks remain in tact for the item rating pools. At least one block (a "common block") is rated by all panel members (i.e., both item rating groups, in the grade group).

Item ratings are placed on the NAEP scale by computing a theta value for the dichotomous items and for the polytomous items in each subscale for each rating group. Information weights are applied for the polytomous items at the subscale level before computing the subscale score for both dichotomous and polytomous items.

Table H-5 presents the information weights computed for each rating group and each subscale for the mathematics NAEP achievement levels. Those data show that there is a *consistent* pattern of error caused by the incorrect information function for math. Analyses of the data from 1992 and 1994 Trial State Assessments in reading show the corrected cutscores are consistently neither higher nor lower as a result of this error, although the impact of the error was generally to estimate a higher cutscore for the polytomous items. Simulated item parameters were used to demonstrate that there was no consistent effect of the incorrect information function to weights used to form the final composite cutpoints.

Analysis of the Effect of Item Discrimination

Figures H-1 through H-3 show graphs for the correct and the incorrect information functions holding other parameters constant while varying the item discrimination parameter in the generalized partial credit item response theory (IRT) model. In general, the differences between correct and incorrect weights increase as item discrimination increases.

These figures show no consistent pattern in the direction (positive or negative) of the difference between the correct and incorrect information function based on item discrimination. When the correct information function is greater than the incorrect function, we observe that information is in the area of maximum information. It is not the case, however, that the correct function always results in a greater information weight where information is maximized.

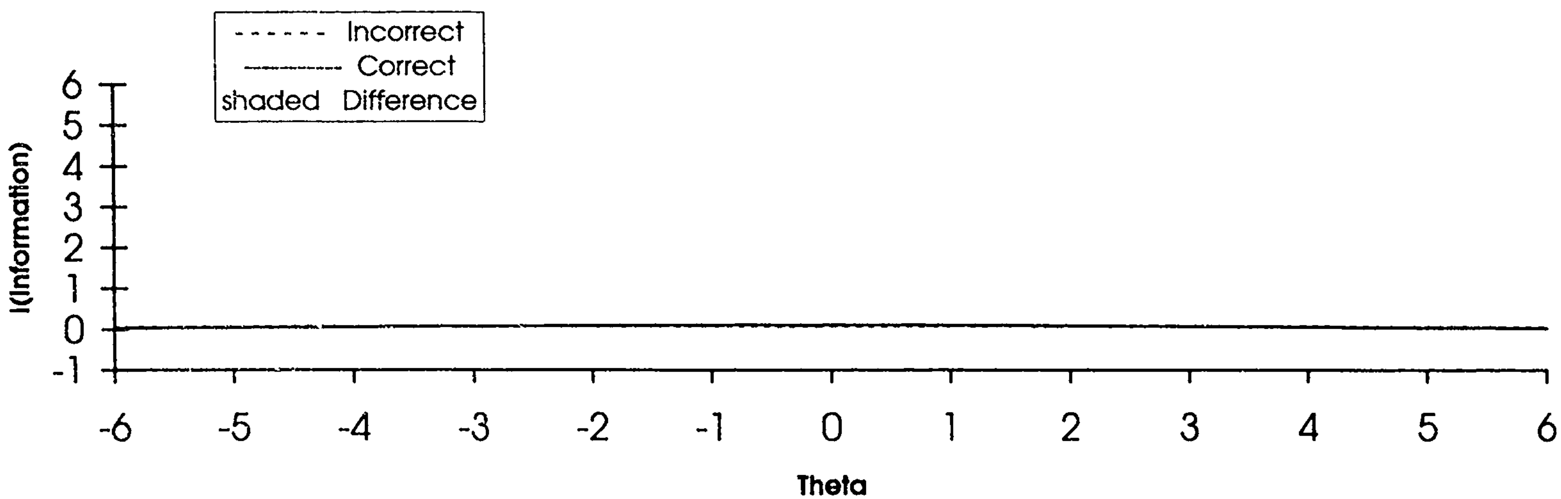
Table H-5

Comparison Between the Incorrect and Correct Information Weights for 1992 Mathematics Achievement Levels Based on Corrected Item Parameters

			Basic			Proficient			Advanced		
Grade	Rating Group	Scale	Incorrect	Correct	Diff	Incorrect	Correct	Diff	Incorrect	Correct	Diff
4	A	1	0.24	0.80	-0.57	0.22	0.70	-0.48	0.14	0.25	-0.11
		3	0.22	0.39	-0.16	0.21	0.33	-0.12	0.21	0.32	-0.11
		5	0.34	0.77	-0.42	0.32	0.61	-0.29	0.30	0.50	-0.20
	B	1	0.26	0.66	-0.40	0.25	0.57	-0.32	0.22	-.40	-0.18
		4	0.51	1.10	-0.59	0.49	0.96	-0.47	0.50	1.01	-0.51
8	A	1	0.72	1.23	-0.51	0.76	1.57	-0.81	0.63	1.00	-0.37
		3	1.05	1.79	-0.74	1.08	2.00	-0.92	1.05	1.82	-0.76
	B	2	0.50	1.25	-0.75	0.47	1.11	-0.64	0.39	0.78	-0.39
		4	1.04	2.85	-1.81	0.94	2.19	-1.24	0.83	1.59	-0.76
		5	0.41	1.31	-0.90	0.32	0.92	-0.60	0.27	0.69	-0.42
12	A	3	0.13	0.29	-0.16	0.13	0.29	-0.16	0.13	0.29	-0.16
		4	0.17	0.37	-0.21	0.16	0.36	-0.20	0.15	0.26	-0.11
		5	1.59	4.11	-2.52	1.69	4.82	-3.17	1.67	4.77	-3.09
	B	5	1.41	2.60	-1.19	1.52	3.60	-2.09	1.43	3.26	-1.83

Figure H-1

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=0.2, b=0, d0=0, d1=2, d2=0, and d3=-2, in Case of Four Response Categories



BEST COPY AVAILABLE

Figure H-2

Comparison Between the Incorrect and Correct Information Functions
Using Hypothetical Item Parameters a=0.5, b=0, d0=0, d1=2, d2=0, and d3=-2, in Case of Four Response Categories

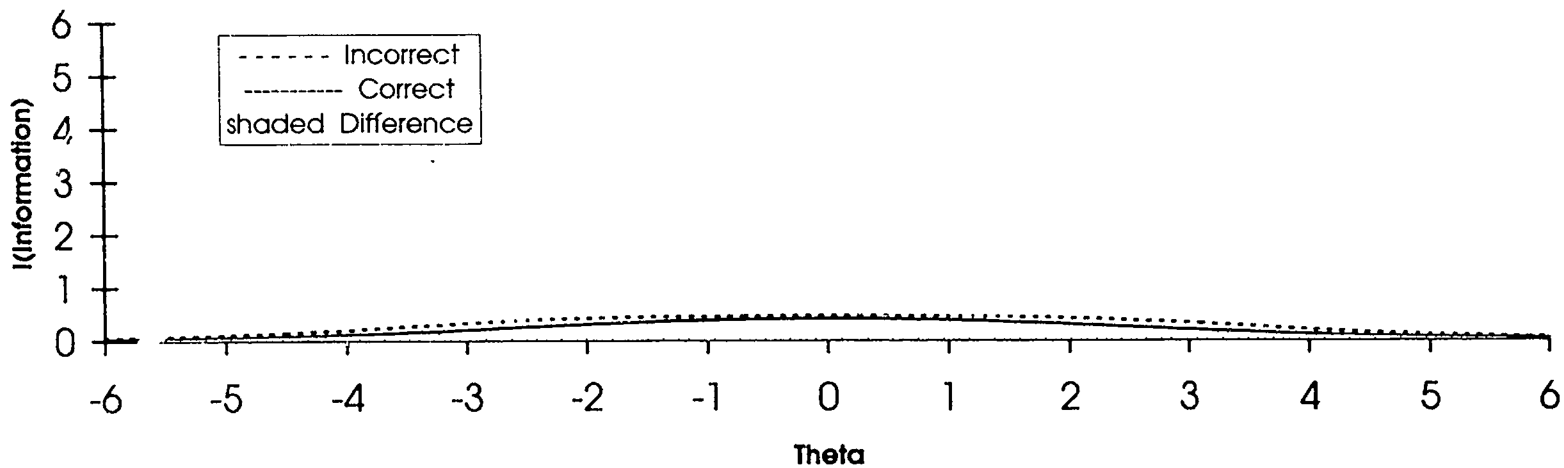
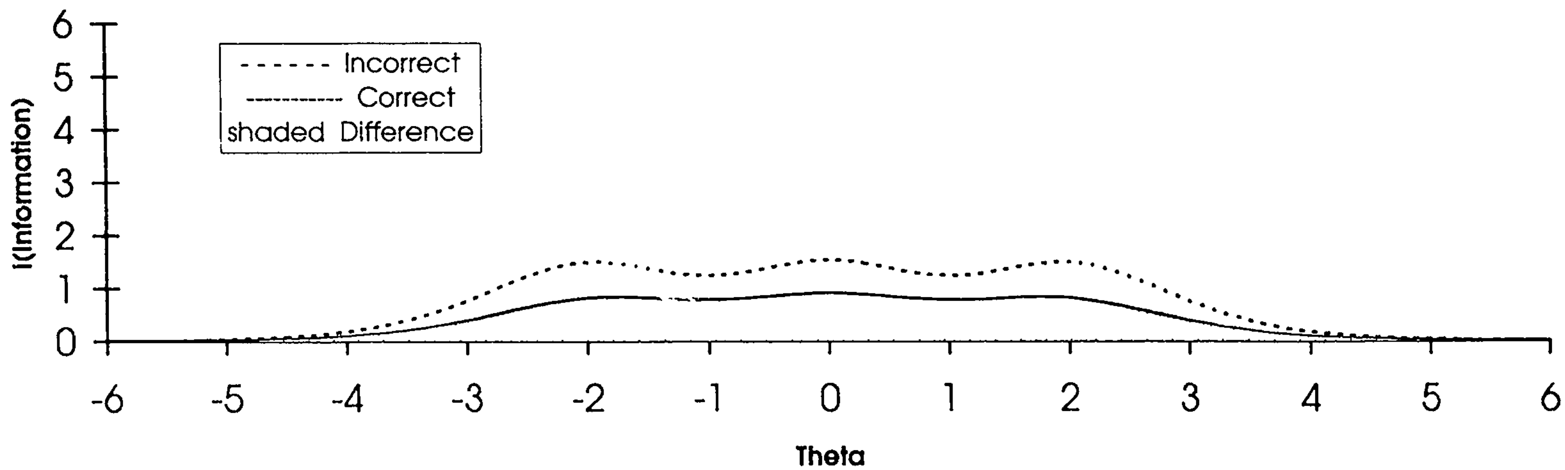


Figure H-3

Comparison Between the Incorrect and Correct Information Functions
Using Hypothetical Item Parameters a=1, b=0, d0=0, d1=2, d2=0, and d3=-2,
in Case of Four Response Categories



Analysis of the Effect of Location Parameters

Figures H-4 through H-6 show the correct and incorrect information weighting functions for varying location parameters. The location parameters only shift the distribution of information, and that is the case for both the correct and incorrect information weighting functions. The amount of difference between the two is unchanged; only the locations change.

Analysis of the Effect of the Threshold Parameters.

If the threshold parameters are close, in terms of the locations of ICCs, the correct information function will have a high peak. In the area of maximum information, i.e. around the peak of the distribution, the incorrect information function underestimates information.

As can be seen in Figures H-6 through H-8, when the threshold parameters are relatively far apart, the information is relatively low and the distribution is multimodal. When the threshold parameters are closer information is higher and the distribution tends to be more unimodal. As the threshold parameters move even closer, the difference between the correct and incorrect information functions increases. As the threshold parameters become closer, the rate at which the incorrect weighting function increments weights at the peak of the distribution is slower than that for the correct function. This results in a negative difference between the two functions in the area of maximum information.

Analysis of the Error: Conclusions

Three general conclusions can be drawn from our analyses:

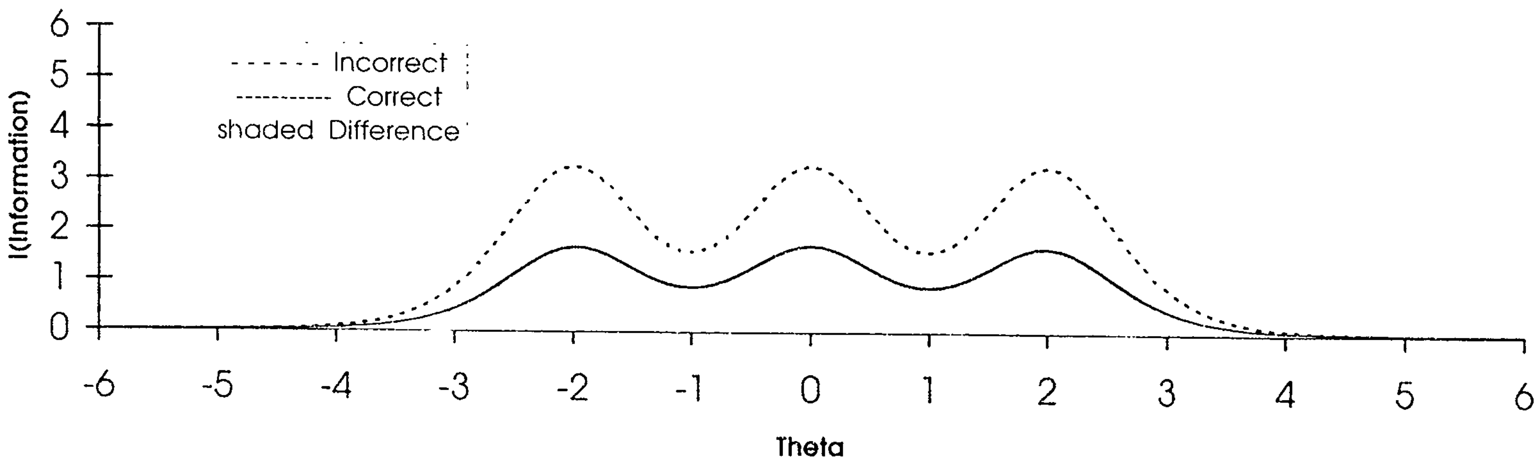
1. No consistent pattern of over- or underestimation can be predicted from the error in information weights. Generally, the incorrect information weighting function results in a lower information weight for 1992 mathematics assessment items, whereas, it results a higher information weight for 1992 Reading assessment items.

2. The difference between the correct and incorrect weights increases as item discrimination increases.

3. The impact of the incorrect information weighting function on the cutscores is not consistent. The impact depends upon the location of the cutscore and the relative weight of the dichotomous items.

Figure H-4

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=0, d0=0, d1=2, d2=0, and d3=-2, in Case of Four Response Categories



BEST COPY AVAILABLE

Figure H-5

Comparison Between the Incorrect and Correct Information Functions
Using Hypothetical Item Parameters a=1.5, b=-1, d0=0, d1=2, d2=0, and d3=-2,
in Case of Four Response Categories

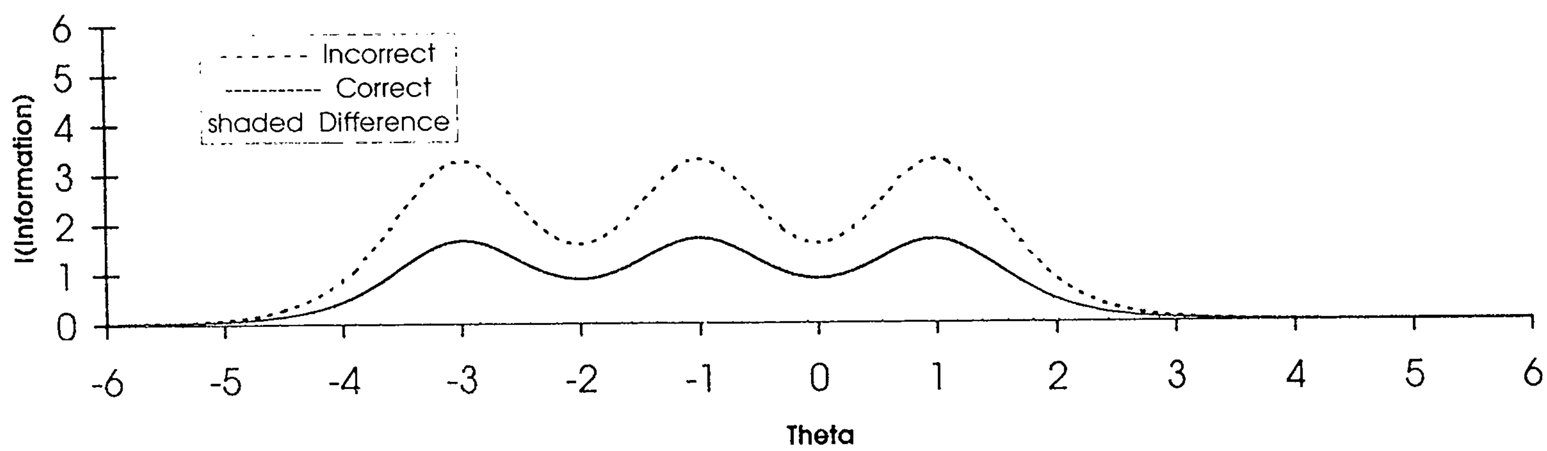


Figure H-6

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=1, d0=0, d1=2, d2=0, and d3=-2, in Case of Four Response Categories

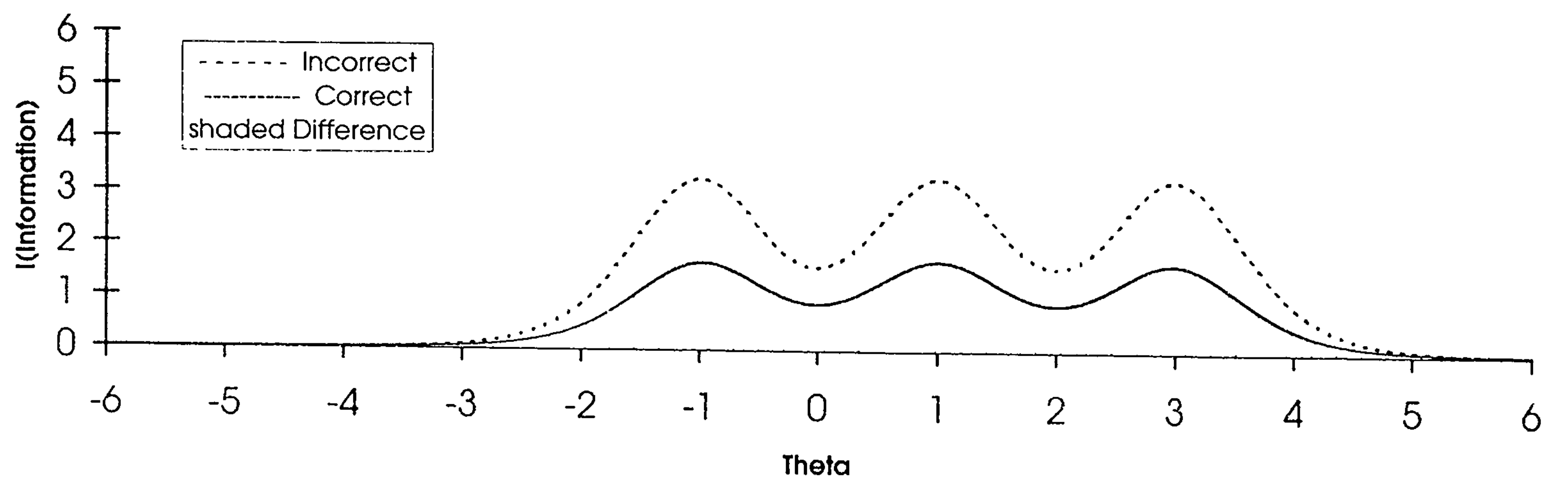


Figure H-7

Comparison Between the Incorrect and Correct Information Functions
Using Hypothetical Item Parameters a=1.5, b=0, d0=0, d1=1, d2=0, and d3=-1,
in Case of Four Response Categories

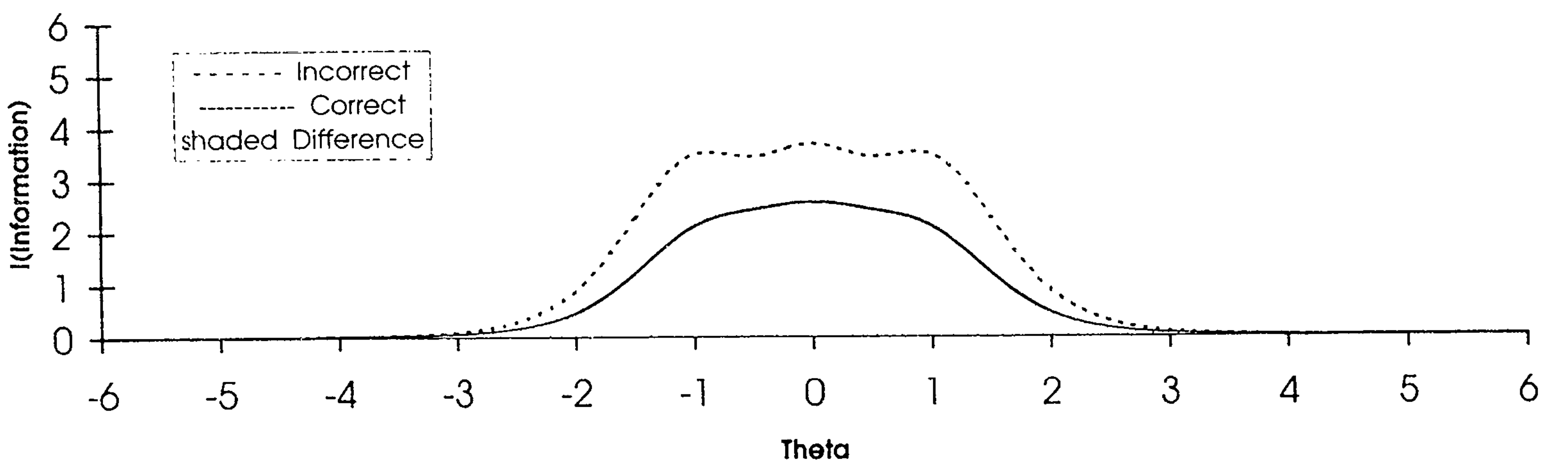
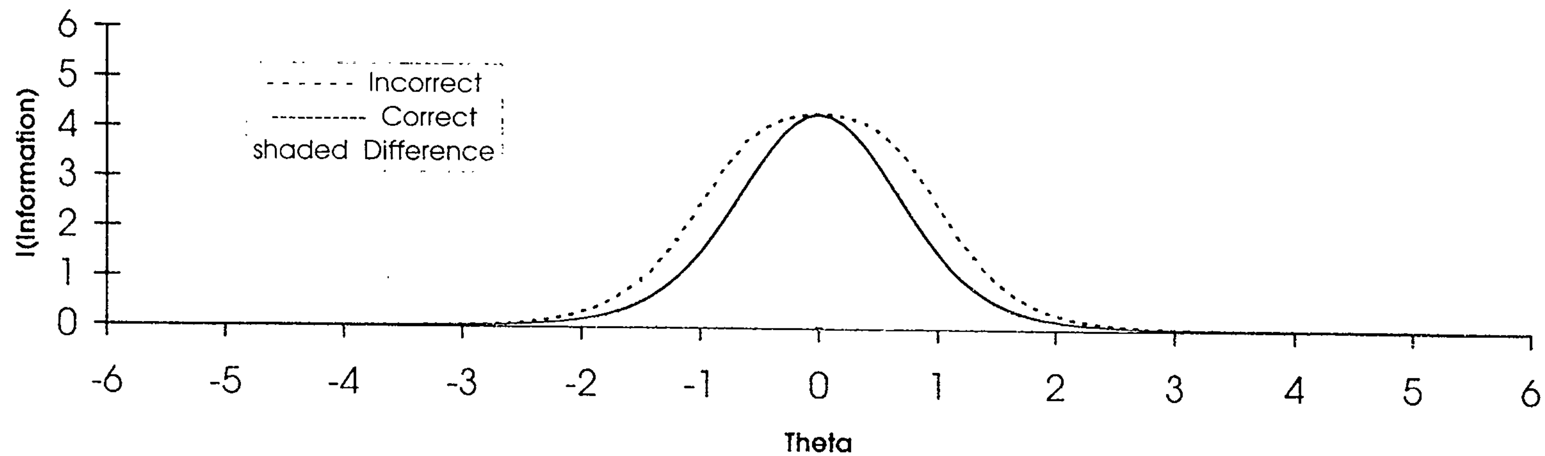


Figure H-8

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=0, d0=0, d1=0.52, d2=0, and d3=-0.52, In Case of Four Response Categories



Appendix I

SAMPLE DESIGN AND SELECTION TABLES

John Burke and James Green
Westat, Inc.

This appendix contains the urbanization classifications used within each jurisdiction and grade (Tables I-1 and I-2). Urbanization classification was created by collapsing type of location categories as necessary and according to specific rules until each urbanization stratus included a minimum of 10 percent of eligible students in the participating jurisdiction.

Also included in this appendix is information on metro area status stratification for the participating jurisdictions (Tables I-3 and I-4). All schools in the sampling frame were assigned a metro area status based on their Federal Information Processing Standards (FIPS) county code and Office of Management and Budget (OMB) Metropolitan Area Definitions as of June 30, 1993.[1] This field indicated if a school was located within a metropolitan area or not.

Tables I-5 and I-6 include information about the number of substitutes provided in each jurisdiction. Of the 47 participating jurisdictions, 42 were provided with at least one substitute at grade 4, and 41 were provided with at least one substitute at grade 8. Among jurisdictions receiving no substitutes, the majority had 100 percent participation from the original sample. The number of substitutes provided to a jurisdiction ranged from 0 to 24 in the fourth-grade sample. A total of 243 substitutes were selected.

Tables I-7 through I-10 show the number of schools in the fourth- and eighth-grade mathematics samples, together with school response rates observed within participating jurisdictions. The tables also show the number of substitutes in each jurisdiction that were associated with a nonparticipating original school selection, and the number of those that participated.

This appendix also contains the distribution of the student samples and response rates by grade, school type, and jurisdiction in Tables I-11 through I-14.

---

[1] Office of Management and Budget Bulletin No. 93-17, June 30, 1993.

Table I-1

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Alaska				
Large	Large	Mid-Size Central City/Urban Fringe	None	43
Large	Small	Mid-Size Central City/Urban Fringe	None	1
Small	Small	Small Town	None	1
Small	Small	Rural	None	41
Small	Large	Small Town	None	34
Small	Large	Rural	None	18
Alabama				
Small	Small	Rural	Low	1
Small	Large	Mid-Size Central City	Low	8
Small	Large	Mid- size Central City	Medium	8
Small	Large	Mid- size Central City	High	8
Small	Large	Urban Fringe of Mid-Size Central City	Low	9
Small	Large	Urban Fringe of Mid-Size Central City	Medium	11
Small	Large	Urban Fringe of Mid-Size Central City	High	9
Small	Large	Large/Small Town	Low	9
Small	Large	Large/Small Town	Medium	9
Small	Large	Large/Small Town	High	9
Small	Large	Rural	Low	8
Small	Large	Rural	Medium	9
Small	Large	Rural	High	9

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selec Schools
Arkansas				
Small	Small	Rural	Low	1
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City/Urban Fringe	Low	9
Small	Large	Mid-Size Central City/Urban Fringe	Medium	9
Small	Large	Mid-Size Central City/Urban Fringe	High	8
Small	Large	Large/Small Town	Low	16
Small	Large	Large/Small Town	Medium	16
Small	Large	Large/Small Town	High	16
Small	Large	Rural	Low	11
Small	Large	Rural	Medium	10
Small	Large	Rural	High	10
Arizona				
Small	Small	Large/Small Town/Rural	Medium	1
Small	Large	Large Central City	Low	9
Small	Large	Large Central City	Medium	8
Small	Large	Large Central City	High	9
Small	Large	Mid-Size Central City	Low	10
Small	Large	Mid-Size Central City	Medium	10
Small	Large	Mid-Size Central City	High	9
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	6
Small	Large	Large/Small Town/Rural	Low	11
Small	Large	Large/Small Town/Rural	Medium	10
Small	Large	Large/Small Town/Rural	High	10

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally selected schools
California				
Small	Small	Large/Small Town/Rural	Low	1
Small	Large	Large/Mid-Size Central City	Low	7
Small	Large	Large/Mid-Size Central City	Medium	8
Small	Large	Large/Mid-Size Central City	High	7
Small	Large	Mid-Size Central City	Low	5
Small	Large	Mid-Size Central City	Medium	6
Small	Large	Mid-Size Central City	High	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	11
Small	Large	Urban Fringe of Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Mid-Size Central City	Medium	4
Small	Large	Urban Fringe of Mid-Size Central City	High	4
Small	Large	Large/Small Town/Rural	Low	7
Small	Large	Large/Small Town/Rural	Medium	7
Small	Large	Large/Small Town/Rural	High	7

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Colorado				
Small	Small	Rural	Low	1
Small	Small	Rural	Medium	1
Small	Large	Large Central City	Low	11
Small	Large	Large Central City	Medium	10
Small	Large	Large Central City	High	10
Small	Large	Urban Fringe of Large Central City	Low	13
Small	Large	Urban Fringe of Large Central City	Medium	13
Small	Large	Urban Fringe of Large Central City	High	13
Small	Large	Large/Small Town	Low	6
Small	Large	Large/Small Town	Medium	7
Small	Large	Large/Small Town	High	6
Small	Large	Rural	Low	5
Small	Large	Rural	Medium	6
Small	Large	Rural	High	5
Connecticut				
Small	Large	Large Central City	Low Black/Low Hispanic	4
Small	Large	Large Central City	Low Black/High Hispanic	3
Small	Large	Large Central City	High Black/Low Hispanic	4
Small	Large	Large Central City	High Black/High Hispanic	4
Small	Large	Mid-Size Central City	Low	6
Small	Large	Mid-Size Central City	Medium	7
Small	Large	Mid-Size Central City	High	6
Small	Large	Urban Fringe of Large Central City	Low	7
Small	Large	Urban Fringe of Large Central City	Medium	6
Small	Large	Urban Fringe of Large Central City	High	7
Small	Large	Urban Fringe of Mid-Size Central City	None	14
Small	Large	Large/Small Town/Rural	None	37

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
District of Columbia				
Large	Large	Large Central City	Low	40
Large	Large	Large Central City	Medium	34
Large	Large	Large Central City	High	34
Large	Small	Large Central City	Low	1
Delaware				
Large	Large	Mid-Size Central City	Low	4
Large	Large	Mid-Size Central City	Medium	3
Small	Large	Mid-Size Central City	Low	2
Small	Large	Mid-Size Central City	Medium	1
Small	Large	Mid-Size Central City	High	3
Small	Large	Urban Fringe of Mid-Size Central City	Low	3
Small	Large	Urban Fringe of Mid-Size Central City	Medium	1
Small	Large	Urban Fringe of Mid-Size Central City	High	3
Small	Large	Small Town	Low	3
Small	Large	Small Town	Medium	2
Small	Large	Small Town	High	2
Small	Large	Rural	Low	9
Small	Large	Rural	Medium	9
Small	Large	Rural	High	8

4?7

4?3

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Florida				
Small	Large	Large Central City	Low Black/Low Hispanic	4
Small	Large	Large Central City	Low Black/High Hispanic	3
Small	Large	Large Central City	High Black/Low Hispanic	5
Small	Large	Large Central City	High Black/High Hispanic	3
Small	Large	Mid-Size Central City	Low	11
Small	Large	Mid-Size Central City	Medium	12
Small	Large	Mid-Size Central City	High	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	12
Small	Large	Large/Small Town/Rural	Low	7
Small	Large	Large/Small Town/Rural	Medium	7
Small	Large	Large/Small Town/Rural	High	6
Georgia				
Small	Large	Large/Mid-Size Central City	Low	7
Small	Large	Large/Mid-Size Central City	Medium	7
Small	Large	Large/Mid-Size Central City	High	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	11
Small	Large	Large/Small Town	Low	10
Small	Large	Large/Small Town	Medium	12
Small	Large	Large/Small Town	High	10
Small	Large	Rural	Low	7
Small	Large	Rural	Medium	7
Small	Large	Rural	High	6

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Hawaii				
Large	Large	Mid-Size Central City	None	32
Large	Large	Urban Fringe of Mid-Size Central City	None	50
Large	Large	Small Town/Rural	None	24
Iowa				
Small	Small	Rural	None	3
Small	Large	Mid-Size Central City/Urban Fringe	None	36
Small	Large	Large/Small Town	None	36
Small	Large	Rural	None	33
Indiana				
Small	Small	Rural	None	1
Small	Large	Large/Mid-Size Central City	Low	9
Small	Large	Large/Mid-Size Central City	Medium	10
Small	Large	Large/Mid-Size Central City	High	9
Small	Large	Urban Fringe of Large Central City	Low	4
Small	Large	Urban Fringe of Large Central City	Medium	4
Small	Large	Urban Fringe of Large Central City	High	4
Small	Large	Urban Fringe of Mid-Size Central City	None	12
Small	Large	Large/Small Town	None	31
Small	Large	Rural	None	22

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Kentucky				
Small	Small	Rural	None	2
Small	Large	Mid-Size Central City	Low	6
Small	Large	Mid-Size Central City	Medium	6
Small	Large	Mid-Size Central City	High	7
Small	Large	Urban Fringe of Mid-Size Central City	Low	6
Small	Large	Urban Fringe of Mid-Size Central City	Medium	5
Small	Large	Urban Fringe of Mid-Size Central City	High	5
Small	Large	Large/Small Town	None	35
Small	Large	Rural	None	35
Louisiana				
Small	Small	Rural	High	1
Small	Large	Large Central City	Low	4
Small	Large	Large Central City	Medium	4
Small	Large	Large Central City	High	4
Small	Large	Mid-Size Central City	Low	8
Small	Large	Mid-Size Central City	Medium	8
Small	Large	Mid-Size Central City	High	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	8
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	6
Small	Large	Large/Small Town	Low	10
Small	Large	Large/Small Town	Medium	12
Small	Large	Large/Small Town	High	10
Small	Large	Rural	Low	7
Small	Large	Rural	Medium	7
Small	Large	Rural	High	6

503

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Massachusetts				
Small	Small	Small Town/Rural	None	1
Small	Large	Large/Mid-Size Central City	Low	9
Small	Large	Large/Mid-Size Central City	Medium	9
Small	Large	Large/Mid-Size Central City	High	9
Small	Large	Urban Fringe of Large Central City	None	19
Small	Large	Urban Fringe of Mid-Size Central City	Low	5
Small	Large	Urban Fringe of Mid-Size Central City	Medium	4
Small	Large	Urban Fringe of Mid-Size Central City	High	4
Small	Large	Large Town	Low	7
Small	Large	Large Town	Medium	6
Small	Large	Large Town	High	7
Small	Large	Small Town/Rural	None	28
Maryland				
Small	Large	Large/Mid-Size Central City	Low	7
Small	Large	Large/Mid-Size Central City	Medium	7
Small	Large	Large/Mid-Size Central City	High	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	21
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	21
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	21
Small	Large	Large/Small Town/Rural	Low	8
Small	Large	Large/Small Town/Rural	Medium	8
Small	Large	Large/Small Town/Rural	High	8

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Maine				
Small	Small	Mid-Size Central City/Urban Fringe	None	1
Small	Small	Small Town	None	2
Small	Small	Rural	None	12
Small	Large	Mid-Size Central City/Urban Fringe	None	20
Small	Large	Small Town	None	54
Small	Large	Rural	None	28
Michigan				
Small	Small	Rural	None	1
Small	Large	Large/Mid-Size Central City	Low	9
Small	Large	Large/Mid-Size Central City	Medium	8
Small	Large	Large/Mid-Size Central City	High	9
Small	Large	Urban Fringe of Large Central City	None	35
Small	Large	Large/Small Town	None	30
Small	Large	Rural	None	16
Minnesota				
Small	Small	Rural	None	2
Small	Large	Large/Mid-Size Central City	Low	5
Small	Large	Large/Mid-Size Central City	Medium	4
Small	Large	Large/Mid-Size Central City	High	5
Small	Large	Urban Fringe of Large Central City	None	32
Small	Large	Large/Small Town	None	32
Small	Large	Rural	None	27

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Missouri				
Small	Small	Large/Small Town	None	1
Small	Small	Rural	None	3
Small	Large	Large/Mid-Size Central City	Low	5
Small	Large	Large/Mid-Size Central City	Medium	4
Small	Large	Large/Mid-Size Central City	High	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	12
Small	Large	Large/Small Town	None	27
Small	Large	Rural	None	27
Mississippi				
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City	Low	4
Small	Large	Mid-Size Central City	Medium	4
Small	Large	Mid-Size Central City	High	4
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	4
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	4
Small	Large	Large/Small Town	Low	14
Small	Large	Large/Small Town	Medium	16
Small	Large	Large/Small Town	High	13
Small	Large	Rural	Low	14
Small	Large	Rural	Medium	14
Small	Large	Rural	High	13

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Montana				
Small	Small	Mid-Size Central City/Urban Fringe	None	1
Small	Small	Large/Small Town	None	1
Small	Small	Rural	None	32
Small	Large	Mid-Size Central City/Urban Fringe	None	24
Small	Large	Large/Small Town	None	43
Small	Large	Rural	None	32
North Carolina				
Small	Small	Rural	Medium	1
Small	Large	Mid-Size Central City	Low	11
Small	Large	Mid-Size Central City	Medium	9
Small	Large	Mid-Size Central City	High	9
Small	Large	Urban Fringe of Mid-Size Central City	Low	5
Small	Large	Urban Fringe of Mid-Size Central City	Medium	5
Small	Large	Urban Fringe of Mid-Size Central City	High	5
Small	Large	Large/Small Town	Low	12
Small	Large	Large/Small Town	Medium	11
Small	Large	Large/Small Town	High	10
Small	Large	Rural	Low	10
Small	Large	Rural	Medium	11
Small	Large	Rural	High	10
North Dakota				
Small	Small	Rural	None	33
Small	Large	Mid-Size Central City/Urban Fringe	None	36
Small	Large	Large/Small Town	None	28
Small	Large	Rural	None	33

511

512

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Nebraska				
Small	Small	Mid-Size Central City/Urban /Fringe	Low	1
Small	Small	Large/Small Town	None	9
Small	Small	Rural	None	30
Small	Large	Mid-Size Central City/Urban Fringe	Low	13
Small	Large	Mid-Size Central City/Urban Fringe	Medium	15
Small	Large	Mid-Size Central City/Urban Fringe	High	14
Small	Large	Large/Small Town	None	30
Small	Large	Rural	None	27
New Jersey				
Small	Small	Urban Fringe of Large Central City	Medium	1
Small	Large	Large/Mid-Size Central City	Low Black/Low Hispanic	5
Small	Large	Large/Mid-Size Central City	Low Black/High Hispanic	5
Small	Large	Large/Mid-Size Central City	High Black/Low Hispanic	5
Small	Large	Large/Mid-Size Central City	High Black/High Hispanic	5
Small	Large	Urban Fringe of Large Central City	Low	13
Small	Large	Urban Fringe of Large Central City	Medium	14
Small	Large	Urban Fringe of Large Central City	High	13
Small	Large	Urban Fringe of Mid-Size Central City	Low	7
Small	Large	Urban Fringe of Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Mid-Size Central City	High	7
Small	Large	Large/Small Town/Rural	None	25

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
New Mexico				
Large	Large	Mid-Size Central City	Low	10
Large	Large	Mid-Size Central City	Medium	6
Large	Large	Mid-Size Central City	High	8
Large	Large	Urban Fringe of Mid-Size Central City	Low	1
Large	Large	Urban Fringe of Mid-Size Central City	Medium	2
Large	Large	Urban Fringe of Mid-Size Central City	High	1
Large	Large	Rural	Medium	1
Small	Small	Rural	Low	1
Small	Small	Rural	Medium	1
Small	Small	Rural	High	2
Small	Large	Mid-Size Central City	Medium	4
Small	Large	Mid-Size Central City	High	2
Small	Large	Urban Fringe of Mid-Size Central City	Low	3
Small	Large	Urban Fringe of Mid-Size Central City	Medium	2
Small	Large	Urban Fringe of Mid-Size Central City	High	3
Small	Large	Large Town	Low	5
Small	Large	Large Town	Medium	5
Small	Large	Large Town	High	5
Small	Large	Small Town	Low	10
Small	Large	Small Town	Medium	10
Small	Large	Small Town	High	11
Small	Large	Rural	Low	6
Small	Large	Rural	Medium	4
Small	Large	Rural	High	5

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Nevada				
Large	Large	Mid-Size Central City/Urban Fringe	Low	13
Large	Large	Mid-Size Central City/Urban Fringe	Medium	22
Large	Large	Mid-Size Central City/Urban Fringe	High	22
Large	Large	Rural	Low	2
Large	Large	Rural	Medium	2
Large	Large	Rural	High	6
Small	Small	Large/Small Town	Low	1
Small	Small	Rural	Low	1
Small	Small	Rural	Medium	1
Small	Large	Mid-Size Central City/Urban Fringe	Low	9
Small	Large	Mid-Size Central City/Urban Fringe	Medium	1
Small	Large	Mid-Size Central City/Urban Fringe	High	3
Small	Large	Large/Small Town	Low	5
Small	Large	Large/Small Town	Medium	4
Small	Large	Large/Small Town	High	5
Small	Large	Rural	Low	6
Small	Large	Rural	Medium	6
Small	Large	Rural	High	2

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
New York				
Large	Large	Large/Mid-Size Central City	Low Black/Low Hispanic	8
Large	Large	Large/Mid-Size Central City	Low Black/High Hispanic	11
Large	Large	Large/Mid-Size Central City	High Black/Low Hispanic	11
Large	Large	Large/Mid-Size Central City	High Black/High Hispanic	7
Large	Large	Urban Fringe of Large Central City	High	1
Small	Large	Large/Mid-Size Central City	Low Black/Low Hispanic	5
Small	Large	Large/Mid-Size Central City	High Black/Low Hispanic	1
Small	Large	Large/Mid-Size Central City	High Black/High Hispanic	4
Small	Large	Urban Fringe of Large Central City	Low	3
Small	Large	Urban Fringe of Large Central City	Medium	4
Small	Large	Urban Fringe of Large Central City	High	3
Small	Large	Urban Fringe of Mid-Size Central City	Low	6
Small	Large	Urban Fringe of Mid-Size Central City	Medium	6
Small	Large	Urban Fringe of Mid-Size Central City	High	7
Small	Large	Large/Small Town/Rural	None	30
Oregon				
Small	Small	Urban Fringe of Mid-Size Central City	Low	1
Small	Small	Urban Fringe of Mid-Size Central City	Medium	1
Small	Small	Large/Small Town/Rural	None	4
Small	Large	Large Central City	Low	5
Small	Large	Large Central City	Medium	4
Small	Large	Large Central City	High	3
Small	Large	Mid-Size Central City	None	14
Small	Large	Urban Fringe of Large Central City	None	32
Small	Large	Urban Fringe of Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Mid-Size Central City	Medium	4
Small	Large	Urban Fringe of Mid-Size Central City	High	4
Small	Large	Large/Small Town/Rural	None	34

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Pennsylvania				
Small	Large	Large/Mid-Size Central City	Low	8
Small	Large	Large/Mid size Central City	Medium	8
Small	Large	Large/Mid-Size Central City	High	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	11
Small	Large	Large/Small Town	None	32
Small	Large	Rural	None	18
Rhode Island				
Small	Large	Large Central City	Low Hispanic/Low Black	5
Small	Large	Large Central City	Low Hispanic/High Black	5
Small	Large	Large Central City	High Hispanic/Low Black	5
Small	Large	Large Central City	High Hispanic/High Black	4
Small	Large	Mid-Size Central City	Low	4
Small	Large	Mid-Size Central City	Medium	4
Small	Large	Mid-Size Central City	High	4
Small	Large	Urban Fringe of Large/Mid-Size Central City	None	47
Small	Large	Large/Small Town/Rural	None	30

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
South Carolina				
Small	Large	Mid-Size Central City	Low	5
Small	Large	Mid-Size Central City	Medium	5
Small	Large	Mid-Size Central City	High	5
Small	Large	Urban Fringe of Mid-Size Central City	Low	10
Small	Large	Urban Fringe of Mid-Size Central City	Medium	10
Small	Large	Urban Fringe of Mid-Size Central City	High	10
Small	Large	Small Town	Low	12
Small	Large	Small Town	Medium	12
Small	Large	Small Town	High	12
Small	Large	Rural	Low	8
Small	Large	Rural	Medium	8
Small	Large	Rural	High	9
Tennessee				
Small	Small	Rural	None	2
Small	Large	Large Central City	Low	7
Small	Large	Large Central City	Medium	9
Small	Large	Large Central City	High	8
Small	Large	Mid-Size Central City	Low	4
Small	Large	Mid-Size Central City	Medium	5
Small	Large	Mid-Size Central City	High	4
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	6
Small	Large	Large/Small Town	Low	10
Small	Large	Large/Small Town	Medium	10
Small	Large	Large/Small Town	High	10
Small	Large	Rural	None	21

523

524

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Texas				
Small	Small	Rural	High	1
Small	Large	Large Central City	Low Hispanic/Low Black	6
Small	Large	Large Central City	Low Hispanic/High Black	7
Small	Large	Large Central City	High Hispanic/Low Black	6
Small	Large	Large Central City	High Hispanic/High Black	7
Small	Large	Mid-Size Central City	Low	9
Small	Large	Mid-Size Central City	Medium	8
Small	Large	Mid-Size Central City	High	9
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	5
Small	Large	Large/Small Town	Low	8
Small	Large	Large/Small Town	Medium	7
Small	Large	Large/Small Town	High	8
Small	Large	Rural	Low	5
Small	Large	Rural	Medium	4
Small	Large	Rural	High	4
Utah				
Small	Small	Rural	None	2
Small	Large	Mid-Size Central City	Low	8
Small	Large	Mid-Size Central City	Medium	8
Small	Large	Mid-Size Central City	High	8
Small	Large	Urban Fringe of Mid-Size Central City	None	47
Small	Large	Large/Small Town	None	17
Small	Large	Rural	None	17

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Virginia				
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City	Low	11
Small	Large	Mid-Size Central City	Medium	11
Small	Large	Mid-Size Central City	High	11
Small	Large	Urban Fringe of Large Central City	None	18
Small	Large	Urban Fringe of Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Mid-Size Central City	Medium	5
Small	Large	Urban Fringe of Mid-Size Central City	High	3
Small	Large	Large/Small Town	Low	5
Small	Large	Large/Small Town	Medium	6
Small	Large	Large/Small Town	High	5
Small	Large	Rural	Low	8
Small	Large	Rural	Medium	9
Small	Large	Rural	High	8
Vermont				
Small	Small	Small Town	None	2
Small	Small	Rural	None	27
Small	Large	Mid-Size Central City/Urban Fringe	None	5
Small	Large	Small Town	None	59
Small	Large	Rural	None	34

529

527

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Washington				
Small	Small	Rural	Low	1
Small	Small	Rural	High	1
Small	Large	Large/Mid-Size Central City	Low	10
Small	Large	Large/Mid-Size Central City	Medium	10
Small	Large	Large/Mid-Size Central City	High	10
Small	Large	Urban Fringe of Large Central City	None	20
Small	Large	Urban Fringe of Mid-Size Central City	None	15
Small	Large	Large/Small Town	Low	7
Small	Large	Large/Small Town	Medium	7
Small	Large	Large/Small Town	High	8
Small	Large	Rural	Low	6
Small	Large	Rural	Medium	6
Small	Large	Rural	High	5
Wisconsin				
Small	Small	Rural	None	2
Small	Large	Large Central City	Low	4
Small	Large	Large Central City	Medium	3
Small	Large	Large Central City	High	4
Small	Large	Mid-Size Central City	None	22
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	6
Small	Large	Large/Small Town	None	27
Small	Large	Rural	None	26

Table I-1 (continued)

Distribution of Selected Public Schools by Sampling Strata, Fourth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
West Virginia				
Small	Small	Mid-Size Central City	None	1
Small	Small	Large/Small Town	None	1
Small	Small	Rural	None	6
Small	Large	Mid-Size Central City	None	14
Small	Large	Urban Fringe of Mid-Size Central City	None	14
Small	Large	Large/Small Town	None	30
Small	Large	Rural	None	46
Wyoming				
Small	Small	Urban Fringe of Mid-Size Central City	High	1
Small	Small	Small Town	None	5
Small	Small	Rural	None	12
Small	Large	Mid-Size Central City	None	13
Small	Large	Urban Fringe of Mid-Size Central City	Low	5
Small	Large	Urban Fringe of Mid-Size Central City	Medium	6
Small	Large	Urban Fringe of Mid-Size Central City	High	6
Small	Large	Small Town	None	56
Small	Large	Rural	None	18

531 532

Table I-2

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Alaska				
Large	Large	Mid-Size Central City/Urban Fringe	None	8
Small	Small	Small Town	None	2
Small	Small	Rural	None	79
Small	Large	Small Town	None	16
Small	Large	Rural	None	16
Alabama				
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City	Low	7
Small	Large	Mid-Size Central City	Medium	7
Small	Large	Mid-Size Central City	High	7
Small	Large	Urban Fringe of Mid-Size Central City	Low	10
Small	Large	Urban Fringe of Mid-Size Central City	Medium	10
Small	Large	Urban Fringe of Mid-Size Central City	High	9
Small	Large	Large/Small Town	Low	9
Small	Large	Large/Small Town	Medium	10
Small	Large	Large/Small Town	High	9
Small	Large	Rural	Low	11
Small	Large	Rural	Medium	9
Small	Large	Rural	High	11

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Arkansas				
Small	Small	Rural	Low	1
Small	Small	Rural	Medium	1
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City/Urban Fringe	Low	8
Small	Large	Mid-Size Central City/Urban Fringe	Medium	9
Small	Large	Mid-Size Central City/Urban Fringe	High	7
Small	Large	Large/Small Town	Low	17
Small	Large	Large/Small Town	Medium	16
Small	Large	Large/Small Town	High	16
Small	Large	Rural	Low	12
Small	Large	Rural	Medium	13
Small	Large	Rural	High	12
Arizona				
Small	Small	Mid-Size Central City	Medium	1
Small	Small	Large/Small Town/Rural	Medium	2
Small	Large	Large Central City	Low	7
Small	Large	Large Central City	Medium	9
Small	Large	Large Central City	High	9
Small	Large	Mid-Size Central City	Low	11
Small	Large	Mid-Size Central City	Medium	10
Small	Large	Mid-Size Central City	High	10
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	6
Small	Large	Large/Small Town/Rural	Low	11
Small	Large	Large/Small Town/Rural	Medium	12
Small	Large	Large/Small Town/Rural	High	10

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
California				
Small	Small	Large Central City	Medium	1
Small	Small	Large/Small Town/Rural	Low	1
Small	Large	Large Central City	Low	7
Small	Large	Large Central City	Medium	7
Small	Large	Large Central City	High	6
Small	Large	Mid-Size Central City	Low	6
Small	Large	Mid-Size Central City	Medium	6
Small	Large	Mid-Size Central City	High	6
Small	Large	Urban Fringe of Large Central City	Low	11
Small	Large	Urban Fringe of Large Central City	Medium	11
Small	Large	Urban Fringe of Large Central City	High	11
Small	Large	Urban Fringe of Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Mid-Size Central City	Medium	5
Small	Large	Urban Fringe of Mid-Size Central City	High	4
Small	Large	Large/Small Town/Rural	Low	8
Small	Large	Large/Small Town/Rural	Medium	7
Small	Large	Large/Small Town/Rural	High	8

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Colorado				
Small	Small	Urban Fringe of Large/Mid-Size Central City	Medium	1
Small	Small	Rural	Low	2
Small	Small	Rural	Medium	1
Small	Small	Rural	High	1
Small	Large	Large Central City	Low Hispanic/Low Black	2
Small	Large	Large Central City	Low Hispanic/High Black	3
Small	Large	Large Central City	High Hispanic/Low Black	3
Small	Large	Large Central City	High Hispanic/High Black	3
Small	Large	Mid-Size Central City	Low	8
Small	Large	Mid-Size Central City	Medium	8
Small	Large	Mid-Size Central City	High	8
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	12
Small	Large	Urban Fringe of Large./Mid-Size Central City	Medium	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	12
Small	Large	Large/Small Town	Low	6
Small	Large	Large/Small Town	Medium	7
Small	Large	Large/Small Town	High	7
Small	Large	Rural	Low	5
Small	Large	Rural	Medium	6
Small	Large	Rural	High	6

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Connecticut				
Small	Large	Large Central City	Low Black/Low Hispanic	2
Small	Large	Large Central City	Low Black/High Hispanic	2
Small	Large	Large Central City	High Black/Low Hispanic	3
Small	Large	Large Central City	High Black/High Hispanic	2
Small	Large	Mid-Size Central City	Low	7
Small	Large	Mid-Size Central City	Medium	6
Small	Large	Mid-Size Central City	High	7
Small	Large	Urban Fringe of Large Central City	Low	6
Small	Large	Urban Fringe of Large Central City	Medium	6
Small	Large	Urban Fringe of Large Central City	High	6
Small	Large	Urban Fringe of Mid-Size Central City	None	16
Small	Large	Large/Small Town/Rural	None	40
District of Columbia				
Large	Large	Large Central City	Low	10
Large	Large	Large Central City	Medium	12
Large	Large	Large Central City	High	11
Large	Small	Large Central City	Low	1

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Delaware				
Large	Large	Urban Fringe of Mid-Size Central City	Low	1
Large	Large	Urban Fringe of Mid-Size Central City	Medium	1
Large	Large	Urban Fringe of Mid-Size Central City	High	1
Small	Large	Mid-Size Central City	Low	1
Small	Large	Mid-Size Central City	Medium	1
Small	Large	Mid-Size Central City	High	1
Small	Large	Urban Fringe of Mid-Size Central city	Low	1
Small	Large	Urban Fringe of Mid-Size Central city	Medium	4
Small	Large	Urban Fringe of Mid-Size Central city	High	2
Small	Large	Small Town	Low	2
Small	Large	Small Town	Medium	2
Small	Large	Small Town	High	2
Small	Large	Rural	Low	4
Small	Large	Rural	Medium	5
Small	Large	Rural	High	3

543 544

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Florida				
Small	Small	Large/Small Town/Rural	Low	1
Small	Large	Large Central City	Low Black/Low Hispanic	3
Small	Large	Large Central City	Low Black/High Hispanic	4
Small	Large	Large Central City	High Black/Low Hispanic	3
Small	Large	Large Central City	High Black/High Hispanic	4
Small	Large	Mid-Size Central City	Low	11
Small	Large	Mid-Size Central City	Medium	12
Small	Large	Mid-Size Central City	High	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	14
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	13
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	14
Small	Large	Large/Small Town/Rural	Low	8
Small	Large	Large/Small Town/Rural	Medium	6
Small	Large	Large/Small Town/Rural	High	6

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Georgia				
Small	Small	Large/Small Town	Low	1
Small	Large	Large/Mid-Size Central City	Low	6
Small	Large	Large/Mid-Size Central City	Medium	6
Small	Large	Large/Mid-Size Central City	High	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	13
Small	Large	Large/Small Town	Low	12
Small	Large	Large/Small Town	Medium	11
Small	Large	Large/Small Town	High	12
Small	Large	Rural	Low	5
Small	Large	Rural	Medium	6
Small	Large	Rural	High	6
Hawaii				
Large	Large	Mid-Size Central City	None	12
Large	Large	Urban Fringe of Mid-Size Central City	None	20
Large	Large	Small Town/Rural	None	20
Large	Small	Small Town/Rural	None	1
Iowa				
Small	Small	Large/Small Town	None	1
Small	Small	Rural	None	2
Small	Large	Urban Fringe of Large/Mid-Size Central City	None	33
Small	Large	Large/Small Town	None	39
Small	Large	Rural	None	41

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Indiana				
Small	Large	Large/Mid-Size Central City	Low	9
Small	Large	Large/Mid-Size Central City	Medium	9
Small	Large	Large/Mid-Size Central City	High	9
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	3
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	None	13
Small	Large	Large/Small Town	None	33
Small	Large	Rural	None	21
Kentucky				
Small	Small	Rural	None	1
Small	Large	Mid-Size Central City	Low	6
Small	Large	Mid-Size Central City	Medium	6
Small	Large	Mid-Size Central City	High	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	6
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	5
Small	Large	Large/Small Town	None	43
Small	Large	Rural	None	33

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Louisiana				
Small	Small	Large/Small Town	Low	1
Small	Small	Rural	High	1
Small	Large	Large/Mid-Size Central City	Low	10
Small	Large	Large/Mid-Size Central City	Medium	10
Small	Large	Large/Mid-Size Central City	High	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	9
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	8
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	7
Small	Large	Large/Small Town	Low	12
Small	Large	Large/Small Town	Medium	11
Small	Large	Large/Small Town	High	11
Small	Large	Rural	Low	8
Small	Large	Rural	Medium	8
Small	Large	Rural	High	8
Massachusetts				
Small	Small	Small Town	None	1
Small	Large	Large/Mid-Size Central City	Low	8
Small	Large	Large/Mid-Size Central City	Medium	9
Small	Large	Large/Mid-Size Central City	High	8
Small	Large	Urban Fringe of Large Central City	Low	7
Small	Large	Urban Fringe of Large Central City	Medium	7
Small	Large	Urban Fringe of Large Central City	High	7
Small	Large	Urban Fringe of Mid-Size Central City	None	13
Small	Large	Large Town	None	18
Small	Large	Small Town	None	19
Small	Large	Rural	None	11

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Maryland				
Small	Large	Large/Mid-Size Central City	Low	6
Small	Large	Large/Mid-Size Central City	Medium	5
Small	Large	Large/Mid-Size Central City	High	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	22
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	21
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	21
Small	Large	Large/Small Town/Rural	Low	9
Small	Large	Large/Small Town/Rural	Medium	8
Small	Large	Large/Small Town/Rural	High	9
Maine				
Small	Small	Mid-Size Central City/Urban Fringe	None	1
Small	Small	Small Town	None	2
Small	Small	Rural	None	13
Small	Large	Mid-Size Central City/Urban Fringe	None	16
Small	Large	Small Town	None	53
Small	Large	Rural	None	33
Michigan				
Small	Small	Rural	None	1
Small	Large	Large/Mid-Size Central City	Low	7
Small	Large	Large/Mid-Size Central City	Medium	8
Small	Large	Large/Mid-Size Central City	High	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	12
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	12
Small	Large	Large/Small Town	None	32
Small	Large	Rural	None	17

55

554

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Minnesota				
Small	Small	Rural	None	1
Small	Large	Large/Mid-Size Central City	Low	4
Small	Large	Large/Mid-Size Central City	Medium	3
Small	Large	Large/Mid-Size Central City	High	3
Small	Large	Urban Fringe of Large/Mid-Size Central City	None	32
Small	Large	Large/Small Town	None	32
Small	Large	Rural	None	33
Missouri				
Small	Small	Large/Small Town	None	1
Small	Small	Rural	None	6
Small	Large	Large/Mid-Size Central city	Low	4
Small	Large	Large/Mid-Size Central city	Medium	4
Small	Large	Large/Mid-Size Central city	High	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	12
Small	Large	Urban Fringe of Large/'Mid-Size Central City	Medium	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	12
Small	Large	Large/Small Town	None	30
Small	Large	Rural	None	35

555 556

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Mississippi				
Small	Large	Mid-Size Central City	Low	3
Small	Large	Mid-Size Central City	Medium	3
Small	Large	Mid-Size Central City	High	4
Small	Large	Urban Fringe of Large/'Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Large/'Mid-Size Central City	Medium	4
Small	Large	Urban Fringe of Large/'Mid-Size Central City	High	4
Small	Large	Large/Small Town	Low	15
Small	Large	Large/Small Town	Medium	15
Small	Large	Large/Small Tow	High	14
Small	Large	Rural	Low	16
Small	Large	Rural	Medium	13
Small	Large	Rural	High	14
Montana				
Small	Small	Mid-Size Central City/Urban Fringe	None	1
Small	Small	Rural	None	56
Small	Large	Mid-Size Central City/Urban Fringe	None	9
Small	Large	Large Town	None	6
Small	Large	Small Town	None	25
Small	Large	Rural	None	44

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
North Carolina				
Small	Large	Mid-Size Central City	Low	9
Small	Large	Mid-Size Central City	Medium	9
Small	Large	Mid-Size Central City	High	10
Small	Large	Urban Fringe of mid-size Central City	Low	5
Small	Large	Urban Fringe of mid-size Central City	Medium	5
Small	Large	Urban Fringe of mid-size Central City	High	5
Small	Large	Large/Small Town	Low	12
Small	Large	Large/Small Town	Medium	12
Small	Large	Large/Small Town	High	12
Small	Large	Rural	Low	10
Small	Large	Rural	Medium	10
Small	Large	Rural	High	9
North Dakota				
Small	Small	Rural	None	67
Small	Large	Mid-Size Central City/Urban Fringe	None	10
Small	Large	Large/Small Town	None	17
Small	Large	Rural	None	64

559

560

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Nebraska				
Small	Small	Mid-Size Central City/Urban Fringe	Low	1
Small	Small	Large/Small Town	None	13
Small	Small	Rural	None	46
Small	Large	Mid-Size Central City/Urban Fringe	Low	11
Small	Large	Mid-Size Central City/Urban Fringe	Medium	10
Small	Large	Mid-Size Central City/Urban Fringe	High	9
Small	Large	Large/Small Town	None	26
Small	Large	Rural	None	46
New Hampshire				
Small	Small	Large/Small Town	None	1
Small	Small	Rural	None	2
Small	Large	Mid-Size Central City/Urban Fringe	None	14
Small	Large	Large/Small Town	None	49
Small	Large	Rural	none	23
New Jersey				
Small	Small	Large/Small Town/Rural	None	1
Small	Large	Large/Mid-Size Central City	Low Black/Low Hispanic	4
Small	Large	Large/Mid-Size Central City	Low Black/High Hispanic	5
Small	Large	Large/Mid-Size Central City	High Black/Low Hispanic	4
Small	Large	Large/Mid-Size Central City	High Black/High Hispanic	5
Small	Large	Urban Fringe of Large Central City	Low	14
Small	Large	Urban Fringe of Large Central City	Medium	14
Small	Large	Urban Fringe of Large Central City	High	14
Small	Large	Urban Fringe of Mid-Size Central City	Low	7
Small	Large	Urban Fringe of Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Mid-Size Central City	High	7
Small	Large	Large/Small Town/Rural	None	27

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
New Mexico				
Large	Large	Mid-Size Central City/Urban Fringe	Low	9
Large	Large	Mid-Size Central City/Urban Fringe	Medium	6
Large	Large	Mid-Size Central City/Urban Fringe	High	6
Large	Large	Rural	Medium	1
Small	Small	Rural	Low	1
Small	Small	Rural	Medium	2
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City/Urban Fringe	Low	1
Small	Large	Mid-Size Central City/Urban Fringe	Medium	4
Small	Large	Mid-Size Central City/Urban Fringe	High	5
Small	Large	Large Town	Low	5
Small	Large	Large Town	Medium	4
Small	Large	Large Town	High	4
Small	Large	Small Town	Low	9
Small	Large	Small Town	Medium	9
Small	Large	Small Town	High	8
Small	Large	Rural	Low	6
Small	Large	Rural	Medium	5
Small	Large	Rural	High	6

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Nevada				
Large	Large	Mid-Size Central City	Low	3
Large	Large	Mid-Size Central City	Medium	7
Large	Large	Mid-Size Central City	High	7
Large	Large	Urban Fringe of Mid-Size Central City	Low	1
Large	Large	Urban Fringe of Mid-Size Central City	Medium	2
Large	Large	Urban Fringe of Mid-Size Central City	High	2
Large	Large	Rural	Low	2
Large	Large	Rural	Medium	2
Large	Large	Rural	High	3
Small	Small	Large/Small Town	High	1
Small	Small	Rural	Low	2
Small	Small	Rural	Medium	2
Small	Small	Rural	High	1
Small	Large	Mid-Size Central City	Low	5
Small	Large	Mid-Size Central City	Medium	1
Small	Large	Mid-Size Central City	High	1
Small	Large	Large/Small Town	Low	3
Small	Large	Large/Small Town	Medium	3
Small	Large	Large/Small Town	High	5
Small	Large	Rural	Low	5
Small	Large	Rural	Medium	3
Small	Large	Rural	High	1

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
New York				
Large	Large	Large/Mid-Size Central City	Low Black/Low Hispanic	6
Large	Large	Large/Mid-Size Central City	Low Black/High Hispanic	10
Large	Large	Large/Mid-Size Central City	High Black/Low Hispanic	10
Large	Large	Large/Mid-Size Central City	High Black/High Hispanic	7
Large	Large	Urban Fringe of Large Central City	High	1
Small	Large	Large/Mid-Size Central City	Low Black/Low Hispanic	4
Small	Large	Large/Mid-Size Central City	Low Black/High Hispanic	1
Small	Large	Large/Mid-Size Central City	High Black/High Hispanic	4
Small	Large	Urban Fringe of Large Central City	Low	4
Small	Large	Urban Fringe of Large Central City	Medium	4
Small	Large	Urban Fringe of Large Central City	High	3
Small	Large	Urban Fringe of Mid-Size Central City	Low	7
Small	Large	Urban Fringe of Mid-Size Central City	Medium	6
Small	Large	Urban Fringe of Mid-Size Central City	High	7
Small	Large	Large/Small Town/Rural	None	32
Oregon				
Small	Small	Urban Fringe of Large/Mid-Size Central City	None	1
Small	Small	Urban Fringe of Mid-Size Central City	Low	1
Small	Small	Urban Fringe of Mid-Size Central City	High	1
Small	Small	Large/Small Town/Rural	None	7
Small	Large	Large Central City	Low	4
Small	Large	Large Central City	Medium	4
Small	Large	Large Central City	High	4
Small	Large	Mid-Size Central City	None	12
Small	Large	Urban Fringe of Large Central City	None	33
Small	Large	Urban Fringe of Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Mid-Size Central City	Medium	4
Small	Large	Urban Fringe of Mid-Size Central City	High	5
Small	Large	Large/Small Town/Rural	None	36

Table I-2 (continued)
Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Rhode Island				
Small	Small	Large Central City	Low Hispanic/Low Black	1
Small	Small	Large/Small Town/Rural	None	1
Small	Large	Large Central City	Low Hispanic/Low Black	2
Small	Large	Large Central City	Low Hispanic/High Black	1
Small	Large	Large Central City	High Hispanic/Low Black	1
Small	Large	Large Central City	High Hispanic/High Black	2
Small	Large	Mid-Size Central City	Low	2
Small	Large	Mid-Size Central City	Medium	1
Small	Large	Mid-Size Central City	High	2
Small	Large	Urban Fringe of Large/Mid-Size Central City	None	25
Small	Large	Large/Small Town/Rural	None	14
South Carolina				
Small	Large	Mid-Size Central City	Low	6
Small	Large	Mid-Size Central City	Medium	5
Small	Large	Mid-Size Central City	High	6
Small	Large	Urban Fringe of Mid-Size Central City	Low	10
Small	Large	Urban Fringe of Mid-Size Central City	Medium	9
Small	Large	Urban Fringe of Mid-Size Central City	High	10
Small	Large	Small Town	Low	13
Small	Large	Small Town	Medium	14
Small	Large	Small Town	High	13
Small	Large	Rural	Low	7
Small	Large	Rural	Medium	7
Small	Large	Rural	High	7

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Tennessee				
Small	Small	Large/Small Town	Low	1
Small	Small	Rural	None	1
Small	Large	Large/Mid-Size Central City	Low	10
Small	Large	Large/Mid-Size Central City	Medium	11
Small	Large	Large/Mid-Size Central City	High	11
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	7
Small	Large	Large/Small Town	Low	13
Small	Large	Large/Small Town	Medium	11
Small	Large	Large/Small Town	High	10
Small	Large	Rural	None	24

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Texas				
Small	Small	Large/Small Town	High	1
Small	Small	Rural	Low	1
Small	Small	Rural	Medium	1
Small	Large	Large Central City	Low Hispanic/Low Black	7
Small	Large	Large Central City	Low Hispanic/High Black	6
Small	Large	Large Central City	High Hispanic/Low Black	6
Small	Large	Large Central City	High Hispanic/High Black	6
Small	Large	Mid-Size Central City	Low	8
Small	Large	Mid-Size Central City	Medium	9
Small	Large	Mid-Size Central City	High	8
Small	Large	Urban Fringe of Large/Mid-Size Central City	Low	5
Small	Large	Urban Fringe of Large/Mid-Size Central City	Medium	7
Small	Large	Urban Fringe of Large/Mid-Size Central City	High	6
Small	Large	Large/Small Town	Low	8
Small	Large	Large/Small Town	Medium	8
Small	Large	Large/Small Town	High	8
Small	Large	Rural	Low	5
Small	Large	Rural	Medium	5
Small	Large	Rural	High	6
Utah				
Small	Small	Rural	None	1
Small	Large	Mid-Size Central City	Low	9
Small	Large	Mid-Size Central City	Medium	7
Small	Large	Mid-Size Central City	High	8
Small	Large	Urban Fringe of Mid-Size Central City	None	38
Small	Large	Large/Small Town	None	18
Small	Large	Rural	None	16

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Virginia				
Small	Large	Mid-Size Central City	Low	10
Small	Large	Mid-Size Central City	Medium	11
Small	Large	Mid-Size Central City	High	10
Small	Large	Urban Fringe of Large Central City	None	19
Small	Large	Urban Fringe of Mid-Size Central City	Low	4
Small	Large	Urban Fringe of Mid-Size Central City	Medium	5
Small	Large	Urban Fringe of Mid-Size Central City	High	4
Small	Large	Large/Small Town	Low	5
Small	Large	Large/Small Town	Medium	5
Small	Large	Large/Small Town	High	6
Small	Large	Rural	Low	10
Small	Large	Rural	Medium	8
Small	Large	Rural	High	9
Vermont				
Small	Small	Rural	None	19
Small	Large	-	-	2
Small	Large	Mid-Size Central City/Urban Fringe	None	3
Small	Large	Small Town	None	51
Small	Large	Rural	None	41

BEST COPY AVAILABLE

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Washington				
Small	Small	Large/Small Town	Low	1
Small	Small	Rural	None	2
Small	Large	Large/Mid-Size Central City	None	29
Small	Large	Urban Fringe of Large Central City	None	22
Small	Large	Urban Fringe of Mid-Size Central City	None	16
Small	Large	Large/Small Town	Low	8
Small	Large	Large/Small Town	Medium	7
Small	Large	Large/Small Town	High	8
Small	Large	Rural	None	18
Wisconsin				
Small	Small	Rural	None	2
Small	Large	Large/Mid-Size Central City	Low	10
Small	Large	Large/Mid-Size Central City	Medium	11
Small	Large	Large/Mid-Size Central City	High	10
Small	Large	Urban Fringe of Large/Mid-Size Central City	None	18
Small	Large	Large/Small Town	None	34
Small	Large	Rural	None	30
West Virginia				
Small	Small	Rural	None	2
Small	Large	Mid-Size Central City	None	15
Small	Large	Urban Fringe of Mid-Size Central City	None	15
Small	Large	Large/Small Town	None	33
Small	Large	Rural	None	43

Table I-2 (continued)

Distribution of Selected Public Schools by Sampling Strata, Eighth Grade

Small or Large District	Small or Large School	Urbanization	Percent of Minority	Originally Selected Schools
Wyoming				
Small	Small	Urban Fringe of Mid-Size Central City	Low	1
Small	Small	Small Town	None	8
Small	Small	Rural	None	17
Small	Large	Mid-Size Central City	None	4
Small	Large	Urban Fringe of Mid-Size Central City	Low	1
Small	Large	Urban Fringe of Mid-Size Central City	Medium	1
Small	Large	Urban Fringe of Mid-Size Central City	High	1
Small	Large	Small Town	None	28
Small	Large	Rural	None	26

579

Table I-3
Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Alaska			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	10
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	3
Alabama			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	7
Large	In Metro Area	Catholic	2
Arkansas			
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	3
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	2
Arizona			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	2

Table I-3 (continued)
Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
California			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	6
Colorado			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	4
Connecticut			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	9
Delaware			
Small	In Metro Area	Other Nonpublic	12
Small	Not In Metro Area	Other Nonpublic	4
Large	In Metro Area	Other Nonpublic	11
Large	In Metro Area	Catholic	17
District of Columbia			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Other Nonpublic	13
Large	In Metro Area	Catholic	15
Florida			
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	4
Georgia			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	1

Table I-3 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Hawaii			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	6
Iowa			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	4
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	5
Indiana			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Catholic	2
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	7
Kentucky			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Other Nonpublic	3
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	8
Louisiana			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	12

Table I-3 (continued)
Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Massachusetts			
Small	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	11
Maryland			
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	8
Large	In Metro Area	Catholic	8
Maine			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	2
Michigan			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	6
Minnesota			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	7

Table I-3 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Missouri			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	10
Mississippi			
Small	In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	6
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	2
Montana			
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	9
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	1
North Carolina			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	2
North Dakota			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	3

Table I-3 (continued)
Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Nebraska			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	4
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	9
New Jersey			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	15
New Mexico			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	2
Nevada			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	3
New York			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	12

Table I-3 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Oregon			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	2
Pennsylvania			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	8
Small	Not In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	16
Rhode Island			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	12
South Carolina			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	1
Tennessee			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	7
Large	In Metro Area	Catholic	1
Texas			
Small	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	2

Table I-3 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Utah			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	2
Virginia			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	3
Vermont			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	2
Washington			
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	4
Wisconsin			
Small	In Metro Area	Catholic	3
Small	In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	10

Table I-3 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Fourth Grade

Small or Large School	Metro Status	School Type	Original Selected School
West Virginia			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	6
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	2
Wyoming			
Small	In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	1

Table I-4

Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Alaska			
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	19
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	4
Alabama			
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	3
Arkansas			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	2
Arizona			
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	5
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	3
California			
Small	In Metro Area	Other Nonpublic	9
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	10
Colorado			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	5

Table I-4 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Connecticut			
Small	In Metro Area	Catholic	3
Small	In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Catholic	2
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	19
District of Columbia			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	7
Large	In Metro Area	Other Nonpublic	14
Large	In Metro Area	Catholic	24
Delaware			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	21
Small	Not In Metro Area	Other Nonpublic	8
Large	In Metro Area	Other Nonpublic	13
Large	In Metro Area	Catholic	22
Florida			
Small	In Metro Area	Other Nonpublic	10
Small	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	12
Large	In Metro Area	Catholic	7
Georgia			
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	7
Large	In Metro Area	Catholic	2
Hawaii			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	5
Large	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	14
Large	In Metro Area	Catholic	10

Table I-4 (continued)
Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Iowa			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	6
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	8
Indiana			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	11
Small	Not In Metro Area	Other Nonpublic	7
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	10
Kentucky			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	9
Louisiana			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	8
Large	In Metro Area	Catholic	20
Massachusetts			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	7
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	8
Large	In Metro Area	Catholic	20

Table I-4 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Maryland			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	8
Small	Not In Metro Area	Other Nonpublic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	11
Large	In Metro Area	Catholic	15
Maine			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	13
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	3
Michigan			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	10
Small	Not In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	8
Large	In Metro Area	Catholic	10
Minnesota			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	8
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	10

Table I-4 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Missouri			
Small	In Metro Area	Catholic	3
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	17
Mississippi			
Small	In Metro Area	Other Nonpublic	2
Small	Not In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	10
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	1
Montana			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	16
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Other Nonpublic	4
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	1
North Carolina			
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	5
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	2
North Dakota			
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	12
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	5

Table I-4 (continued)
Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Nebraska			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	10
Small	Not In Metro Area	Catholic	3
Large	Not In Metro Area	Catholic	6
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	10
New Hampshire			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	9
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	2
Large	In Metro Area	Other Nonpublic	2
Large	In Metro Area	Catholic	7
New Jersey			
Small	In Metro Area	Catholic	4
Small	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Other Nonpublic	9
Large	In Metro Area	Catholic	28
New Mexico			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	9
Small	Not In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	5
Nevada			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	3
Large	In Metro Area	Catholic	4

Table I-4 (continued)
Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
New York			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	2
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	12
Large	In Metro Area	Catholic	21
Oregon			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	5
Rhode Island			
Small	In Metro Area	Catholic	5
Small	In Metro Area	Other Nonpublic	8
Small	Not In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	4
Large	In Metro Area	Catholic	26
South Carolina			
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	2
Tennessee			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	6
Small	Not In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	10
Large	In Metro Area	Catholic	3

Table I-4 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Texas			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	6
Large	In Metro Area	Catholic	3
Utah			
Small	In Metro Area	Other Nonpublic	4
Small	Not In Metro Area	Other Nonpublic	1
Small	Not In Metro Area	Catholic	1
Large	In Metro Area	Other Nonpublic	5
Large	In Metro Area	Catholic	2
Virginia			
Small	In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Other Nonpublic	4
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	7
Large	In Metro Area	Catholic	4
Vermont			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	19
Small	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Catholic	2
Large	Not In Metro Area	Other Nonpublic	5
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	3
Washington			
Small	In Metro Area	Catholic	1
Small	In Metro Area	Other Nonpublic	7
Small	Not In Metro Area	Other Nonpublic	3
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	7
Large	In Metro Area	Catholic	6

Table I-4 (continued)

Distribution of Selected Nonpublic Schools by Sampling Strata, Eighth Grade

Small or Large School	Metro Status	School Type	Original Selected School
Wisconsin			
Small	In Metro Area	Catholic	6
Small	In Metro Area	Other Nonpublic	14
Small	Not In Metro Area	Other Nonpublic	11
Small	Not In Metro Area	Catholic	5
Large	Not In Metro Area	Catholic	4
Large	Not In Metro Area	Other Nonpublic	3
Large	In Metro Area	Other Nonpublic	8
Large	In Metro Area	Catholic	17
West Virginia			
Small	In Metro Area	Catholic	2
Small	In Metro Area	Other Nonpublic	5
Small	Not In Metro Area	Other Nonpublic	11
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	3
Wyoming			
Small	In Metro Area	Other Nonpublic	3
Small	Not In Metro Area	Other Nonpublic	11
Small	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Catholic	1
Large	Not In Metro Area	Other Nonpublic	1
Large	In Metro Area	Catholic	2

Table I-5

Number of Substitute Schools Provided in Each Jurisdiction By School Type, Fourth Grade

Jurisdiction	Public			Nonpublic		
	Regular substitutes	Double session substitutes	Total substitutes	Regular substitutes	Double session substitutes	Total substitutes
Alabama	100	1	101	15	0	15
Alaska	66	0	66	0	0	0
Arizona	102	0	102	11	0	11
Arkansas	95	0	95	10	0	10
California	106	0	106	16	0	16
Colorado	107	0	107	12	0	12
Connecticut	96	0	96	17	0	17
Delaware	0	0	0	23	0	23
District of Columbia	0	0	0	11	0	11
DoDEA/DDESS	0	0	0	0	0	0
DoDEA/DoDDS	0	0	0	0	0	0
Florida	98	0	98	18	0	18
Georgia	104	0	104	12	0	12
Guam	0	0	0	0	0	0
Hawaii	52	0	52	0	0	0
Indiana	106	0	106	22	0	22
Iowa	107	0	107	17	0	17
Kentucky	105	0	105	16	0	16
Louisiana	105	0	105	21	0	21
Maine	103	0	103	15	0	15
Maryland	104	0	104	21	0	21
Massachusetts	101	0	101	17	0	17
Michigan	105	0	105	20	0	20
Minnesota	103	0	103	21	0	21
Mississippi	87	0	87	14	0	14
Missouri	105	0	105	22	0	22
Montana	107	0	107	17	0	17

Table I-5 (continued)

Number of Substitute Schools Provided in Each Jurisdiction By School Type, Fourth Grade

Jurisdiction	Public			Nonpublic		
	Regular substitutes	Double session substitutes	Total substitutes	Regular substitutes	Double session substitutes	Total substitutes
Nebraska	130	0	130	25	0	25
Nevada	77	0	77	8	0	8
New Jersey	92	0	92	25	0	25
New Mexico	89	0	89	12	0	12
New York	98	0	98	25	0	25
North Carolina	106	0	106	0	0	0
North Dakota	93	11	104	19	0	19
Oregon	106	0	106	13	0	13
Pennsylvania	100	0	100	34	0	34
Rhode Island	62	2	64	0	0	0
South Carolina	93	0	93	0	0	0
Tennessee	101	0	101	0	0	0
Texas	104	0	104	9	0	9
Utah	104	0	104	7	0	7
Vermont	81	0	81	16	0	16
Virginia	101	0	101	0	0	0
Washington	104	0	104	0	0	0
West Virginia	108	0	108	0	0	0
Wisconsin	102	0	102	36	0	36
Wyoming	58	0	58	8	0	8
Total	**4,073**	**14**	**4,087**	**605**	**0**	**605**

601

6?2

Table I-6

Number of Substitute Schools Provided in Each Jurisdiction By School Type, Eighth Grade

Jurisdiction	Public			Nonpublic		
	Regular substitutes	Double session substitutes	Total substitutes	Regular substitutes	Double session substitutes	Total substitutes
Alabama	89	2	91	19	0	19
Alaska	91	0	91	0	0	0
Arizona	59	0	59	0	0	0
Arkansas	74	0	74	12	0	12
California	97	0	97	28	0	28
Colorado	65	0	65	0	0	0
Connecticut	46	0	46	37	0	37
Delaware	0	0	0	30	0	30
District of Columbia	0	0	0	0	0	0
DoDEA/DDESS	0	0	0	0	0	0
DoDEA/DoDDS	0	0	0	0	0	0
Florida	86	0	86	0	0	0
Georgia	96	0	96	20	0	20
Guam	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
Indiana	93	0	93	0	0	0
Iowa	92	0	92	27	0	27
Kentucky	85	0	85	24	0	24
Louisiana	90	0	90	31	0	31
Maine	72	0	72	0	0	0
Maryland	66	0	66	37	0	37
Massachusetts	75	0	75	35	0	35
Michigan	102	0	102	35	0	35
Minnesota	75	0	75	30	0	30
Mississippi	70	0	70	0	0	0
Missouri	100	0	100	38	0	38
Montana	103	0	103	28	0	28

Table I-6 (continued)

Number of Substitute Schools Provided in Each Jurisdiction By School Type, Eighth Grade

	Public			Nonpublic		
Jurisdiction	Regular substitutes	Double session substitutes	Total substitutes	Regular substitutes	Double session substitutes	Total substitutes
Nebraska	118	0	118	37	0	37
Nevada	12	0	12	8	0	8
New Hampshire	36	0	36	23	0	23
New Jersey	93	0	93	39	0	39
New Mexico	19	0	19	24	0	24
New York	96	0	96	38	0	38
North Carolina	98	0	98	0	0	0
North Dakota	79	4	83	17	0	17
Oregon	82	0	82	22	0	22
Rhode Island	0	4	4	21	0	21
South Carolina	66	0	66	19	0	19
Tennessee	94	0	94	0	0	0
Texas	103	0	103	12	0	12
Utah	14	0	14	11	0	11
Vermont	12	0	12	16	0	16
Virginia	82	0	82	0	0	0
Washington	105	0	105	21	0	21
West Virginia	54	0	54	0	0	0
Wisconsin	101	0	101	64	0	64
Wyoming	10	0	10	9	0	9
Total	**3,000**	**10**	**3,010**	**812**	**0**	**812**

605

606

Table I-7

Distribution of Grade 4 Public-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Alabama	79%	93%	107	1	84	22	15	99
Alaska	91%	91%	138	5	113	17	0	113
Arizona	87%	87%	106	1	91	14	0	91
Arkansas	76%	78%	107	2	79	21	2	81
California	80%	94%	106	0	84	22	15	99
Colorado	99%	99%	107	0	107	0	0	107
Connecticut	100%	100%	105	0	105	0	0	105
Delaware	100%	100%	53	2	51	0	0	51
District of Columbia	100%	100%	109	1	108	0	0	108
DoDEA/DDESS	100%	100%	38	0	38	0	0	38
DoDEA/DoDDS	100%	100%	95	2	93	0	0	93
Florida	100%	100%	106	0	106	0	0	106
Georgia	98%	98%	106	2	103	1	0	103
Guam	100%	100%	22	0	22	0	0	22
Hawaii	100%	100%	106	0	106	0	0	106
Indiana	87%	91%	106	0	92	14	4	96
Iowa	79%	87%	108	0	87	20	8	95
Kentucky	88%	96%	107	1	93	12	9	102
Louisiana	100%	100%	109	1	108	0	0	108
Maine	87%	87%	117	5	97	14	0	97
Maryland	93%	93%	107	0	99	8	0	99
Massachusetts	97%	97%	108	2	103	3	0	103
Michigan	76%	88%	108	0	81	26	13	94
Minnesota	91%	93%	107	1	97	9	2	99

Table I-7 (continued)

Distribution of Grade 4 Public-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Mississippi	92%	97%	109	3	97	7	6	103
Missouri	96%	99%	108	0	103	5	4	107
Montana	70%	81%	133	10	83	36	16	99
Nebraska	100%	100%	139	6	132	1	0	132
Nevada	84%	86%	111	1	93	13	2	95
New Jersey	73%	73%	107	1	78	24	0	78
New Mexico	100%	100%	108	1	107	0	0	107
New York	73%	86%	107	2	77	26	13	90
North Carolina	97%	97%	109	0	106	3	0	106
North Dakota	75%	96%	130	5	94	30	26	120
Oregon	86%	90%	110	4	91	15	4	95
Pennsylvania	73%	86%	106	1	77	24	13	90
Rhode Island	89%	99%	108	3	93	12	11	104
South Carolina	87%	88%	106	1	91	14	1	92
Tennessee	94%	94%	108	4	98	6	0	98
Texas	95%	97%	107	0	102	5	2	104
Utah	100%	100%	107	1	106	0	0	106
Vermont	78%	81%	127	6	95	17	5	100
Virginia	100%	100%	105	1	104	0	0	104
Washington	99%	99%	106	0	105	1	0	105
West Virginia	100%	100%	112	3	109	0	0	109
Wisconsin	92%	94%	107	2	97	8	2	99
Wyoming	100%	100%	122	7	115	0	0	115

Table I-8

Distribution of Grade 4 Nonpublic-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Alabama	72%	72%	15	0	10	5	0	10
Arizona	78%	87%	13	1	9	1	1	10
Arkansas	86%	86%	12	2	8	1	0	8
California	73%	73%	19	4	11	4	0	11
Colorado	76%	76%	15	2	10	3	0	10
Connecticut	75%	75%	19	2	13	4	0	13
Delaware	41%	43%	44	11	12	9	1	13
District of Columbia	63%	66%	34	5	17	4	1	18
Florida	66%	73%	19	3	11	4	1	12
Georgia	99%	99%	14	0	13	1	0	13
Guam	78%	78%	14	1	9	0	0	9
Indiana	79%	86%	24	5	14	5	1	15
Iowa	82%	82%	19	0	15	3	0	15
Kentucky	87%	87%	19	3	13	3	0	13
Louisiana	86%	86%	24	2	19	3	0	19
Maine	71%	74%	16	5	7	4	1	8
Maryland	57%	57%	24	5	11	7	0	11
Massachusetts	84%	84%	19	1	15	2	0	15
Michigan	86%	94%	22	3	16	2	2	18
Minnesota	78%	78%	23	4	15	4	0	15

Table I-8 (continued)

Distribution of Grade 4 Nonpublic-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Mississippi	79%	79%	15	0	11	4	0	11
Missouri	99%	100%	23	0	22	1	1	23
Montana	94%	94%	19	6	10	3	0	10
Nebraska	91%	91%	27	2	22	3	0	22
Nevada	91%	100%	11	2	8	1	1	9
New Jersey	64%	75%	26	4	14	8	2	16
New Mexico	90%	90%	20	5	13	1	0	13
New York	83%	91%	27	2	21	4	2	23
North Dakota	68%	68%	21	2	12	7	0	12
Oregon	34%	34%	15	3	4	7	0	4
Pennsylvania	66%	66%	35	1	19	15	0	19
Texas	64%	64%	10	4	4	2	0	4
Utah	81%	81%	10	1	7	2	0	7
Vermont	74%	74%	19	6	9	3	0	9
Wisconsin	68%	73%	38	3	23	12	2	25
Wyoming	82%	95%	11	3	6	2	1	7

613 614

Table I-9

Distribution of Grade 8 Public-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Alabama	84%	90%	110	2	91	15	6	97
Alaska	92%	92%	80	8	53	17	0	53
Arizona	87%	87%	107	1	93	9	0	93
Arkansas	70%	71%	112	1	76	25	1	77
California	83%	94%	108	0	89	19	12	101
Colorado	100%	100%	109	1	108	0	0	108
Connecticut	100%	100%	103	1	102	0	0	102
Delaware	100%	100%	31	1	30	0	0	30
District of Columbia	100%	100%	35	3	32	0	0	32
DoDEA/DDESS	100%	100%	12	0	12	0	0	12
DoDEA/DoDDS	100%	100%	59	2	57	0	0	57
Florida	100%	100%	109	5	104	0	0	104
Georgia	99%	99%	108	7	100	1	0	100
Guam	100%	100%	6	0	6	0	0	6
Hawaii	100%	100%	53	1	51	0	0	51
Indiana	88%	91%	107	1	93	12	3	96
Iowa	74%	84%	114	3	82	27	11	93
Kentucky	88%	92%	110	1	96	9	5	101
Louisiana	100%	100%	114	2	112	0	0	112
Maine	90%	90%	110	6	93	6	0	93
Maryland	86%	86%	106	2	89	10	0	89
Massachusetts	92%	92%	108	3	98	7	0	98
Michigan	70%	86%	106	0	74	31	16	90
Minnesota	86%	88%	108	0	94	8	2	96
Mississippi	89%	95%	109	3	96	9	7	103
Missouri	93%	96%	117	7	102	7	3	105

615 619

Table I-9 (continued)

Distribution of Grade 8 Public-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Montana	72%	75%	112	10	69	22	6	75
Nebraska	99%	100%	132	14	115	3	1	116
Nevada	38%	38%	59	2	28	2	0	28
New Hampshire	66%	69%	87	0	59	11	3	62
New Jersey	64%	65%	109	2	68	34	1	69
New Mexico	100%	100%	90	0	90	0	0	90
New York	71%	80%	106	0	75	29	9	84
North Carolina	100%	100%	108	1	107	0	0	107
North Dakota	83%	95%	124	7	96	17	12	108
Oregon	86%	92%	111	4	92	13	6	98
Rhode Island	90%	90%	51	1	42	4	0	42
South Carolina	86%	87%	107	2	90	10	1	91
Tennessee	92%	92%	112	5	98	6	0	98
Texas	90%	95%	110	5	95	10	5	100
Utah	100%	100%	97	2	95	0	0	95
Vermont	74%	74%	105	6	75	1	0	75
Virginia	100%	100%	106	0	106	0	0	106
Washington	94%	95%	110	1	102	7	1	103
West Virginia	100%	100%	107	1	106	0	0	106
Wisconsin	78%	78%	114	0	90	23	0	90
Wyoming	100%	100%	74	4	70	0	0	70

Table I-10

Distribution of Grade 8 Nonpublic-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Alabama	64%	64%	18	3	9	5	0	9
Arkansas	51%	60%	11	4	4	2	1	5
California	75%	75%	24	5	13	6	0	13
Connecticut	63%	65%	35	7	18	9	1	19
Delaware	38%	40%	50	12	11	8	1	12
District of Columbia	47%	47%	42	10	16	0	0	16
Georgia	88%	88%	16	3	10	3	0	10
Guam	76%	76%	11	0	8	0	0	8
Iowa	88%	88%	22	4	15	3	0	15
Kentucky	67%	67%	21	4	11	5	0	11
Louisiana	73%	73%	34	2	22	7	0	22
Maryland	60%	64%	34	5	17	12	1	18
Massachusetts	70%	74%	34	9	17	8	1	18
Michigan	80%	88%	27	6	16	5	2	18
Minnesota	75%	75%	25	5	15	5	0	15
Missouri	94%	100%	32	10	21	1	1	22

Table I-10 (continued)

Distribution of Grade 8 Nonpublic-School Sample by Jurisdiction

Jurisdiction	Weighted percent of school participation		Number of schools in the original sample			Number of substitute schools for nonparticipating originals		Total number of schools that participated
	Before substitution	After substitution	Total	Not eligible	Participated	Provided	Participated	
Montana	78%	78%	19	7	9	3	0	9
Nebraska	83%	85%	31	5	20	5	0	20
Nevada	78%	78%	11	3	6	2	0	6
New Hampshire	85%	85%	19	4	12	2	0	12
New Jersey	68%	71%	42	10	21	9	1	22
New Mexico	87%	87%	22	6	12	4	0	12
New York	88%	90%	39	6	29	3	1	30
North Dakota	86%	86%	20	4	12	4	0	12
Oregon	22%	22%	18	3	3	10	0	3
Rhode Island	81%	81%	39	6	26	3	0	26
South Carolina	76%	76%	16	2	10	4	0	10
Texas	93%	93%	12	1	9	2	0	9
Utah	43%	43%	10	3	2	4	0	2
Vermont	73%	73%	24	11	9	2	0	9
Washington	86%	86%	19	7	9	2	0	9
Wisconsin	68%	73%	50	8	26	14	2	28
Wyoming	74%	74%	12	5	5	2	0	5

621

622

Table I-11

Distribution of the Fourth-Grade Public-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Alabama	96%	2,739	80	2,646	2,541
Alaska	91%	2,634	56	2,528	2,304
Arizona	95%	2,467	182	2,240	2,113
Arkansas	96%	2,237	72	2,130	2,047
California	94%	2,464	245	2,187	2,063
Colorado	95%	2,923	138	2,753	2,609
Connecticut	96%	2,853	123	2,684	2,565
Delaware	94%	2,215	85	2,099	1,984
District of Columbia	95%	2,949	155	2,722	2,574
DoDEA/DDESS	95%	1,438	27	1,384	1,313
DoDEA/DoDDS	94%	3,010	73	2,755	2,604
Florida	94%	2,891	168	2,709	2,549
Georgia	95%	2,836	107	2,679	2,542
Guam	94%	1,676	104	1,520	1,431
Hawaii	95%	2,925	82	2,701	2,578
Indiana	96%	2,665	75	2,566	2,470
Iowa	97%	2,517	67	2,437	2,359
Kentucky	95%	2,849	89	2,702	2,579
Louisiana	95%	2,964	118	2,805	2,671
Maine	94%	2,365	104	2,253	2,115
Maryland	96%	2,761	107	2,575	2,465
Massachusetts	95%	2,753	128	2,611	2,497
Michigan	94%	2,653	88	2,544	2,382
Minnesota	94%	2,686	85	2,559	2,425
Mississippi	96%	2,927	76	2,836	2,716
Missouri	95%	2,857	83	2,777	2,643

Table I-11 (continued)

Distribution of the Fourth-Grade Public-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Montana	96%	2,415	58	2,340	2,251
Nebraska	95%	2,923	78	2,821	2,678
Nevada	92%	2,539	120	2,377	2,193
New Jersey	95%	2,154	66	2,068	1,961
New Mexico	94%	2,779	191	2,542	2,389
New York	94%	2,517	121	2,386	2,248
North Carolina	96%	2,922	114	2,779	2,658
North Dakota	96%	2,842	58	2,772	2,666
Oregon	95%	2,495	121	2,349	2,233
Pennsylvania	95%	2,568	70	2,469	2,347
Rhode Island	95%	2,746	98	2,601	2,461
South Carolina	95%	2,584	77	2,482	2,364
Tennessee	96%	2,716	96	2,577	2,473
Texas	96%	2,740	178	2,527	2,413
Utah	95%	2,880	88	2,751	2,625
Vermont	96%	2,318	80	2,240	2,136
Virginia	95%	2,866	102	2,718	2,586
Washington	94%	2,888	81	2,808	2,640
West Virginia	95%	2,784	118	2,647	2,530
Wisconsin	95%	2,685	109	2,564	2,437
Wyoming	96%	2,963	67	2,875	2,758

Table I-12

Distribution of the Fourth-Grade Nonpublic-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Alabama	97%	248	0	247	239
Arizona	99%	196	3	188	185
Arkansas	97%	184	2	180	174
California	98%	263	0	263	256
Colorado	96%	186	4	183	174
Connecticut	96%	258	2	257	245
Delaware	95%	356	2	354	337
District of Columbia	96%	413	0	412	395
Florida	96%	245	2	242	232
Georgia	94%	260	1	267	251
Guam	94%	345	4	336	317
Indiana	96%	312	1	309	297
Iowa	96%	297	1	296	284
Kentucky	97%	316	2	309	300
Louisiana	97%	460	5	460	444
Maine	97%	105	0	105	101
Maryland	98%	276	0	275	269
Massachusetts	96%	322	2	319	305
Michigan	97%	353	0	353	342
Minnesota	96%	291	1	290	277
Mississippi	96%	276	0	280	268
Missouri	95%	472	1	469	449

Table I-12 (continued)

Distribution of the Fourth-Grade Nonpublic-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Montana	95%	178	0	182	
Nebraska	99%	443	1	440	433
Nevada	96%	181	0	180	173
New Jersey	94%	349	0	353	334
New Mexico	94%	225	7	223	212
New York	96%	523	1	518	495
North Dakota	95%	158	1	160	152
Oregon	96%	74	0	72	69
Pennsylvania	96%	423	3	417	401
Texas	96%	107	2	106	101
Utah	95%	154	0	153	146
Vermont	97%	148	0	150	145
Wisconsin	97%	496	0	494	480
Wyoming	96%	91	1	88	84

629 630

Table I-13

Distribution of the Eighth-Grade Public-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Alabama	93%	2,605	106	2,434	2,261
Alaska	80%	1,885	54	1,782	1,462
Arizona	91%	2,508	111	2,346	2,136
Arkansas	92%	2,149	86	1,995	1,845
California	90%	2,688	161	2,505	2,290
Colorado	91%	2,939	62	2,782	2,530
Connecticut	91%	2,916	144	2,735	2,485
Delaware	90%	2,160	102	2,004	1,798
District of Columbia	85%	2,148	102	1,998	1,693
DoDEA/DDESS	95%	690	16	650	620
DoDEA/DoDDS	94%	2,460	27	2,308	2,160
Florida	91%	2,831	144	2,647	2,401
Georgia	90%	2,788	88	2,629	2,364
Guam	86%	1,121	24	1,076	928
Hawaii	91%	2,615	75	2,409	2,189
Indiana	93%	2,650	75	2,528	2,347
Iowa	93%	2,417	57	2,315	2,169
Kentucky	94%	2,744	75	2,618	2,461
Louisiana	89%	3,070	89	2,909	2,599
Maine	92%	2,538	53	2,465	2,258
Maryland	91%	2,479	80	2,350	2,137
Massachusetts	92%	2,579	91	2,468	2,280
Michigan	90%	2,497	60	2,387	2,155
Minnesota	92%	2,719	42	2,637	2,425
Mississippi	93%	2,850	98	2,688	2,487
Missouri	91%	2,789	110	2,615	2,386

Table I-13 (continued)

Distribution of the Eighth-Grade Public-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Montana	92%	2,143	38	2,071	1,912
Nebraska	91%	2,954	56	2,888	2,610
Nevada	90%	1,156	55	1,083	983
New Hampshire	89%	1,990	45	1,922	1,723
New Jersey	93%	1,873	64	1,786	1,655
New Mexico	90%	2,854	118	2,636	2,371
New York	91%	2,275	87	2,156	1,962
North Carolina	91%	2,995	64	2,899	2,638
North Dakota	94%	2,824	58	2,744	2,602
Oregon	90%	2,684	53	2,585	2,323
Rhode Island	89%	2,445	88	2,291	2,055
South Carolina	89%	2,534	74	2,397	2,143
Tennessee	91%	2,644	55	2,538	2,300
Texas	92%	2,636	118	2,427	2,245
Utah	91%	3,112	103	2,968	2,697
Vermont	93%	2,216	58	2,145	2,001
Virginia	91%	2,952	114	2,792	2,545
Washington	90%	2,827	84	2,708	2,434
West Virginia	92%	2,972	128	2,795	2,578
Wisconsin	92%	2,463	92	2,351	2,165
Wyoming	93%	2,970	22	2,886	2,696

Table I-14

Distribution of the Eighth-Grade Nonpublic-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Alabama	92%	130	0	128	119
Arkansas	98%	66	0	64	62
California	97%	237	0	238	232
Connecticut	94%	282	0	280	265
Delaware	96%	294	0	294	281
District of Columbia	95%	237	0	234	222
Georgia	97%	291	6	283	267
Guam	95%	212	0	212	202
Iowa	96%	295	0	295	282
Kentucky	98%	228	0	224	218
Louisiana	96%	455	5	446	426
Maryland	97%	311	1	308	301
Massachusetts	95%	314	1	315	301
Michigan	96%	310	0	308	293
Minnesota	96%	264	0	263	250
Missouri	96%	371	1	367	353
Montana	95%	125	1	128	121
Nebraska	95%	376	0	375	358
Nevada	95%	107	0	107	101
New Hampshire	96%	222	1	219	212
New Jersey	94%	353	6	342	320
New Mexico	89%	248	0	248	228
New York	95%	567	0	567	539
North Dakota	96%	199	0	202	194

Table I-14 (continued)

Distribution of the Eighth-Grade Nonpublic-School Student Sample and Response Rates by Jurisdiction

Jurisdiction	Weighted Percentage of Student Participation After Make-Ups	Number of Students Original Sample	Number of Students Excluded	Number of Students to be Assessed	Total Number of Students Assessed
Oregon	93%	45	0	46	43
Rhode Island	96%	441	0	439	423
South Carolina	96%	168	0	170	164
Texas	92%	180	1	179	166
Utah	93%	44	1	43	40
Vermont	95%	123	0	120	114
Washington	97%	193	0	188	182
Wisconsin	94%	384	1	384	362
Wyoming	97%	53	0	53	51

REFERENCES CITED IN TEXT

Allen, N. A., Kline, D. L., & Zelenak, C. A. (1996). *The NAEP 1994 technical report.* Washington, DC: National Center for Education Statistics.

Allen, N. A., Carlson, J. E., & Zelenak, C. A. (1998). *The NAEP 1996 technical report.* Washington, DC: National Center for Education Statistics. Report in preparation.

Andersen, E. B. (1980). Comparing latent distributions. *Psychometrika, 45*, 121-134.

Anderson, N. E., Jenkins, F. F., & Miller, K. E. (1996). *NAEP inclusion criteria and testing accommodations: Findings from the NAEP 1995 field test in mathematics.* Princeton, NJ: Educational Testing Service.

Angoff, W. H. (1971). Scales, norms, and equivalent scores. In R. L. Thorndike (Ed.), *Educational measurement* (2nd ed., pp. 508 - 600). Washington, DC: American Council on Education.

Beaton, A. E., & Johnson, E. G. (1990). The average response method of scaling. *Journal of Educational Statistics, 15,* 9-38.

Beaton, A. E., & Johnson, E. G. (1992). Overview of the scaling methodology used in the National Assessment. *Journal of Educational Measurement, 26(2),* 163-175.

Beaton, A. E., & Zwick, R. (1990). *The effect of changes in the National Assessment: Disentangling the NAEP 1985-86 reading anomaly.* (No. 17-TR-21) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Benjamini, Y., & Hochberg, Y. (1994). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society, Series B, 57*(1), 289-300.

Bourque, M. L., & Garrison, H. H. (1991). *The levels of mathematics achievement. Vol. I, national and state summaries.* Washington, DC: National Assessment Governing Board.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences.* New York, NY: Academic Press.

Curry, L. (1987, April). *Group decision process in setting cut-off scores.* Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.

Dempster, A. P., Laird, N. M., & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm (with discussion). *Journal of the Royal Statistical Society, Series B, 39,* 1-38.

Educational Testing Service (1987). *ETS standards for quality and fairness.* Princeton, NJ: Author.

Educational Testing Service (1992). *Innovations and ingenuity: A foundation for the future. Application for cooperative agreement for NAEP*. CFDA Number: 84.999E. Princeton, NJ: Author.

Engelen, R. J. H. (1987). *Semiparametric estimation in the Rasch model*. Research Report 87-1. Twente, the Netherlands: Department of Education, University of Twente.

Fitzpatrick, A. R. (1989). Social influences in standard-setting: The effects of social interaction on group judgments. *Review of Educational Research, 59*, 315-328.

Friedman, C. B., & Ho, K. T. (1990, April). *Interjudge consensus and intrajudge consistency: Is it possible to have both on standard setting?* Paper presented at the annual meeting of the National Council for Measurement in Education, Boston, MA.

Hambleton, R. K., & Bourque, M. L. (1991). *The levels of mathematics achievement. Vol. II, technical report.* Washington, DC: National Assessment Governing Board.

Hoijtink, H. (1991). *Estimating the parameters of linear models with a latent dependent variable by nonparametric maximum likelihood.* Research Bulletin HB-91-1040-EX. Groningen, The Netherlands: Psychological Institute, University of Groningen.

Holland, P. W., & Thayer, D. T. (1988). Differential item performance and the Mantel-Haenszel procedure. In H. Wainer & H. I. Braun (Eds.), *Test validity*. Hillsdale, NJ: Erlbaum.

Jerry, L. (1995). *The NAEP computer-generated reporting system for the 1994 Trial State Assessment.* Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Johnson, E. G., & Rust, K. F. (1992). Population inferences and variance estimation for NAEP data. *Journal of Educational Statistics, 17*, 175-190.

Johnson, E. G., Mazzeo, J., & Kline, D. L. (1993). *Technical report of the NAEP 1992 Trial State Assessment program in mathematics*. Washington, DC: National Center for Education Statistics.

Keyfitz, N. (1951). Sampling with probability proportional to size; adjustment for changes in probabilities. *Journal of the American Statistical Association, 46*. 105-109.

Laird, N. M. (1978). Nonparametric maximum likelihood estimation of a mixing distribution. *Journal of the American Statistical Association, 73*, 805-811.

Lindsey, B., Clogg, C. C., & Grego, J. (1991). Semiparametric estimation in the Rasch model and related exponential response models, including a simple latent class model for item analysis. *Journal of the American Statistical Association, 86*, 96-107.

Little, R. J. A., & Rubin, D. B. (1983). On jointly estimating parameters and missing data. *American Statistician, 37*, 218-220.

Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data*. New York, NY: John Wiley & Sons.

Lord, F. M. (1980). *Applications of item response theory to practical testing problems.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Luecht, R. M. (April, 1993). *Using IRT to improve the standard setting process for dichotomous and polytomous items.* Paper presented at the annual meeting of the National Council on Measurement in Education, Atlanta, GA.

Mantel, N. (1963). Chi-square tests with one degree of freedom: Extensions of the Mantel-Haenszel procedure. *Journal of the American Statistical Association, 58,* 690-700.

Mazzeo, J. (1991). Data analysis and scaling. In S. L. Koffler, *The technical report of NAEP's 1990 Trial State Assessment program* (No. ST-21-01). Washington, DC: National Center for Education Statistics.

Mazzeo, J., Allen, N. L., & Kline, D. L. (1995). *Technical report of the NAEP 1994 Trial State Assessment program in reading.* Washington, DC: National Center for Education Statistics.

Mazzeo, J., Johnson, E. G., Bowker, D., & Fong, Y. F. (1992). *The use of collateral information in proficiency estimation for the Trial State Assessment.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Miller, R. G. (1966). *Simultaneous statistical inference.* New York, NY: McGraw-Hill.

Mislevy, R. J. (1985). Estimation of latent group effects. *Journal of the American Statistical Association, 80,* 993-997.

Mislevy, R. J. (1990). Scaling procedures. In E. G. Johnson and R. Zwick, *Focusing the new design: The NAEP 1988 technical report* (No. 19-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Mislevy, R. J. (1991). Randomization-based inference about latent variables from complex samples. *Psychometrika, 56,* 177-196.

Mislevy, R. J., Beaton, A. E., Kaplan, B., & Sheehan, K. M. (1992). Estimating population characteristics from sparse matrix samples of item responses. *Journal of Educational Measurement, 29*(2), 133-161.

Mislevy, R. J., & Bock, R. D. (1982). *BILOG: Item analysis and test scoring with binary logistic models* [Computer program]. Mooresville, IN: Scientific Software.

Mislevy, R. J., Johnson, E. G., & Muraki, E. (1992). Scaling procedures in NAEP. *Journal of Educational Statistics, 17*(2), 131-154.

Mislevy, R. J., & Sheehan, K. M. (1987). Marginal estimation procedures. In A. E. Beaton, *Implementing the new design: The NAEP 1983-84 technical report* (No. 15-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Mislevy, R. J., & Stocking, M. L. (1987). *A consumer's guide to LOGIST and BILOG.* (ETS Research Report 87-43). Princeton, NJ: Educational Testing Service.

Mislevy, R. J., & Wu, P-K. (1988). *Inferring examinee ability when some item responses are missing* (ETS Research Report RR-88-48-ONR). Princeton, NJ: Educational Testing Service.

Muraki, E. (1992). A generalized partial credit model: Application of an EM algorithm. *Applied Psychological Measurement, 16*(2), 159-176.

Muraki, E. (1993). Information functions of the generalized partial credit model. *Applied Psychological Measurement, 17*(4), 351-362.

Muraki, E., & Bock, R. D. (1991). *PARSCALE: Parameter scaling of rating data.* Chicago, IL: Scientific Software, Inc.

National Academy of Education (1993). *Setting performance standards for student achievement.* Stanford, CA: Author.

National Academy of Education (1993). *Setting performance standards for student achievement: Background studies.* Stanford, CA: Author.

National Academy of Education (1997). *Assessment in transition: Monitoring the nation's educational progress.* Stanford, CA: Author.

National Assessment Governing Board (1990). *Setting appropriate achievement levels for the National Assessment of Educational Progress: Policy framework and technical procedures.* Washington, DC: Author.

National Assessment Governing Board (1996). *Mathematics framework for the 1996 National Assessment of Educational Progress.* Washington, DC: Author.

National Council of Teachers of Mathematics (1987). *Curriculum and evaluation standards for school mathematics.* Reston, VA: Author.

O'Reilly, P. O., Zelenak, C. A., Rogers, A. M., & Kline, D. L. (1998). *NAEP 1996 secondary-use data files user guide.* Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. Report in preparation.

O'Reilly, P. O., Zelenak, C. A., Rogers, A. M., & Kline, D. L. (1997). *NAEP 1996 state assessment program in mathematics secondary-use data files user guide.* Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress. Report in preparation.

Reese, C. M., Miller, K. E., Mazzeo, J., & Dossey, J. A. (1997). *NAEP 1996 mathematics report card for the nation and the states: Findings from the National Assessment of Educational Progress.* Washington, DC: National Center for Education Statistics.

Rogers, A. M. (1991). *NAEP-MGROUP: Enhanced version of Sheehan's software for the estimation of group effects in multivariate models* [Computer program]. Princeton, NJ: Educational Testing Service.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys.* New York, NY: John Wiley & Sons.

Rubin, D. B. (1991). EM and beyond. *Psychometrika, 56*, 241-254.

Rust, K. R., & Johnson, E. G. (1992). Sampling and weighting in the national assessment. *Journal of Educational Statistics, 17*(2), 111-129.

Sheehan, K. M. (1985). *MGROUP: Estimation of group effects in multivariate models* [Computer program]. Princeton, NJ: Educational Testing Service.

Smith, R. L., & Smith, J. K. (1988). Differential use of item information by judges using Angoff and Nedelsky procedures. *Journal of Educational Measurement, 25*, 259-274.

Somes, G. W. (1986). The generalized Mantel-Haenszel statistic. *The American Statistician, 40*, 106-108.

Stone, C. A., Mislevy, R. J., & Mazzeo, J. (1994, April). *Misclassification error and goodness-of-fit in IRT models.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Tanner, M., & Wong, W. (1987). The calculation of posterior distributions by data augmentation (with discussion). *Journal of the American Statistical Association, 82*, 528-550.

Thomas, N. (1993). Asymptotic corrections for multivariate posterior moments with factored likelihood functions. *Journal of Computational and Graphical Statistics, 2*, 309-322.

Tukey, J. W. (1977). *Exploratory data analysis.* Reading, MA: Addison-Wesley Publishing Co.

Wainer, H. (1974). The suspended rootogram and other visual displays: An empirical validation. *The American Statistician, 28(4)*, 143-145.

Wainer, H., & Kiely, G. (1987). Item clusters and computerized adaptive testing: A case for testlets. *Journal of Educational Measurement, 24*, 185-202.

Williams, P. L., Reese, C. M., Campbell, J. R., Mazzeo, J., & Phillips, G. W. (1995). *NAEP 1994 reading: A first look Findings from the National Assessment of Educational Progress.* Washington, DC: National Center for Education Statistics.

Westat, Inc. (1996). *Report on the data collection activities for the 1996 National Assessment of Educational Progress.* Rockville, MD: Author.

Westat, Inc. (1996). *1996 NAEP state assessment report on data collection activities for all states.* Rockville, MD: Author.

Wingersky, M., Kaplan, B. A., & Beaton, A. E. (1987). Joint estimation procedures. In A. E. Beaton, *Implementing the new design: The NAEP 1983-84 technical report* (pp. 285-292). (No. 15-TR-20) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Yamamoto, K., & Jenkins, F. (1992). Data analysis for the mathematics assessment. In E. G. Johnson & N. L. Allen, *The NAEP 1990 technical report* (No. 21-TR-20). Washington, DC: National Center for Education Statistics.

Yamamoto, K., & Mazzeo, J. (1992). Item response theory scale linking in NAEP. *Journal of Educational Statistics, 17(2)*, 155-173.

Zieky, M. (1993). Practical questions in the use of DIF statistics. In P. W. Holland & H. Wainer (Eds.), *Differential item functioning*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Zwinderman, A. H. (1991). Logistic regression Rasch models. *Psychometrika, 56*, 589-600.

ISBN 0-16-049225-4

90000

United States
Department of Education
Washington, DC 20208–5653

Official Business
Penalty for Private Use, $300

Postage and Fees Paid
U S Department of Education
Permit No G–17

Standard Mail (B)