

**TITLE** The State of Mathematics Achievement in Arkansas: The Trial State Assessment at Grade Eight.

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

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

**REPORT NO** ETS-21-ST-02; ISBN-0-88685-14-9

**PUB DATE** Jun 91

**NOTE** 146p.; The entire Report consists of a composite report, an executive summary, and 40 separate reports for 37 states, DC, Guam, and the Virgin Islands, respectively; see SE 052 055-096.

**AVAILABLE FROM** Individual state reports are available directly from the assessment division of the appropriate State Department of Education.

**PUB TYPE** Statistical Data (110) -- Reports - Research/Technical (143)

**EDRS PRICE** MF01/PC06 Plus Postage.

**DESCRIPTORS** Academic Achievement; Calculators; \*Educational Assessment; Family Environment; \*Grade 8; Homework; Junior High Schools; \*Mathematics Achievement; Mathematics Instruction; Mathematics Skills; Mathematics Tests; National Programs; Problem Solving; Public Schools; \*State Programs; Student Attitudes; Teacher Attitudes; Teacher Qualifications; Television Viewing

**IDENTIFIERS** \*Arkansas; National Assessment of Educational Progress; \*Numeracy; State Mathematics Assessments; Trial State Assessment (NAEP)

**ABSTRACT**

In 1990, the National Assessment of Educational Progress (NAEP) included a Trial State Assessment (TSA); for the first time in the NAEP's history, voluntary state-by-state assessments (37 states, the District of Columbia, Guam, and the Virgin Islands) were made. The sample was designed to represent the 8th grade public school population in a state or territory. The 1990 TSA covered five mathematics content areas (numbers and operations; measurement; geometry; data analysis, statistics, and probability; and algebra and functions). In Arkansas, 2,669 students in 107 public schools were assessed. This report describes the mathematics proficiency of Arkansas eighth-graders, compares their overall performance to students in the Southeast region of the United States and the nation (using data from the NAEP national assessments), presents the average proficiency separately for the five content areas, and summarizes the performance of subpopulations (race/ethnicity, type of community, parents' educational level, and gender). To provide a context for the assessment data, participating students, their mathematics teachers, and principals completed questionnaires which focused on: instructional content (curriculum coverage, amount of homework); delivery of math instruction (availability of resources, type); use of calculators; educational background of teachers; and conditions facilitating math learning (e.g., hours of television watched, absenteeism). On the NAEP math scale, Arkansas students had an average proficiency of 256 compared to 261 nationwide. Many fewer students (Arkansas-7%; U.S.-12%) appear to have acquired reasoning and problem solving skills. (JJK/CRW)

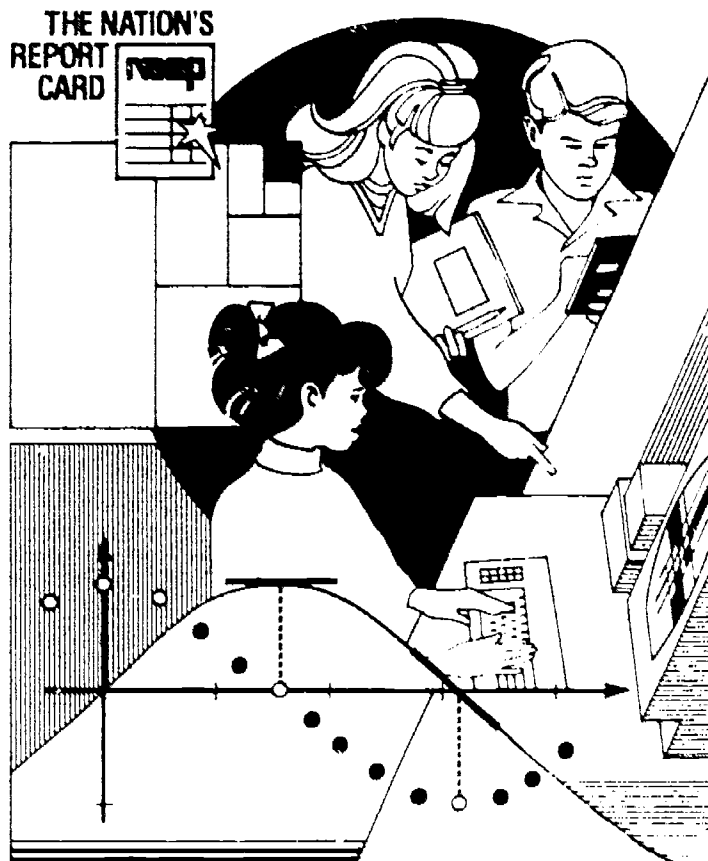
ED330549

# The STATE of Mathematics Achievement in ARKANSAS

The Trial State Assessment at Grade Eight

U.S. DEPARTMENT OF EDUCATION  
Office of Educational Research and Improvement  
EDUCATIONAL RESOURCES INFORMATION  
CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.
- Minor changes have been made to improve reproduction quality.
- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.



BEST COPY AVAILABLE

Prepared by Educational Testing Service under Contract with the National Center for Education Statistics  
Office of Educational Research and Improvement • U.S. Department of Education

SE052059

## 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 created the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The board is responsible for selecting the subject areas to be assessed, which may include adding to those specified by Congress; identifying appropriate achievement goals for each age and grade; developing assessment objectives; developing test specifications; designing the assessment methodology; developing guidelines and standards for data analysis and for reporting and disseminating results; developing standards and procedures for interstate, regional, and national comparisons; improving the form and use of the National Assessment, and ensuring that all items selected for use in the National Assessment are free from racial, cultural, gender, or regional bias.

## The National Assessment Governing Board

**Richard A. Boyd, Chairman**  
Executive Director  
Martha Holden Jennings Foundation  
Cleveland, Ohio

**Phyllis Williamson Aldrich**  
Curriculum Coordinator  
Saratoga-Warren B.O.C.E.S.  
Saratoga Springs, New York

**Francie Alexander**  
Associate Superintendent  
California Department of Education  
Sacramento, California

**David P. Battini**  
High School History Teacher  
Cairo-Durham High School  
Cairo, New York

**Parris C. Battle**  
Teacher  
Horace Mann Elementary School  
Miami, Florida

**Mary R. Blanton**  
Attorney  
Cromwell, Porter, Blanton & Blanton  
Salisbury, North Carolina

**Boyd W. Boehlje**  
Attorney  
Gaass, Klyn, & Boehlje  
Pella, Iowa

**Linda R. Bryant**  
Teacher  
Greenway Middle School Teacher Center  
Pittsburgh, Pennsylvania

**Honorable Michael N. Castle**  
Governor of Delaware  
Carvel State Office Building  
Wilmington, Delaware

**Honorable Naomi K. Cohen**  
State of Connecticut  
House of Representatives  
Legislative Office Building  
Hartford, Connecticut

**Chester E. Finn, Jr.**  
Professor of Education and Public Policy  
Vanderbilt University  
Washington, D.C.

**Michael S. Glode**  
Wyoming State Board of Education  
Saratoga, Wyoming

**Christine Johnson**  
Principal  
Abraham Lincoln High School  
Denver, Colorado

**John Lindley**  
Principal  
South Colby Elementary School  
Port Orchard, Washington

**Carl J. Moser**  
Director of Schools  
The Lutheran Church -- Missouri Synod  
International Center  
St. Louis, Missouri

**Mark D. Musick**  
President  
Southern Regional Education Board  
Atlanta, Georgia

**Honorable Carolyn Pollan**  
Arkansas House of Representatives  
Fort Smith, Arkansas

**Matthew W. Prophet, Jr.**  
Superintendent  
Portland Oregon School District  
Portland, Oregon

**Honorable William T. Randall**  
Commissioner of Education  
State Department of Education  
Denver, Colorado

**Dorothy K. Rich**  
President  
Home and School Institute  
Special Projects Office  
Washington, D.C.

**Honorable Richard W. Riley**  
Attorney  
Nelson, Mullins, Riley and  
Scarborough  
Columbia, South Carolina

**Thomas Topuzes**  
Attorney  
Law Offices of Frank Rogozienski  
Coronado, California

**Herbert J. Walberg**  
Professor of Education  
University of Illinois  
Chicago, Illinois

Assistant Secretary for  
Educational Research and  
Improvement (Ex Officio)  
U.S. Department of Education  
Washington, D.C.

**Roy Truby**  
Executive Director, NAGB  
Washington, D.C.

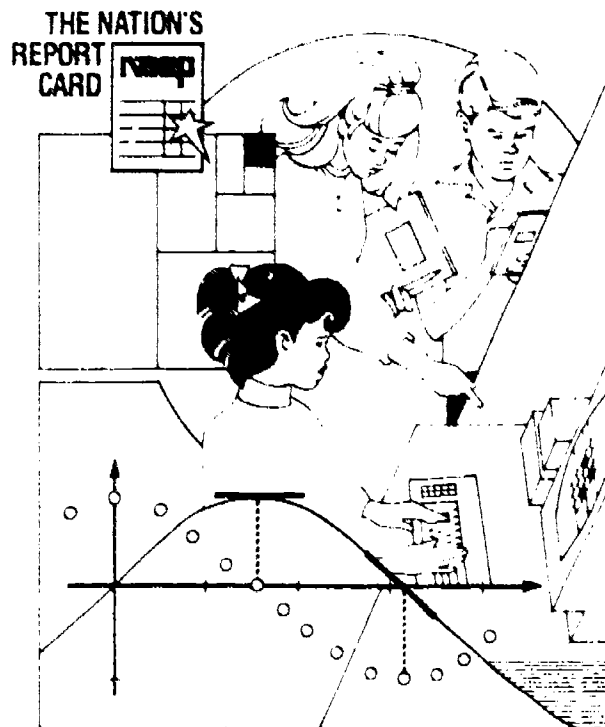
---

NATIONAL CENTER FOR EDUCATION STATISTICS

---

# The STATE of Mathematics Achievement in ARKANSAS

The Trial State Assessment at Grade Eight



Report No: 21-ST-02

June 1991

---

Prepared by Educational Testing Service under Contract with the National Center for Education Statistics  
Office of Educational Research and Improvement • U.S. Department of Education

**U.S. Department of Education  
Lamar Alexander  
Secretary**

**Office of Educational Research and Improvement  
Bruno V. Manno  
Acting Assistant Secretary**

**National Center for Education Statistics  
Emerson J. Elliott  
Acting Commissioner**

**FOR MORE INFORMATION:**

Copies of the 1990 NAEP Trial State Assessment's individual State reports are available directly from the participating States. For ordering information, please contact the assessment division of your State Department of Education. For ordering information on the composite report of results for the Nation and all State participants, or for single copies of the Executive Summary while supplies last, write:

**Education Information Branch  
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, D.C. metropolitan area call 202-219-1651).

Library of Congress, Catalog Card Number: 91-61478

ISBN: 0-88685-14-9

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.

Educational Testing Service, ETS, and  are registered trademarks of Educational Testing Service.

# Table of Contents

<b>EXECUTIVE SUMMARY</b> .....	1
<b>INTRODUCTION</b> .....	7
<b>Overview of the 1990 Trial State Assessment</b> .....	8
<b>This Report</b> .....	9
<b>Guidelines for Analysis</b> .....	12
<b>Profile of Arkansas</b> .....	14
Eighth-Grade School and Student Characteristics .....	14
Schools and Students Assessed .....	15
<b>PART ONE</b>	
<b>How Proficient in Mathematics Are Eighth-Grade Students     in Arkansas Public Schools?</b> .....	17
<b>Chapter 1. Students' Mathematics Performance</b> .....	18
Levels of Mathematics Proficiency .....	19
Content Area Performance .....	19
<b>Chapter 2. Mathematics Performance by Subpopulations</b> .....	24
Race/Ethnicity .....	24
Type of Community .....	27
Parents' Education Level .....	29
Gender .....	31
Content Area Performance .....	33

## PART TWO

### Finding a Context for Understanding

#### Students' Mathematics Proficiency .....37

#### Chapter 3. What Are Students Taught in Mathematics? .....39

Curriculum Coverage .....41

Mathematics Homework .....42

Instructional Emphasis .....45

Summary .....48

#### Chapter 4. How Is Mathematics Instruction Delivered? .....49

Availability of Resources .....49

Patterns in Classroom Instruction .....51

Collaborating in Small Groups .....54

Using Mathematical Objects .....55

Materials for Mathematics Instruction .....56

Summary .....59

#### Chapter 5. How Are Calculators Used? .....60

The Availability of Calculators .....62

The Use of Calculators .....63

When To Use a Calculator .....64

Summary .....66

#### Chapter 6. Who Is Teaching Eighth-Grade Mathematics? .....67

Educational Background .....68

Summary .....71

#### Chapter 7. The Conditions Beyond School that Facilitate Mathematics Learning and Teaching .....73

Amount of Reading Materials in the Home .....74

Hours of Television Watched per Day .....75

Student Absenteeism .....76

Students' Perceptions of Mathematics .....78

Summary .....79

## PROCEDURAL APPENDIX .....81

## DATA APPENDIX .....97



## EXECUTIVE SUMMARY

In 1988, Congress passed new legislation for the National Assessment of Educational Progress (NAEP), which included -- for the first time in the project's history -- a provision authorizing voluntary state-by-state assessments on a trial basis, in addition to continuing its primary mission, the national assessments that NAEP has conducted since its inception.

As a result of the legislation, the 1990 NAEP program included a Trial State Assessment Program in eighth-grade mathematics. National assessments in mathematics, reading, writing, and science were conducted simultaneously in 1990 at grades four, eight, and twelve.

For the Trial State Assessment, eighth-grade public-school students were assessed in each of 37 states, the District of Columbia, and two territories in February 1990. The sample was carefully designed to represent the eighth-grade public-school population in a state or territory. Within each selected school, students were randomly chosen to participate in the program. Local school district personnel administered all assessment sessions, and the contractor's staff monitored 50 percent of the sessions as part of the quality assurance program designed to ensure that the sessions were being conducted uniformly. The results of the monitoring indicated a high degree of quality and uniformity across sessions.



## Arkansas

---

In Arkansas, 107 public schools participated in the assessment. The weighted school participation rate was 100 percent, which means that all of the eighth-grade students in this sample of schools were representative of 100 percent of the eighth-grade public-school students in Arkansas.

In each school, a random sample of students was selected to participate in the assessment. As estimated by the sample, 0 percent of the eighth-grade public-school population was classified as Limited English Proficient (LEP), while 11 percent had an Individualized Education Plan (IEP). An IEP is a plan, written for a student who has been determined to be eligible for special education, that typically sets forth goals and objectives for the student and describes a program of activities and/or related services necessary to achieve the goals and objectives.

Schools were permitted to exclude certain students from the assessment. To be excluded from the assessment, a student had to be categorized as Limited English Proficient or had to have an Individualized Education Plan and (in either case) be judged incapable of participating in the assessment. The students who were excluded from the assessment because they were categorized as LEP or had an IEP represented 0 percent and 8 percent of the population, respectively. In total, 2,669 eighth-grade Arkansas public-school students were assessed. The weighted student participation rate was 95 percent. This means that the sample of students who took part in the assessment was representative of 95 percent of the eligible eighth-grade public-school student population in Arkansas.

### Students' Mathematics Performance

The average proficiency of eighth-grade public-school students from Arkansas on the NAEP mathematics scale is 256. This proficiency is lower than that of students across the nation (261).

Average proficiency on the NAEP scale provides a global view of eighth graders' mathematics achievement; however, it does not reveal specifically what the students know and can do in the subject. To describe the nature of students' proficiency in greater detail, NAEP used the results from the 1990 national assessments of fourth-, eighth-, and twelfth-grade students to define the skills, knowledge, and understandings that characterize four levels of mathematics performance -- levels 200, 250, 300, and 350 -- on the NAEP scale.

## *Arkansas*

---

In Arkansas, 97 percent of the eighth graders, compared to 97 percent in the nation, appear to have acquired skills involving simple additive reasoning and problem solving with whole numbers (level 200). However, many fewer students in Arkansas (7 percent) and 12 percent in the nation appear to have acquired reasoning and problem-solving skills involving fractions, decimals, percents, elementary geometric properties, and simple algebraic manipulations (level 300).

The Trial State Assessment included five content areas -- Numbers and Operations; Measurement; Geometry; Data Analysis, Statistics, and Probability; and Algebra and Functions. Students in Arkansas performed lower than students in the nation in Geometry, Data Analysis, Statistics, and Probability, and Algebra and Functions. Students in Arkansas performed comparably to students in the nation in Numbers and Operations and Measurement.

### **Subpopulation Performance**

In addition to the overall results, the 1990 Trial State Assessment permits reporting on the performance of various subpopulations of the Arkansas eighth-grade student population defined by race/ethnicity, type of community, parents' education level, and gender. In Arkansas:

- White students had higher average mathematics proficiency than did Black or Hispanic students.
- Further, a greater percentage of White students than Black or Hispanic students attained level 300.
- The results by type of community indicate that the average mathematics performance of the Arkansas students attending schools in advantaged urban areas was higher than that of students attending schools in disadvantaged urban areas, extreme rural areas, or areas classified as "other".
- In Arkansas, the average mathematics proficiency of eighth-grade public-school students having at least one parent who graduated from college was approximately 22 points higher than that of students whose parents did not graduate from high school.
- The results by gender show that there appears to be no difference in the average mathematics proficiency of eighth-grade males and females attending public schools in Arkansas. In addition, a greater percentage of males than females in Arkansas attained level 300. Compared to the national results, females in Arkansas performed lower than females across the country, males in Arkansas performed lower than males across the country.

## **A Context for Understanding Students' Mathematics Proficiency**

Information on students' mathematics proficiency is valuable in and of itself, but it becomes more useful for improving instruction and setting policy when supplemented with contextual information about schools, teachers, and students.

To gather such information, the students participating in the 1990 Trial State Assessment, their mathematics teachers, and the principals or other administrators in their schools were asked to complete questionnaires on policies, instruction, and programs. Taken together, the student, teacher, and school data help to describe some of the current practices and emphases in mathematics education, illuminate some of the factors that appear to be related to eighth-grade public-school students' proficiency in the subject, and provide an educational context for understanding information about student achievement.

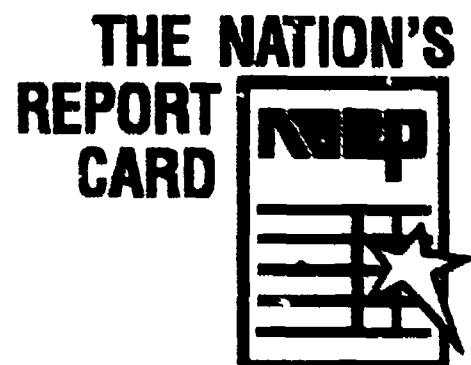
Some of the salient results for the public-school students in Arkansas are as follows:

- More than half of the students in Arkansas (59 percent) were in schools where mathematics was identified as a special priority. This is about the same percentage as that for the nation (63 percent).
- In Arkansas, 50 percent of the students could take an algebra course in eighth grade for high-school course placement or credit.
- A greater percentage of students in Arkansas were taking eighth-grade mathematics (72 percent) than were taking a course in pre-algebra or algebra (26 percent). Across the nation, 62 percent were taking eighth-grade mathematics and 34 percent were taking a course in pre-algebra or algebra.
- According to their teachers, the greatest percentage of eighth-grade students in public schools in Arkansas spent 30 minutes doing mathematics homework each day; according to the students, most of them spent 30 minutes doing mathematics homework each day. Across the nation, teachers reported that the largest percentage of students spent either 15 or 30 minutes doing mathematics homework each day, while students reported either 15 or 30 minutes daily.
- Students whose teachers placed heavy instructional emphasis on Algebra and Functions had higher proficiency in this content area than students whose teachers placed little or no emphasis on Algebra and Functions. Students whose teachers placed heavy instructional emphasis on Numbers and Operations and Measurement had lower proficiency in these content areas than students whose teachers placed little or no emphasis on the same areas.

## Arkansas

---

- In Arkansas, 19 percent of the eighth-grade students had mathematics teachers who reported getting all of the resources they needed, while 41 percent of the students were taught by teachers who got only some or none of the resources they needed. Across the nation, these figures were 13 percent and 31 percent, respectively.
- In Arkansas, 25 percent of the students never used a calculator to work problems in class, while 50 percent almost always did.
- In Arkansas, 34 percent of the students were being taught by mathematics teachers who reported having at least a master's or education specialist's degree. This compares to 44 percent for students across the nation.
- More than half of the students (57 percent) had teachers who had the highest level of teaching certification available. This is similar to the figure for the nation, where 66 percent of students were taught by teachers who were certified at the highest level available in their states.
- Students in Arkansas who had four types of reading materials (an encyclopedia, newspapers, magazines, and more than 25 books) at home showed higher mathematics proficiency than did students with zero to two types of these materials. This is similar to the results for the nation, where students who had all four types of materials showed higher mathematics proficiency than did students who had zero to two types.
- Relatively few of the eighth-grade public-school students in Arkansas (8 percent) watched one hour or less of television each day; 20 percent watched six hours or more. Average mathematics proficiency was lowest for students who spent six hours or more watching television each day.



## INTRODUCTION

As a result of legislation enacted in 1988, the 1990 National Assessment of Educational Progress (NAEP) included a Trial State Assessment Program in eighth-grade mathematics. The Trial State Assessment was conducted in February 1990 with the following participants:

Alabama	Iowa	Ohio
Arizona	Kentucky	Oklahoma
Arkansas	Louisiana	Oregon
California	Maryland	Pennsylvania
Colorado	Michigan	Rhode Island
Connecticut	Minnesota	Texas
Delaware	Montana	Virginia
District of Columbia	Nebraska	West Virginia
Florida	New Hampshire	Wisconsin
Georgia	New Jersey	Wyoming
Hawaii	New Mexico	
Idaho	New York	
Illinois	North Carolina	Guam
Indiana	North Dakota	Virgin Islands

This report describes the performance of the eighth-grade public-school students in Arkansas and consists of three sections:

- This Introduction provides background information about the Trial State Assessment and this report. It also provides a profile of the eighth-grade public-school students in Arkansas.
- Part One describes the mathematics performance of the eighth-grade public-school students in Arkansas, the Southeast region, and the nation.
- Part Two relates students' mathematics performance to contextual information about the mathematics policies and instruction in schools in Arkansas, the Southeast region, and the nation.

## Overview of the 1990 Trial State Assessment

In 1988, Congress passed new legislation for the National Assessment of Educational Progress (NAEP), which included -- for the first time in the project's history -- a provision authorizing voluntary state-by-state assessments on a trial basis, in addition to continuing its primary mission, the national assessments that NAEP has conducted since its inception:

*The National Assessment shall develop a trial mathematics assessment survey instrument for the eighth grade and shall conduct a demonstration of the instrument in 1990 in States which wish to participate, with the purpose of determining whether such an assessment yields valid, reliable State representative data. (Section 406 (i)(2)(C)(i) of the General Education Provisions Act, as amended by Pub. L. 100-297 (20 U.S.C. 1221e-1(i)(2)(C)(i)))*

As a result of the legislation, the 1990 NAEP program included a Trial State Assessment Program in eighth-grade mathematics. National assessments in mathematics, reading, writing, and science were conducted simultaneously in 1990 at grades four, eight, and twelve.

For the Trial State Assessment, eighth-grade public-school students were assessed in each state or territory. The sample was carefully designed to represent the eighth-grade public-school population in the state or territory. Within each selected school, students were randomly chosen to participate in the program. Local school district personnel administered all assessment sessions, and the contractor's staff monitored 50 percent of the sessions as part of the quality assurance program designed to ensure that the sessions were being conducted uniformly. The results of the monitoring indicated a high degree of quality and uniformity across sessions.

The Trial State Assessment was based on a set of mathematics objectives newly developed for the program and patterned after the consensus process described in Public Law 98-511, Section 405 (E), which authorized NAEP through June 30, 1988. Anticipating the 1988 legislation that authorized the Trial State Assessment, the federal government arranged for the National Science Foundation and the U.S. Department of Education to issue a special grant to the Council of Chief State School Officers in mid-1987 to develop the objectives. The development process included careful attention to the standards developed by the National Council of Teachers of Mathematics,<sup>1</sup> the formal mathematics objectives of states and of a sampling of local districts, and the opinions of practitioners at the state and local levels as to what content should be assessed.

There was an extensive review by mathematics educators, scholars, states' mathematics supervisors, the National Center for Education Statistics (NCES), and the Assessment Policy Committee (APC), a panel that advised on NAEP policy at that time. The objectives were further refined by NAEP's Item Development Panel, reviewed by the Task Force on State Comparisons, and resubmitted to NCES for peer review. Because the objectives needed to be coordinated across all the grades for the national program, the final objectives provided specifications for the 1990 mathematics assessment at the fourth, eighth, and twelfth grades rather than solely for the Trial State Assessment in grade eight. An overview of the mathematics objectives is provided in the Procedural Appendix.

## This Report

This is a computer-generated report that describes the performance of eighth-grade public-school students in Arkansas, in the Southeast region, and for the nation. Results also are provided for groups of students defined by shared characteristics -- race/ethnicity, type of community, parents' education level, and gender. Definitions of the subpopulations referred to in this report are presented below. The results for Arkansas are based only on the students included in the Trial State Assessment Program. However, the results for the nation and the region of the country are based on the nationally and regionally representative samples of public-school students who were assessed in January or February as part of the 1990 national NAEP program. Use of the regional and national results from the 1990 national NAEP program was necessary because the voluntary nature of the Trial State Assessment Program did not guarantee representative national or regional results, since not every state participated in the program.

---

<sup>1</sup> National Council of Teachers of Mathematics, *Curriculum and Evaluation Standards for School Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1989).

### **RACE/ETHNICITY**

Results are presented for students of different racial/ethnic groups based on the students' self-identification of their race/ethnicity according to the following mutually exclusive categories: White, Black, Hispanic, Asian (including Pacific Islander), and American Indian (including Alaskan Native). Based on criteria described in the Procedural Appendix, there must be at least 62 students in a particular subpopulation in order for the results for that subpopulation to be considered reliable. Thus, results for racial/ethnic groups with fewer than 62 students are not reported. However, the data for all students, regardless of whether their racial/ethnic group was reported separately, were included in computing overall results for Arkansas.

### **TYPE OF COMMUNITY**

Results are provided for four mutually exclusive community types -- advantaged urban, disadvantaged urban, extreme rural, and other -- as defined below:

*Advantaged Urban:* Students in this group live in metropolitan statistical areas and attend schools where a high proportion of the students' parents are in professional or managerial positions.

*Disadvantaged Urban:* Students in this group live in metropolitan statistical areas and attend schools where a high proportion of the students' parents are on welfare or are not regularly employed.

*Extreme Rural:* Students in this group live outside metropolitan statistical areas, live in areas with a population below 10,000, and attend schools where many of the students' parents are farmers or farm workers.

*Other:* Students in this category attend schools in areas other than those defined as advantaged urban, disadvantaged urban, or extreme rural.

The reporting of results by each type of community was also subject to a minimum student sample size of 62.

### **PARENTS' EDUCATION LEVEL**

Students were asked to indicate the extent of schooling for each of their parents -- did not finish high school, graduated high school, some education after high school, or graduated college. The response indicating the higher level of education was selected for reporting.



**GENDER**

Results are reported separately for males and females.

**REGION**

The United States has been divided into four regions: Northeast, Southeast, Central, and West. States included in each region are shown in Figure 1. All 50 states and the District of Columbia are listed, with the participants in the Trial State Assessment highlighted in boldface type. Territories were not assigned to a region. Further, 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. Because most of the students are in the Southeast region, regional comparisons for Virginia will be to the Southeast.



FIGURE 1 | Regions of the Country

NORTHEAST	SOUTHEAST	CENTRAL	WEST
<b>Connecticut</b> <b>Delaware</b> <b>District of Columbia</b> <b>Maine</b> <b>Maryland</b> <b>Massachusetts</b> <b>New Hampshire</b> <b>New Jersey</b> <b>New York</b> <b>Pennsylvania</b> <b>Rhode Island</b> <b>Vermont</b> <b>Virginia</b>	<b>Alabama</b> <b>Arkansas</b> <b>Florida</b> <b>Georgia</b> <b>Kentucky</b> <b>Louisiana</b> <b>Mississippi</b> <b>North Carolina</b> <b>South Carolina</b> <b>Tennessee</b> <b>Virginia</b> <b>West Virginia</b>	<b>Illinois</b> <b>Indiana</b> <b>Iowa</b> <b>Kansas</b> <b>Michigan</b> <b>Minnesota</b> <b>Missouri</b> <b>Nebraska</b> <b>North Dakota</b> <b>Ohio</b> <b>South Dakota</b> <b>Wisconsin</b>	<b>Alaska</b> <b>Arizona</b> <b>California</b> <b>Colorado</b> <b>Hawaii</b> <b>Idaho</b> <b>Montana</b> <b>Nevada</b> <b>New Mexico</b> <b>Oklahoma</b> <b>Oregon</b> <b>Texas</b> <b>Utah</b> <b>Washington</b> <b>Wyoming</b>

## Guidelines for Analysis

This report describes and compares the mathematics proficiency of various subpopulations of students - for example, those who have certain demographic characteristics or who responded to a specific background question in a particular way. The report examines the results for individual subpopulations and individual background questions. It does not include an analysis of the relationships among combinations of these subpopulations or background questions.

Because the proportions of students in these subpopulations and their average proficiency are based on samples -- rather than the entire population of eighth graders in public schools in the state or territory -- the numbers reported are necessarily *estimates*. As such, they are subject to a measure of uncertainty, reflected in the *standard error* of the estimate. When the proportions or average proficiency of certain subpopulations are compared, it is essential that the standard error be taken into account, rather than relying solely on observed similarities or differences. Therefore, the comparisons discussed in this report are based on *statistical tests* that consider both the magnitude of the difference between the means or proportions and the standard errors of those statistics.

The statistical tests determine whether the evidence -- based on the data from the groups in the sample -- is strong enough to conclude that the means or proportions are really different for those groups in the *population*. If the evidence is strong (i.e., the difference is *statistically significant*), the report describes the group means or proportions as being different (e.g., one group performed *higher than* or *lower than* another group) -- regardless of whether the sample means or sample proportions appear to be about the same or not. If the evidence is not sufficiently strong (i.e., the difference is not statistically significant), the means or proportions are described as being *about the same* -- again, regardless of whether the sample means or sample proportions appear to be about the same or widely discrepant.

The reader is cautioned to rely on the results of the statistical tests -- rather than on the apparent magnitude of the difference between sample means or proportions -- to determine whether those sample differences are likely to represent actual differences between the groups in the population. If a statement appears in the report indicating that a particular group had *higher (or lower)* average proficiency than a second group, the 95 percent confidence interval for the difference between groups did not contain the value zero. When a statement indicates that the average proficiency or proportion of some attribute was *about the same* for two groups, the confidence interval included zero, and thus no difference could be assumed between the groups. When three or more groups are being compared, a Bonferroni procedure is also used. The statistical tests and Bonferroni procedure are discussed in greater detail in the Procedural Appendix.

It is also important to note that the confidence intervals pictured in the figures in Part One of this report are approximate 95 percent confidence intervals about the mean of a particular population of interest. Comparing such confidence intervals for two populations is not equivalent to examining the 95 percent confidence interval for the difference between the means of the populations. If the individual confidence intervals for two populations do not overlap, it is true that there is a statistically significant difference between the populations. However, if the confidence intervals overlap, it is not always true that there is *not* a statistically significant difference between the populations.

Finally, in several places in this report, results (mean proficiencies and proportions) are reported in the text for combined groups of students. For example, in the text, the percentage of students in the combined group taking either algebra or pre-algebra is given and compared to the percentage of students enrolled in eighth-grade mathematics. However, the tables that accompany that text report percentages and proficiencies separately for the three groups (algebra, pre-algebra, and eighth-grade mathematics). The combined-group percentages reported in the text and used in all statistical tests are based on *unrounded* estimates (i.e., estimates calculated to several decimal places) of the percentages in each group. The percentages shown in the tables are *rounded* to integers. Hence, the percentage for a combined group (reported in the text) may differ slightly from the sum of the separate percentages (presented in the tables) for each of the groups that were combined. Similarly, if statistical tests were to be conducted based on the rounded numbers in the tables, the results might not be consonant with the results of the statistical tests that are reported in the text (based on unrounded numbers).

## Profile of Arkansas

### EIGHTH-GRADE SCHOOL AND STUDENT CHARACTERISTICS

Table 1 provides a profile of the demographic characteristics of the eighth-grade public-school students in Arkansas, the Southeast region, and the nation. This profile is based on data collected from the students and schools participating in the Trial State Assessment.

**TABLE 1 | Profile of Arkansas Eighth-Grade Public-School Students**

PERCENTAGE OF STUDENTS			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<b>DEMOGRAPHIC SUBGROUPS</b>			
<b>Race/Ethnicity</b>	<b>Percentage</b>	<b>Percentage</b>	<b>Percentage</b>
White	72 ( 1.5)	63 ( 3.0)	70 ( 0.5)
Black	22 ( 1.5)	32 ( 3.0)	16 ( 0.3)
Hispanic	4 ( 0.4)	3 ( 0.8)	10 ( 0.4)
Asian	1 ( 0.2)	1 ( 0.4)	2 ( 0.5)
American Indian	2 ( 0.3)	0 ( 0.1)	2 ( 0.7)
<b>Type of Community</b>			
Advantaged urban	5 ( 2.1)	0 ( 0.0)	10 ( 3.3)
Disadvantaged urban	6 ( 2.1)	2 ( 2.3)	10 ( 2.8)
Extreme rural	24 ( 3.3)	9 ( 5.3)	10 ( 3.0)
Other	65 ( 4.4)	69 ( 5.8)	70 ( 4.4)
<b>Parents' Education</b>			
Did not finish high school	12 ( 0.6)	14 ( 2.1)	10 ( 0.8)
Graduated high school	32 ( 0.9)	27 ( 1.6)	25 ( 1.2)
Some education after high school	17 ( 0.8)	18 ( 1.7)	17 ( 0.9)
Graduated college	31 ( 1.1)	32 ( 3.3)	39 ( 1.9)
<b>Gender</b>			
Male	50 ( 1.1)	49 ( 2.8)	51 ( 1.1)
Female	50 ( 1.1)	51 ( 2.8)	49 ( 1.1)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages for Race Ethnicity may not add to 100 percent because some students categorized themselves as "Other." This may also be true of Parents' Education, for which some students responded "I don't know." Throughout this report, percentages less than 0.5 percent are reported as 0 percent.

**SCHOOLS AND STUDENTS ASSESSED**

Table 2 provides a profile summarizing participation data for Arkansas schools and students sampled for the 1990 Trial State Assessment. In Arkansas, 107 public schools participated in the assessment. The weighted school participation rate was 100 percent, which means that all of the eighth-grade students in this sample of schools were representative of 100 percent of the eighth-grade public-school students in Arkansas.

**TABLE 2 | Profile of the Population Assessed in Arkansas**

<b>EIGHTH-GRADE PUBLIC SCHOOL PARTICIPATION</b>		<b>EIGHTH-GRADE PUBLIC-SCHOOL STUDENT PARTICIPATION</b>	
Weighted school participation rate before substitution	100%	Weighted student participation rate after make-ups	95%
Weighted school participation rate after substitution	100%	Number of students selected to participate in the assessment	3,231
Number of schools originally sampled	107	Number of students withdrawn from the assessment	183
Number of schools not eligible	0	Percentage of students who were of Limited English Proficiency	0%
Number of schools in original sample participating	107	Percentage of students excluded from the assessment due to Limited English Proficiency	0%
Number of substitute schools provided	0	Percentage of students who had an Individualized Education Plan	11%
Number of substitute schools participating	0	Percentage of students excluded from the assessment due to Individualized Education Plan status	8%
Total number of participating schools	107	Number of students to be assessed	2,804
		Number of students assessed	2,689

51

## Arkansas

---

In each school, a random sample of students was selected to participate in the assessment. As estimated by the sample, 0 percent of the eighth-grade public-school population was classified as Limited English Proficient (LEP), while 11 percent had an Individualized Education Plan (IEP). An IEP is a plan, written for a student who has been determined to be eligible for special education, that typically sets forth goals and objectives for the student and describes a program of activities and/or related services necessary to achieve the goals and objectives.

Schools were permitted to exclude certain students from the assessment. To be excluded from the assessment, a student had to be categorized as Limited English Proficient or had to have an Individualized Education Plan *and* (in either case) be judged incapable of participating in the assessment. The students who were excluded from the assessment because they were categorized as LEP or had an IEP represented 0 percent and 8 percent of the population, respectively.

In total, 2,669 eighth-grade Arkansas public-school students were assessed. The weighted student participation rate was 95 percent. This means that the sample of students who took part in the assessment was representative of 95 percent of the eligible eighth-grade public-school student population in Arkansas.



## PART ONE

### **How Proficient in Mathematics Are Eighth-Grade Students in Arkansas Public Schools?**

The 1990 Trial State Assessment covered five mathematics content areas -- Numbers and Operations; Measurement; Geometry; Data Analysis, Statistics, and Probability; and Algebra and Functions. Students' overall performance in these content areas was summarized on the NAEP mathematics scale, which ranges from 0 to 500.

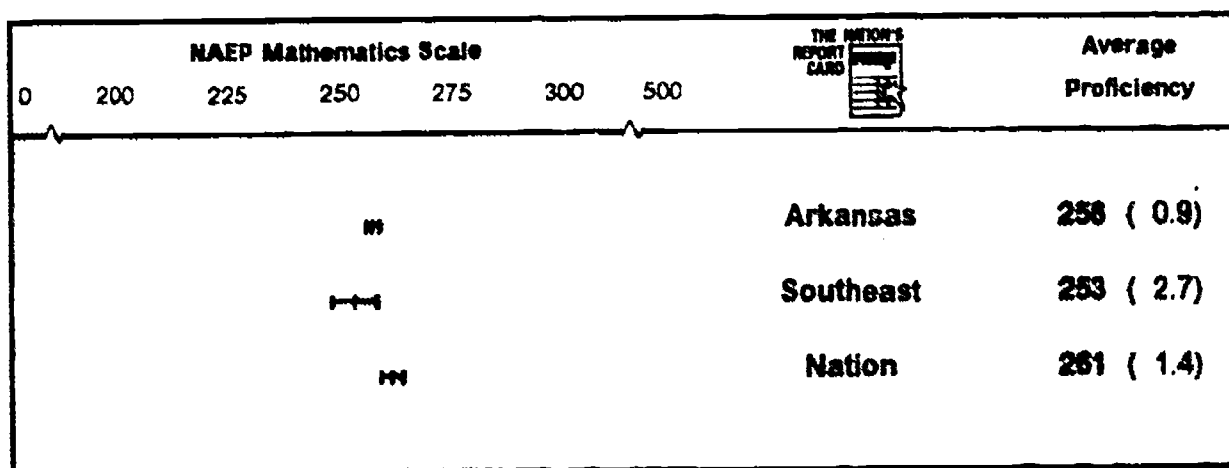
This part of the report contains two chapters that describe the mathematics proficiency of eighth-grade public-school students in Arkansas. Chapter 1 compares the overall mathematics performance of the students in Arkansas to students in the Southeast region and the nation. It also presents the students' average proficiency separately for the five mathematics content areas. Chapter 2 summarizes the students' overall mathematics performance for subpopulations defined by race/ethnicity, type of community, parents' education level, and gender, as well as their mathematics performance in the five content areas.

CHAPTER 1

Students' Mathematics Performance

As shown in Figure 2, the average proficiency of eighth-grade public-school students from Arkansas on the NAEP mathematics scale is 256. This proficiency is lower than that of students across the nation (261).<sup>2</sup>

FIGURE 2 | Average Eighth-Grade Public-School Mathematics Proficiency



The standard errors are presented in parentheses. With about 95 percent certainty, the average mathematics proficiency for each population of interest is within  $\pm 2$  standard errors of the estimated mean (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations.

<sup>2</sup> Differences reported are statistically different at about the 95 percent certainty level. This means that with about 95 percent certainty there is a real difference in the average mathematics proficiency between the two populations of interest.



## **LEVELS OF MATHEMATICS PROFICIENCY**

Average proficiency on the NAEP scale provides a global view of eighth graders' mathematics achievement; however, it does not reveal the specifics of what the students know and can do in the subject. To describe the nature of students' proficiency in greater detail, NAEP used the results from the 1990 national assessments of fourth-, eighth-, and twelfth-grade students to define the skills, knowledge, and understandings that characterize four levels of mathematics performance -- levels 200, 250, 300, and 350 -- on the NAEP scale.

To define the skills, knowledge, and understandings that characterize each proficiency level, mathematics specialists studied the questions that were typically answered correctly by most students at a particular level but answered incorrectly by a majority of students at the next lower level. They then summarized the kinds of abilities needed to answer each set of questions. While defining proficiency levels below 200 and above 350 is theoretically possible, so few students performed at the extreme ends of the scale that it was impractical to define meaningful levels of mathematics proficiency beyond the four presented here.

Definitions of the four levels of mathematics proficiency are given in Figure 3. It is important to note that the definitions of these levels are based solely on student performance on the 1990 mathematics assessment. The levels are not judgmental standards of what ought to be achieved at a particular grade. Figure 4 provides the percentages of students at or above each of these proficiency levels. In Arkansas, 97 percent of the eighth graders, compared to 97 percent in the nation, appear to have acquired skills involving simple additive reasoning and problem solving with whole numbers (level 200). However, many fewer students in Arkansas (7 percent) and 12 percent in the nation appear to have acquired reasoning and problem-solving skills involving fractions, decimals, percents, elementary geometric properties, and simple algebraic manipulations (level 300).

## **CONTENT AREA PERFORMANCE**

As previously indicated, the questions comprising the Trial State Assessment covered five content areas -- Numbers and Operations; Measurement; Geometry; Data Analysis, Statistics, and Probability; and Algebra and Functions. Figure 5 provides the Arkansas, Southeast region, and national results for each content area. Students in Arkansas performed lower than students in the nation in Geometry, Data Analysis, Statistics, and Probability, and Algebra and Functions. Students in Arkansas performed comparably to students in the nation in Numbers and Operations and Measurement.



FIGURE 3 | Levels of Mathematics Proficiency

<b>LEVEL 200</b>	<b>Simple Additive Reasoning and Problem Solving with Whole Numbers</b>
------------------	---

Students at this level have some degree of understanding of simple quantitative relationships involving whole numbers. They can solve simple addition and subtraction problems with and without regrouping. Using a calculator, they can extend these abilities to multiplication and division problems. These students can identify solutions to one-step word problems and select the greatest four-digit number in a list.

In measurement, these students can read a ruler as well as common weight and graduated scales. They also can make volume comparisons based on visualization and determine the value of coins. In geometry, these students can recognize simple figures. In data analysis, they are able to read simple bar graphs. In the algebra dimension, these students can recognize translations of word problems to numerical sentences and extend simple pattern sequences.

<b>LEVEL 250</b>	<b>Simple Multiplicative Reasoning and Two-Step Problem Solving</b>
------------------	---

Students at this level have extended their understanding of quantitative reasoning with whole numbers from additive to multiplicative settings. They can solve routine one-step multiplication and division problems involving remainders and two-step addition and subtraction problems involving money. Using a calculator, they can identify solutions to other elementary two-step word problems. In these basic problem-solving situations, they can identify missing or extraneous information and have some knowledge of when to use computational estimation. They have a rudimentary understanding of such concepts as whole number place value, "even," "factor," and "multiple."

In measurement, these students can use a ruler to measure objects, convert units within a system when the conversions require multiplication, and recognize a numerical expression solving a measurement word problem. In geometry, they demonstrate an initial understanding of basic terms and properties, such as parallelism and symmetry. In data analysis, they can complete a bar graph, sketch a circle graph, and use information from graphs to solve simple problems. They are beginning to understand the relationship between proportion and probability. In algebra, they are beginning to deal informally with a variable through numerical substitution in the evaluation of simple expressions.



**FIGURE 3** | **Levels of Mathematics Proficiency**  
(continued)

<b>LEVEL 300</b>	<b>Reasoning and Problem Solving Involving Fractions, Decimals, Percents, Elementary Geometric Properties, and Simple Algebraic Manipulations</b>
------------------	---

Students at this level are able to represent, interpret, and perform simple operations with fractions and decimal numbers. They are able to locate fractions and decimals on number lines, simplify fractions, and recognize the equivalence between common fractions and decimals, including pictorial representations. They can interpret the meaning of percents less than and greater than 100 and apply the concepts of percentages to solve simple problems. These students demonstrate some evidence of using mathematical notation to interpret expressions, including those with exponents and negative integers.

In measurement, these students can find the perimeters and areas of rectangles, recognize relationships among common units of measure, and use proportional relationships to solve routine problems involving similar triangles and scale drawings. In geometry, they have some mastery of the definitions and properties of geometric figures and solids.

In data analysis, these students can calculate averages, select and interpret data from tabular displays, pictographs, and line graphs, compute relative frequency distributions, and have a beginning understanding of sample bias. In algebra, they can graph points in the Cartesian plane and perform simple algebraic manipulations such as simplifying an expression by collecting like terms, identifying the solution to open linear sentences and inequalities by substitution, and checking and graphing an interval representing a compound inequality when it is described in words. They can determine and apply a rule for simple functional relations and extend a numerical pattern.

<b>LEVEL 350</b>	<b>Reasoning and Problem Solving Involving Geometric Relationships, Algebraic Equations, and Beginning Statistics and Probability</b>
------------------	---

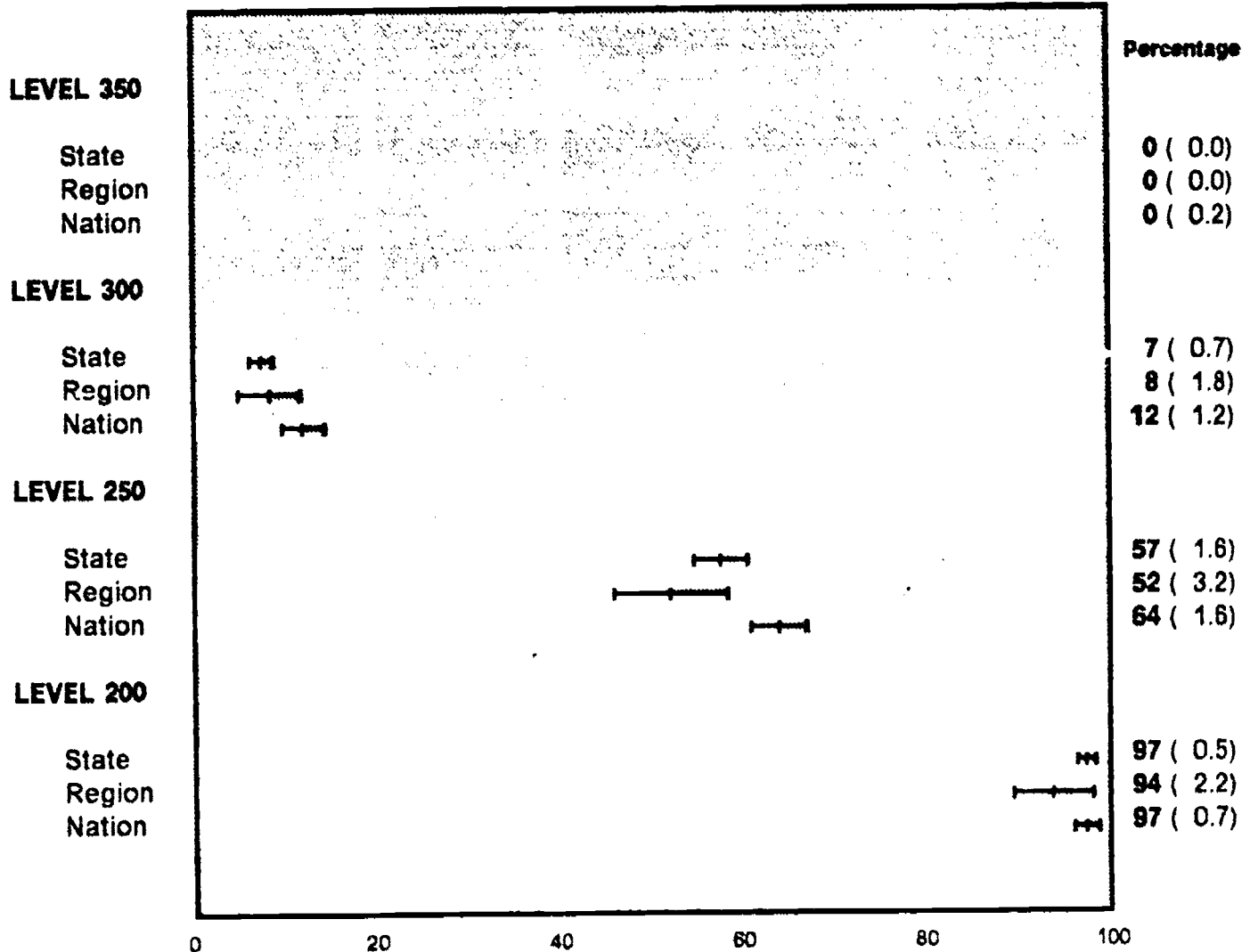
Students at this level have extended their knowledge of number and algebraic understanding to include some properties of exponents. They can recognize scientific notation on a calculator and make the transition between scientific notation and decimal notation. In measurement, they can apply their knowledge of area and perimeter of rectangles and triangles to solve problems. They can find the circumferences of circles and the surface areas of solid figures. In geometry, they can apply the Pythagorean theorem to solve problems involving indirect measurement. These students also can apply their knowledge of the properties of geometric figures to solve problems, such as determining the slope of a line.

In data analysis, these students can compute means from frequency tables and determine the probability of a simple event. In algebra, they can identify an equation describing a linear relation provided in a table and solve literal equations and a system of two linear equations. They are developing an understanding of linear functions and their graphs, as well as functional notation, including the composition of functions. They can determine the  $n$ th term of a sequence and give counterexamples to disprove an algebraic generalization.



FIGURE 4

**Levels of Eighth-Grade Public-School Mathematics Proficiency**

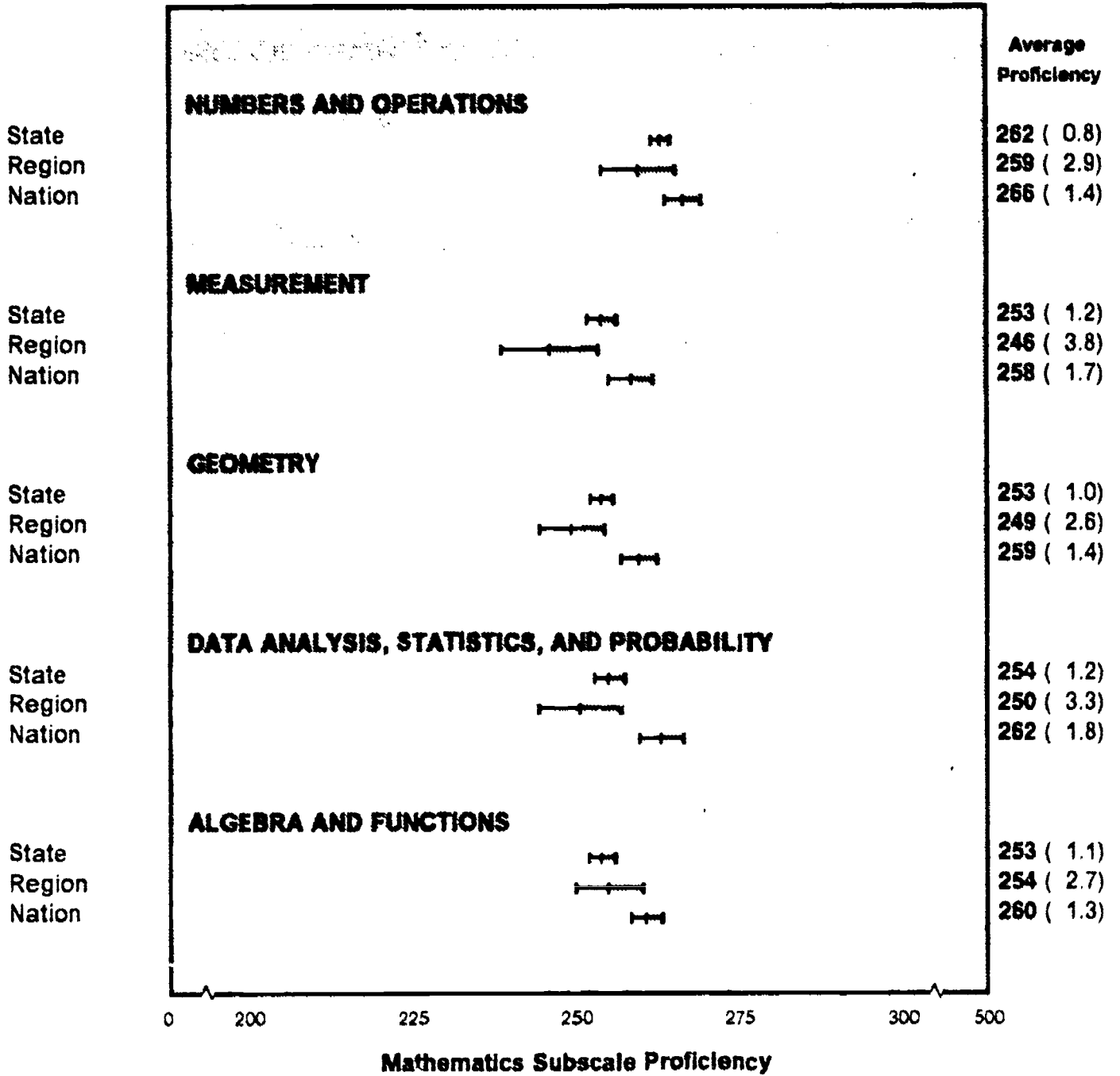


**Percentage at or Above Proficiency Levels**

The standard errors are presented in parentheses. With about 95 percent certainty, the value for each population of interest is within  $\pm 2$  standard errors of the estimated percentage (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations.



FIGURE 5 | Eighth-Grade Public-School Mathematics Content Area Performance



The standard errors are presented in parentheses. With about 95 percent certainty, the average mathematics proficiency for each population of interest is within  $\pm 2$  standard errors of the estimated mean (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations.

## CHAPTER 2

### **Mathematics Performance by Subpopulations**

In addition to the overall state results, the 1990 Trial State Assessment included reporting on the performance of various subgroups of the student population defined by race/ethnicity, type of community, parents' education level, and gender.

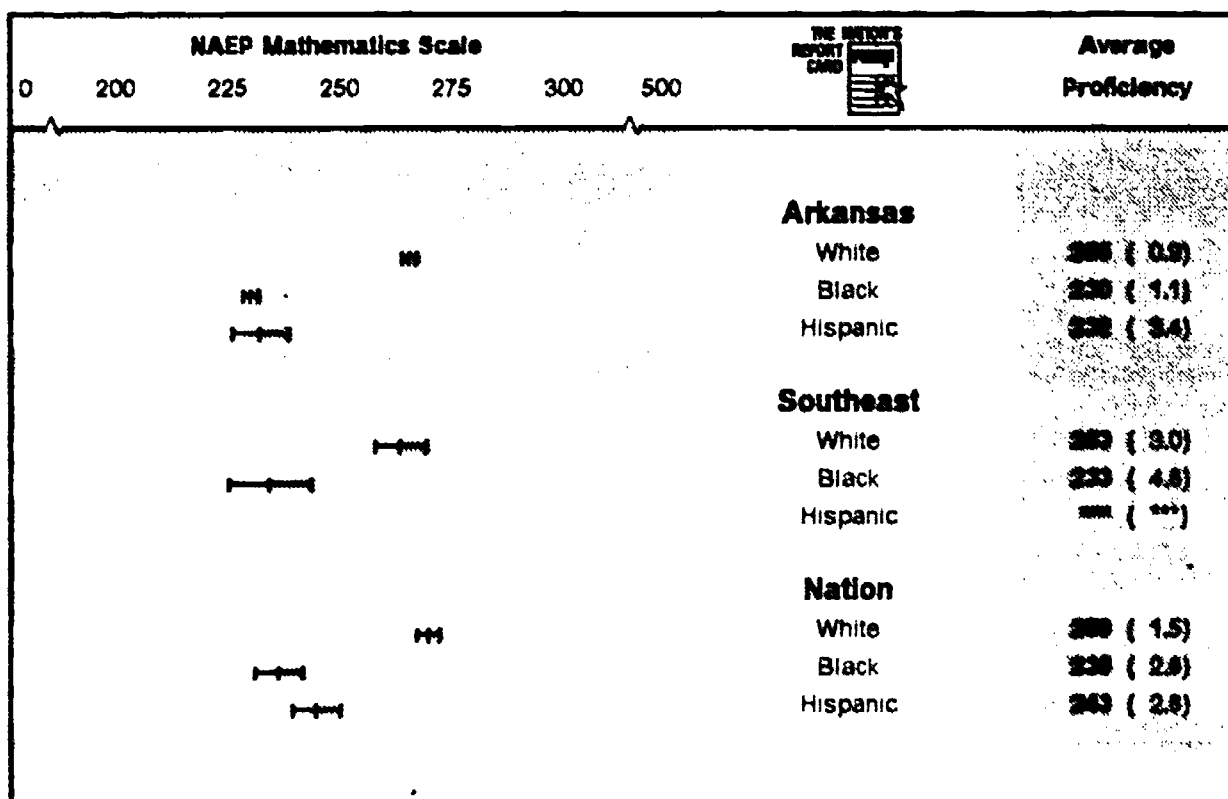
#### **RACE/ETHNICITY**

The Trial State Assessment results can be compared according to the different racial/ethnic groups when the number of students in a racial/ethnic group is sufficient in size to be reliably reported (at least 62 students). Average mathematics performance results for **White, Black, and Hispanic** students from Arkansas are presented in Figure 6.

As shown in Figure 6, White students demonstrated higher average mathematics proficiency than did Black or Hispanic students.

Figure 7 presents mathematics performance by proficiency levels. The figure shows that a greater percentage of White students than Black or Hispanic students attained level 300.

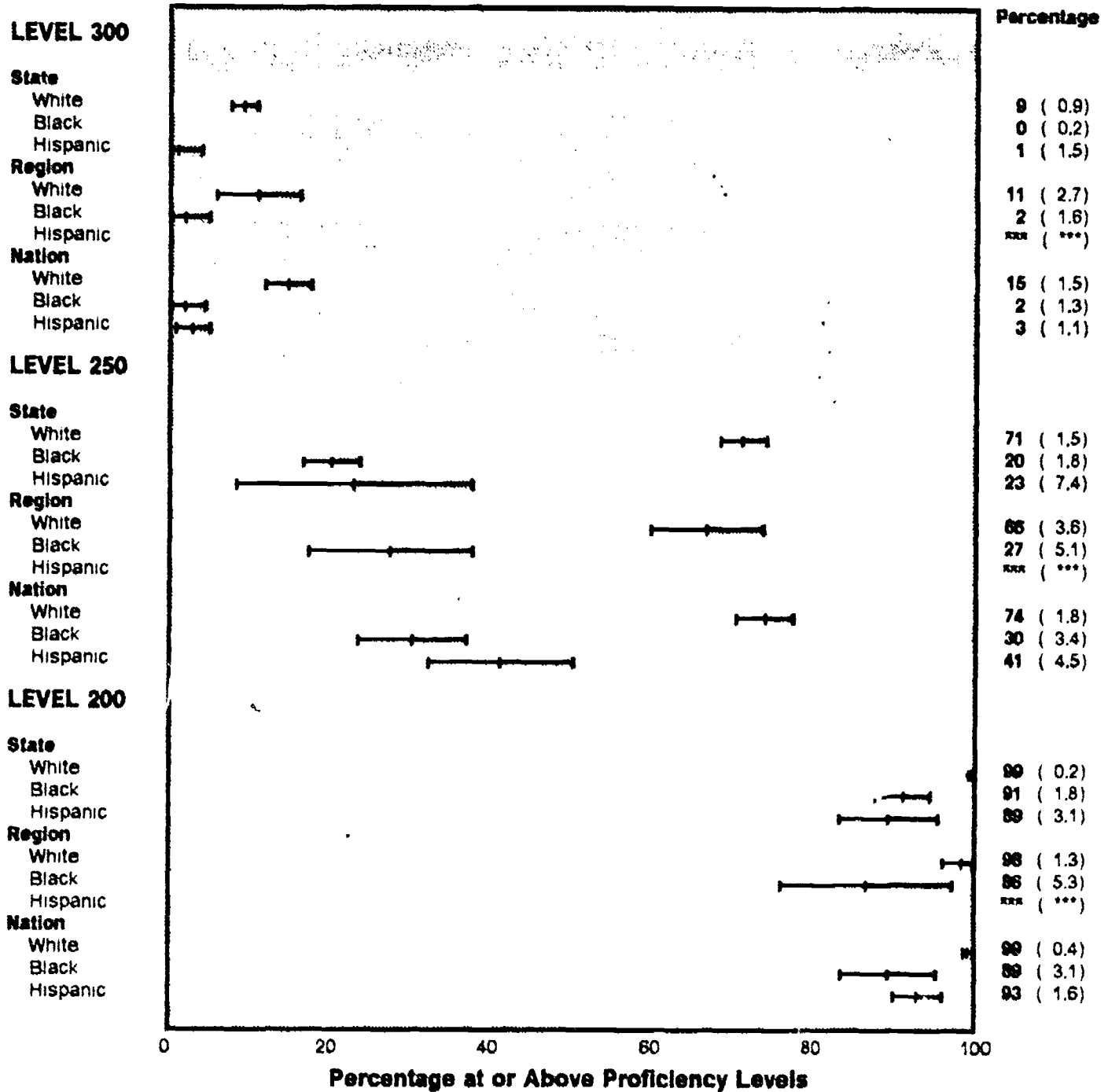
FIGURE 6 | Average Eighth-Grade Public-School Mathematics Proficiency by Race/Ethnicity



The standard errors are presented in parentheses. With about 95 percent certainty, the average mathematics proficiency for each population of interest is within  $\pm 2$  standard errors of the estimated mean (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



FIGURE 7 | Levels of Eighth-Grade Public-School Mathematics Proficiency by Race/Ethnicity



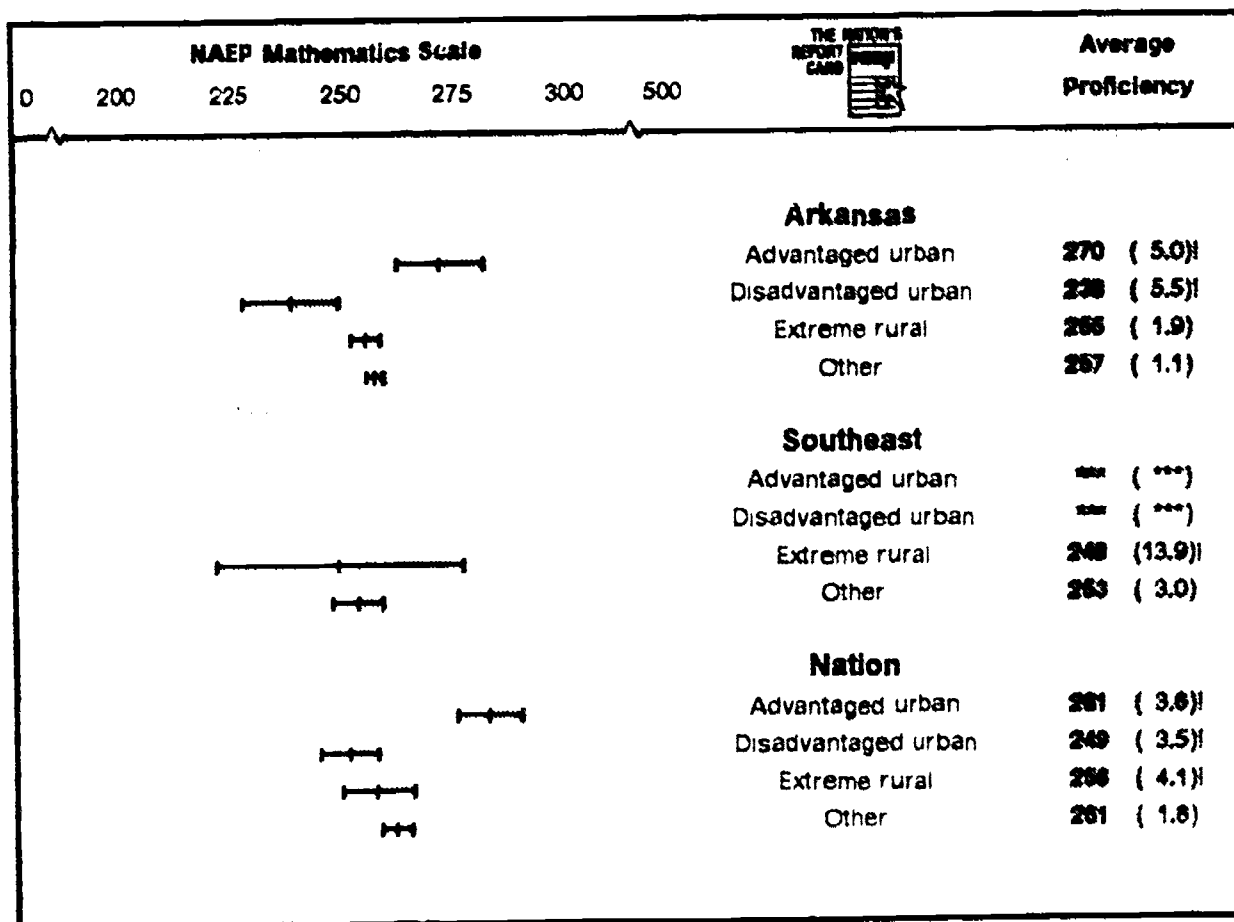
The standard errors are presented in parentheses. With about 95 percent certainty, the value for each population of interest is within  $\pm 2$  standard errors of the estimated percentage (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations. Proficiency level 350 is not presented in this figure because so few students attained that level. Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



TYPE OF COMMUNITY

Figure 8 and Figure 9 present the mathematics proficiency results for eighth-grade students attending public schools in advantaged urban areas, disadvantaged urban areas, extreme rural areas, and areas classified as "other". (These are the "type of community" groups in Arkansas with student samples large enough to be reliably reported.) The results indicate that the average mathematics performance of the Arkansas students attending schools in advantaged urban areas was higher than that of students attending schools in disadvantaged urban areas, extreme rural areas, or areas classified as "other".

FIGURE 8 | Average Eighth-Grade Public-School Mathematics Proficiency by Type of Community



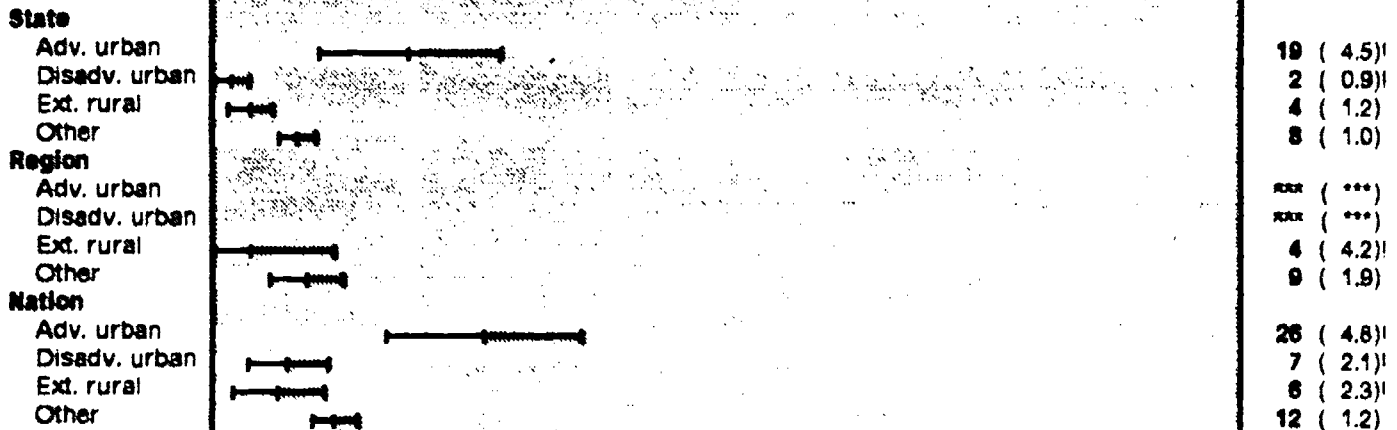
The standard errors are presented in parentheses. With about 95 percent certainty, the average mathematics proficiency for each population of interest is within  $\pm 2$  standard errors of the estimated mean (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

FIGURE 9

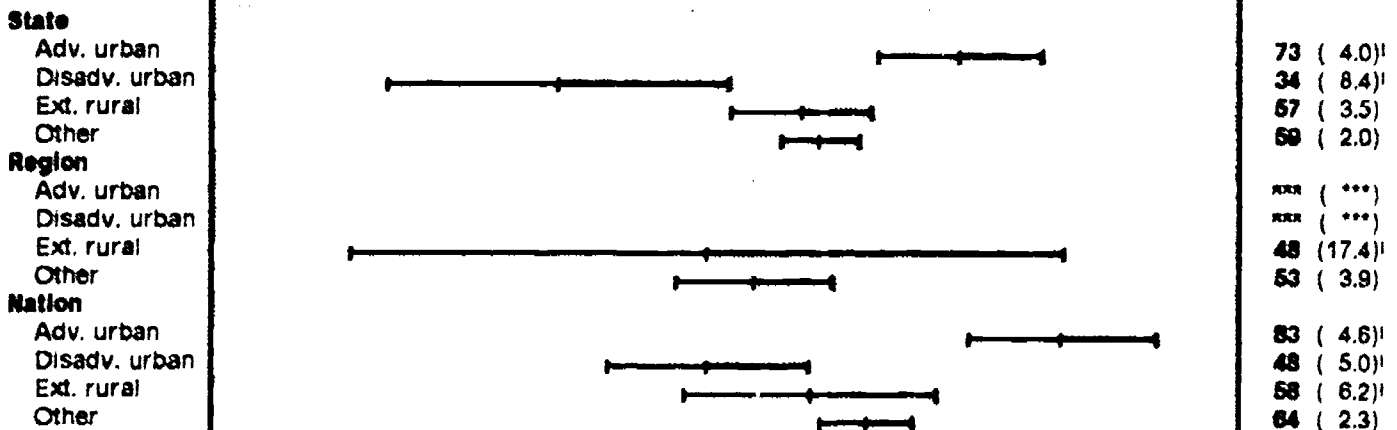
**Levels of Eighth-Grade Public-School Mathematics Proficiency by Type of Community**



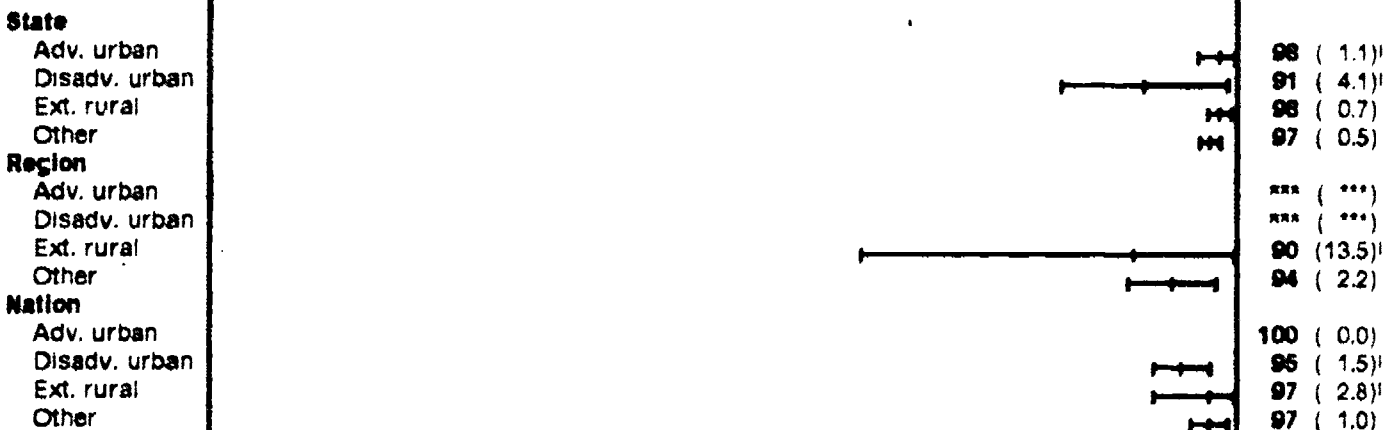
**LEVEL 300**



**LEVEL 250**



**LEVEL 200**



Percentage at or Above Proficiency Levels

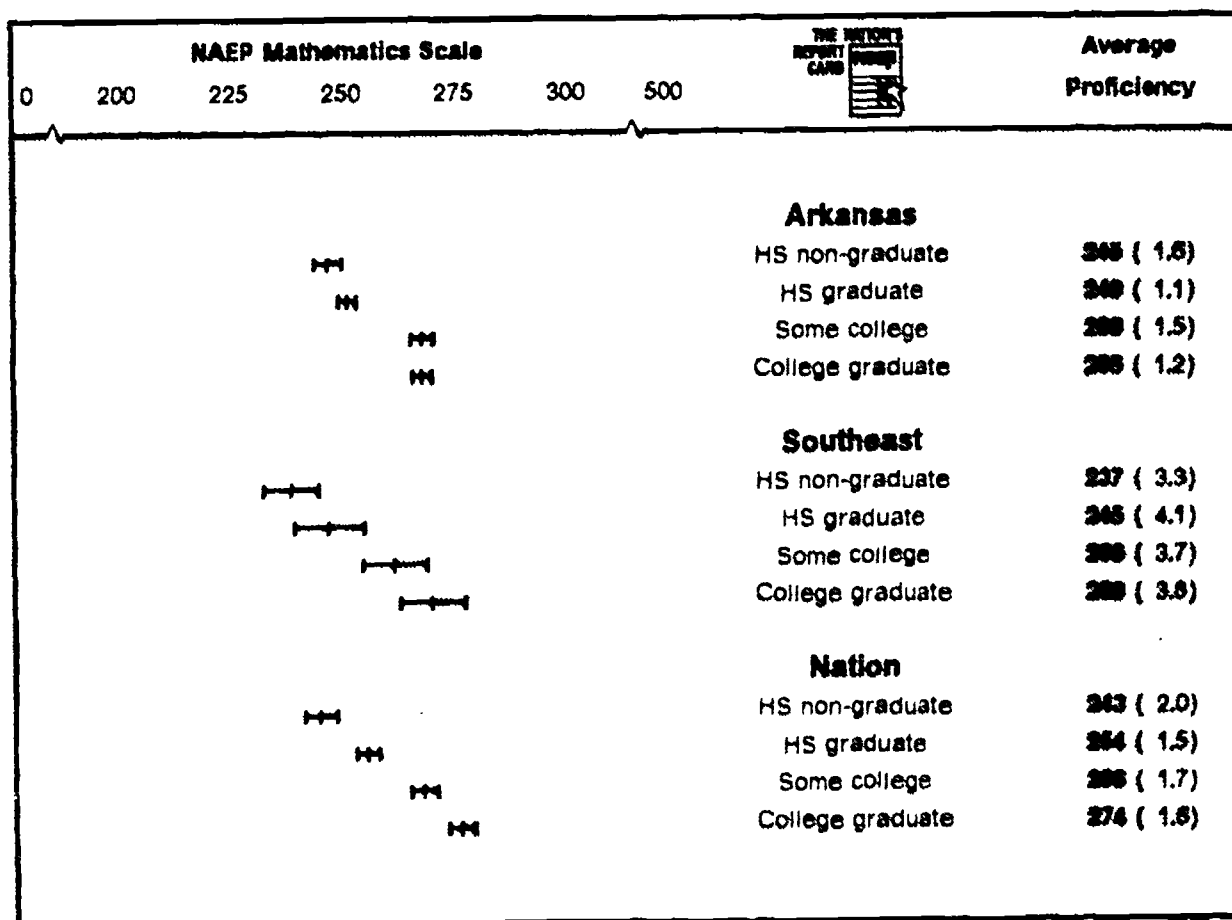
The standard errors are presented in parentheses. With about 95 percent certainty, the value for each population of interest is within  $\pm 2$  standard errors of the estimated percentage (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations. Proficiency level 350 is not presented in this figure because so few students attained that level. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



**PARENTS' EDUCATION LEVEL**

Previous NAEP findings have shown that students whose parents are better educated tend to have higher mathematics proficiency (see Figures 10 and 11). In Arkansas, the average mathematics proficiency of eighth-grade public-school students having at least one parent who graduated from college was approximately 22 points higher than that of students who reported that neither parent graduated from high school. As shown in Table 1 in the Introduction, a smaller percentage of students in Arkansas (31 percent) than in the nation (39 percent) had at least one parent who graduated from college. In comparison, the percentage of students who reported that neither parent graduated from high school was 12 percent for Arkansas and 10 percent for the nation.

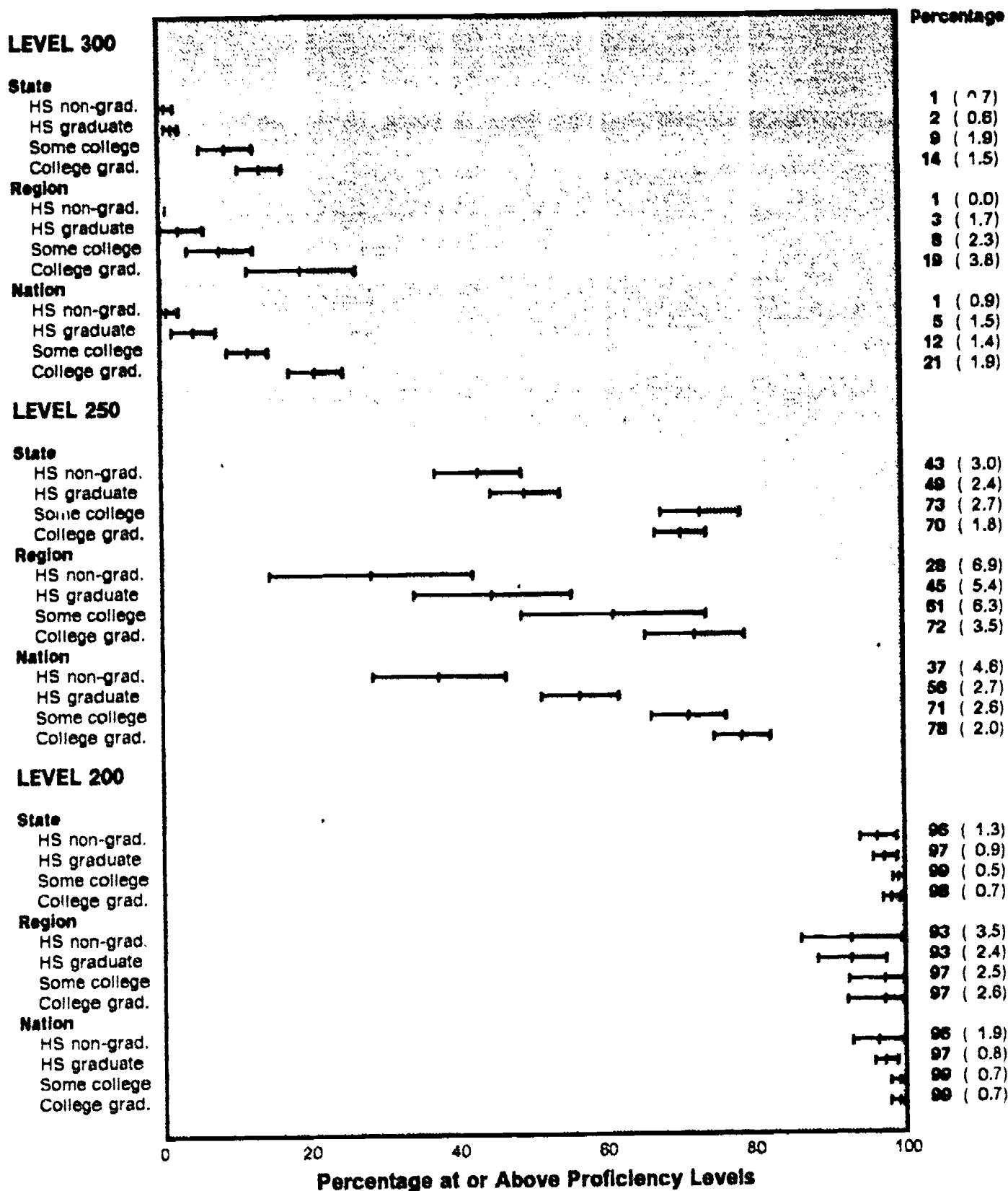
**FIGURE 10 | Average Eighth-Grade Public-School Mathematics Proficiency by Parents' Education**



The standard errors are presented in parentheses. With about 95 percent certainty, the average mathematics proficiency for each population of interest is within  $\pm 2$  standard errors of the estimated mean (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations.



FIGURE 11 | Levels of Eighth-Grade Public-School Mathematics Proficiency by Parents' Education

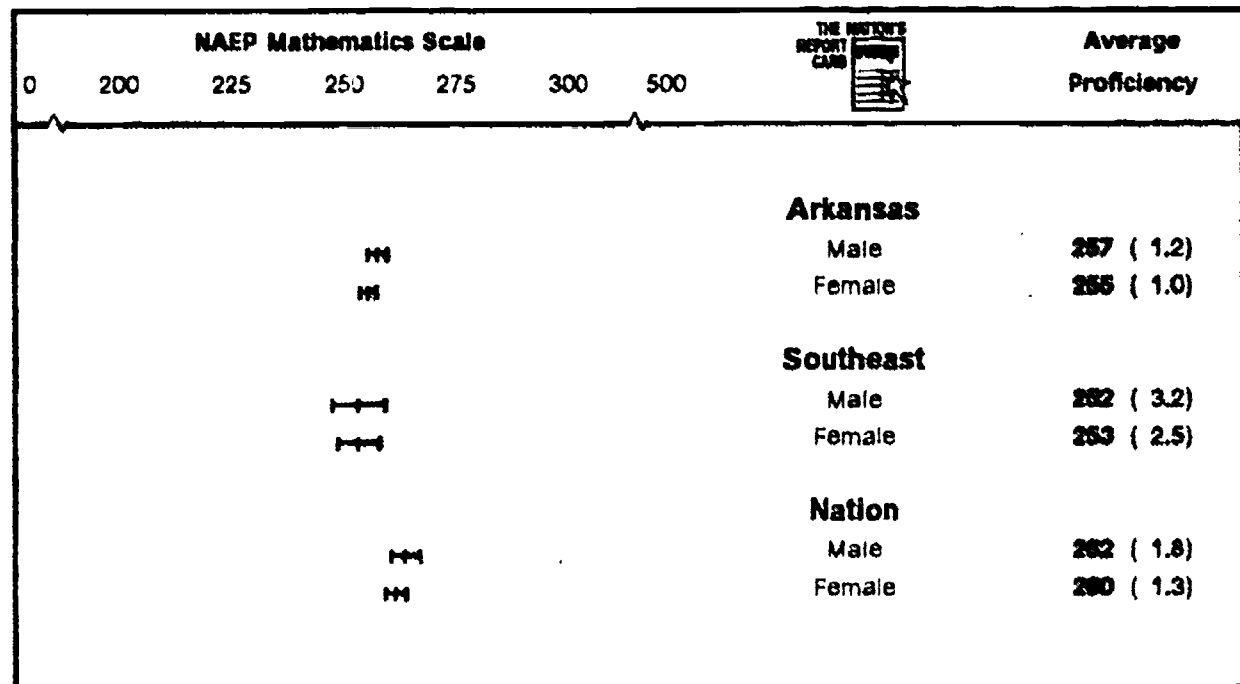


The standard errors are presented in parentheses. With about 95 percent certainty, the value for each population of interest is within  $\pm 2$  standard errors of the estimated percentage (95 percent confidence interval, denoted by **HH**). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations. Proficiency level 350 is not presented in this figure because so few students attained that level.

**GENDER**

As shown in Figure 12, there appears to be no difference in the average mathematics proficiency of eighth-grade males and females attending public schools in Arkansas. Compared to the national results, females in Arkansas performed lower than females across the country; males in Arkansas performed lower than males across the country.

**FIGURE 12 | Average Eighth-Grade Public-School Mathematics Proficiency by Gender**

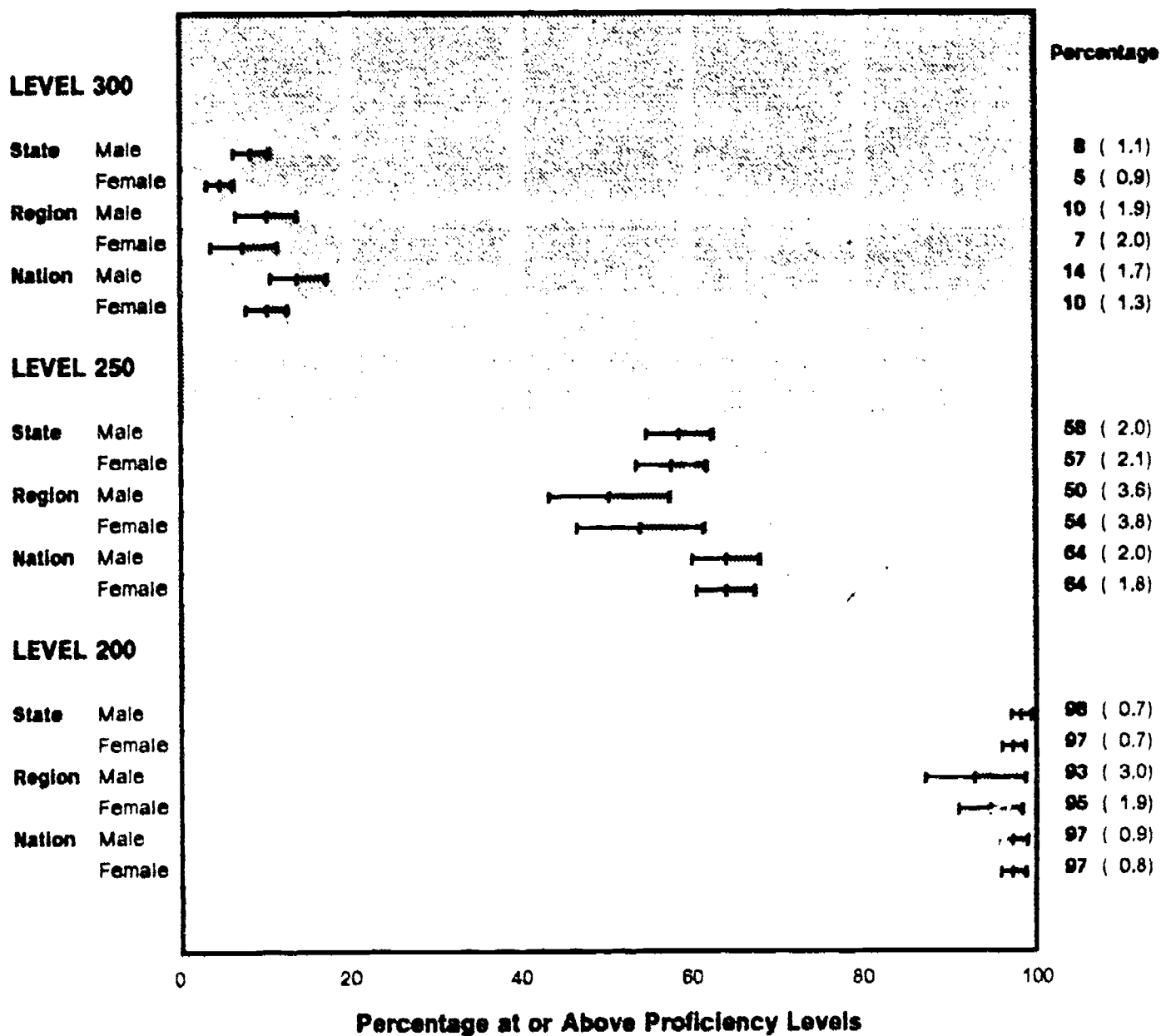


The standard errors are presented in parentheses. With about 95 percent certainty, the average mathematics proficiency for each population of interest is within  $\pm 2$  standard errors of the estimated mean (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations.

As shown in Figure 13, there was no difference between the percentages of males and females in Arkansas who attained level 200. The percentage of females in Arkansas who attained level 200 was similar to the percentage of females in the nation who attained level 200. Also, the percentage of males in Arkansas who attained level 200 was similar to the percentage of males in the nation who attained level 200.



FIGURE 13 | Levels of Eighth-Grade Public-School Mathematics Proficiency by Gender



The standard errors are presented in parentheses. With about 95 percent certainty, the value for each population of interest is within  $\pm 2$  standard errors of the estimated percentage (95 percent confidence interval, denoted by  $\pm$ ). If the confidence intervals for the populations do not overlap, there is a statistically significant difference between the populations. Proficiency level 350 is not presented in this figure because so few students attained that level.

In addition, a greater percentage of males than females in Arkansas attained level 300. The percentage of females in Arkansas who attained level 300 was smaller than the percentage of females in the nation who attained level 300. Also, the percentage of males in Arkansas who attained level 300 was smaller than the percentage of males in the nation who attained level 300.

### **CONTENT AREA PERFORMANCE**

Table 3 provides a summary of content area performance by race/ethnicity, type of community, parents' education level, and gender.

TABLE 3 | Eighth-Grade Public-School Mathematics  
Content Area Performance by Subpopulations

AVERAGE MATHEMATICS PROFICIENCY OF STUDENTS

1990 NAEP TRIAL STATE ASSESSMENT	Numbers and Operations	Measurement	Geometry	Data Analysis, Statistics, and Probability	Algebra and Functions
<b>TOTAL</b>	<b>Proficiency</b>	<b>Proficiency</b>	<b>Proficiency</b>	<b>Proficiency</b>	<b>Proficiency</b>
State	262 ( 0.8)	253 ( 1.2)	253 ( 1.0)	254 ( 1.2)	253 ( 1.1)
Region	259 ( 2.9)	246 ( 3.8)	249 ( 2.6)	250 ( 3.3)	254 ( 2.7)
Nation	266 ( 1.4)	258 ( 1.7)	259 ( 1.4)	262 ( 1.8)	260 ( 1.3)
<b>RACE/ETHNICITY</b>					
<b>White</b>					
State	270 ( 0.8)	264 ( 1.3)	262 ( 1.2)	266 ( 1.2)	261 ( 1.2)
Region	268 ( 3.0)	258 ( 4.2)	259 ( 3.5)	263 ( 3.4)	264 ( 3.4)
Nation	273 ( 1.6)	267 ( 2.0)	267 ( 1.5)	272 ( 1.8)	268 ( 1.4)
<b>Black</b>					
State	240 ( 1.3)	222 ( 1.7)	227 ( 1.6)	220 ( 1.5)	231 ( 1.8)
Region	242 ( 5.1)	222 ( 5.8)	228 ( 4.2)	227 ( 6.5)	235 ( 4.5)
Nation	244 ( 3.1)	227 ( 3.6)	234 ( 2.8)	231 ( 3.8)	237 ( 2.7)
<b>Hispanic</b>					
State	240 ( 3.9)	227 ( 5.5)	230 ( 4.3)	230 ( 4.1)	225 ( 4.0)
Region	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
Nation	248 ( 2.7)	238 ( 3.4)	243 ( 3.2)	239 ( 3.4)	243 ( 3.1)
<b>TYPE OF COMMUNITY</b>					
<b>Advantaged urban</b>					
State	275 ( 4.0) <sup>!</sup>	267 ( 5.7) <sup>!</sup>	271 ( 5.7) <sup>!</sup>	274 ( 7.6) <sup>!</sup>	262 ( 5.4) <sup>!</sup>
Region	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
Nation	283 ( 3.2) <sup>!</sup>	281 ( 3.2) <sup>!</sup>	277 ( 5.2) <sup>!</sup>	285 ( 4.8) <sup>!</sup>	277 ( 4.8) <sup>!</sup>
<b>Disadvantaged urban</b>					
State	248 ( 5.0) <sup>!</sup>	234 ( 6.5) <sup>!</sup>	237 ( 5.7) <sup>!</sup>	231 ( 6.9) <sup>!</sup>	235 ( 6.0) <sup>!</sup>
Region	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
Nation	255 ( 3.1) <sup>!</sup>	242 ( 4.9) <sup>!</sup>	248 ( 3.7) <sup>!</sup>	247 ( 4.6) <sup>!</sup>	247 ( 3.2) <sup>!</sup>
<b>Extreme rural</b>					
State	281 ( 1.8)	254 ( 3.2)	252 ( 2.0)	253 ( 2.4)	250 ( 2.0)
Region	254 ( 9.8) <sup>!</sup>	241 (17.1) <sup>!</sup>	244 (18.4) <sup>!</sup>	245 (13.7) <sup>!</sup>	251 (14.7) <sup>!</sup>
Nation	258 ( 4.3) <sup>!</sup>	254 ( 4.2) <sup>!</sup>	253 ( 4.5) <sup>!</sup>	257 ( 5.0) <sup>!</sup>	256 ( 4.8) <sup>!</sup>
<b>Other</b>					
State	263 ( 1.0)	255 ( 1.5)	254 ( 1.3)	255 ( 1.3)	255 ( 1.4)
Region	259 ( 3.3)	246 ( 4.0)	249 ( 2.7)	251 ( 3.8)	255 ( 3.0)
Nation	266 ( 1.9)	257 ( 2.4)	259 ( 1.7)	261 ( 2.2)	261 ( 1.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. <sup>\*\*\*</sup> Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

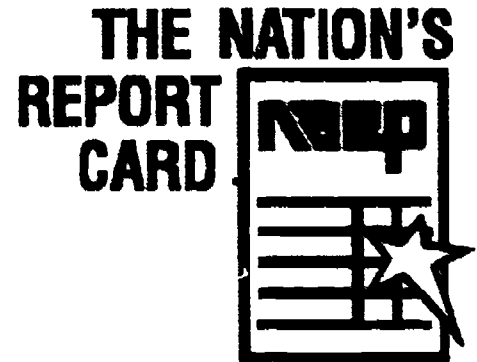


**TABLE 3** | **Eighth-Grade Public-School Mathematics**  
 (continued) | **Content Area Performance by Subpopulations**

## AVERAGE MATHEMATICS PROFICIENCY OF STUDENTS

1990 NAEP TRIAL STATE ASSESSMENT	Numbers and Operations	Measurement	Geometry	Data Analysis, Statistics, and Probability	Algebra and Functions
<b>TOTAL</b>	<b>Proficiency</b>	<b>Proficiency</b>	<b>Proficiency</b>	<b>Proficiency</b>	<b>Proficiency</b>
State	262 ( 0.8)	253 ( 1.2)	252 ( 1.1)	254 ( 1.2)	253 ( 1.1)
Region	259 ( 2.9)	248 ( 3.8)	249 ( 3.1)	250 ( 3.3)	254 ( 2.7)
Nation	266 ( 1.4)	258 ( 1.7)	256 ( 1.4)	262 ( 1.8)	260 ( 1.3)
<b>PARENTS' EDUCATION</b>					
<b>HS non-graduate</b>					
State	253 ( 1.8)	241 ( 2.7)	244 ( 1.9)	241 ( 2.7)	239 ( 2.1)
Region	243 ( 4.5)	227 ( 6.1)	237 ( 4.1)	234 ( 4.7)	240 ( 3.5)
Nation	247 ( 2.4)	237 ( 3.6)	242 ( 2.2)	240 ( 3.1)	242 ( 3.0)
<b>HS graduate</b>					
State	256 ( 1.1)	248 ( 1.9)	245 ( 1.4)	247 ( 1.5)	248 ( 1.5)
Region	252 ( 4.7)	235 ( 5.3)	242 ( 3.3)	242 ( 5.4)	247 ( 4.5)
Nation	259 ( 1.8)	248 ( 2.1)	252 ( 1.6)	253 ( 2.2)	253 ( 2.0)
<b>Some college</b>					
State	270 ( 1.9)	265 ( 2.4)	264 ( 1.8)	265 ( 2.1)	263 ( 1.7)
Region	265 ( 3.5)	257 ( 6.3)	253 ( 4.2)	260 ( 3.9)	260 ( 5.7)
Nation	270 ( 1.5)	264 ( 2.7)	262 ( 2.0)	269 ( 2.4)	263 ( 2.2)
<b>College graduate</b>					
State	272 ( 1.2)	264 ( 1.5)	263 ( 1.6)	266 ( 1.7)	264 ( 1.5)
Region	275 ( 3.9)	264 ( 4.8)	263 ( 3.6)	267 ( 4.6)	270 ( 4.1)
Nation	278 ( 1.6)	272 ( 2.0)	270 ( 1.6)	276 ( 2.2)	273 ( 1.7)
<b>GENDER</b>					
<b>Male</b>					
State	262 ( 1.2)	258 ( 1.8)	255 ( 1.5)	255 ( 1.4)	252 ( 1.6)
Region	257 ( 3.6)	249 ( 4.4)	249 ( 3.2)	249 ( 3.9)	253 ( 3.2)
Nation	266 ( 2.0)	262 ( 2.3)	260 ( 1.7)	262 ( 2.1)	260 ( 1.6)
<b>Female</b>					
State	262 ( 1.0)	249 ( 1.5)	251 ( 1.1)	253 ( 1.6)	253 ( 1.2)
Region	261 ( 2.9)	243 ( 4.0)	248 ( 2.4)	251 ( 3.7)	255 ( 2.6)
Nation	266 ( 1.4)	253 ( 1.6)	258 ( 1.5)	261 ( 1.9)	260 ( 1.4)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.



## PART TWO

### **Finding a Context for Understanding Students' Mathematics Proficiency**

Information on students' mathematics proficiency is valuable in and of itself, but it becomes more useful for improving instruction and setting policy when supplemented with contextual information about schools, teachers, and students.

To gather such information, the students participating in the 1990 Trial State Assessment, their mathematics teachers, and the principals or other administrators in their schools were asked to complete questionnaires on policies, instruction, and programs. Taken together, the student, teacher, and school data help to describe some of the current practices and emphases in mathematics education, illuminate some of the factors that appear to be related to eighth-grade public-school students' proficiency in the subject, and provide an educational context for understanding information on student achievement. It is important to note that the NAEP data cannot establish cause-and-effect links between various contextual factors and students' mathematics proficiency. However, the results do provide information about important relationships between the contextual factors and proficiency.

The contextual information provided in Part Two of this report focuses on four major areas: instructional content, instructional practices, teacher qualifications, and conditions beyond school that facilitate learning and instruction -- fundamental aspects of the educational process in the country.

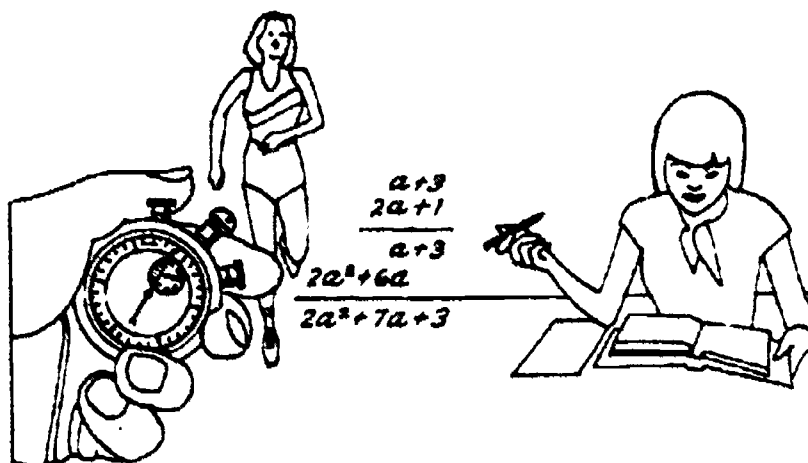
## *Arkansas*

---

Through the questionnaires administered to students, teachers, and principals, NAEP is able to provide a broad picture of educational practices prevalent in American schools and classrooms. In many instances, however, these findings contradict our perceptions of what school is like or educational researchers' suggestions about what strategies work best to help students learn.

For example, research has indicated new and more successful ways of teaching and learning, incorporating more hands-on activities and student-centered learning techniques; however, as described in Chapter 4, NAEP data indicate that classroom work is still dominated by textbooks or worksheets. Also, it is widely recognized that home environment has an enormous impact on future academic achievement. Yet, as shown in Chapters 3 and 7, large proportions of students report having spent much more time each day watching television than doing mathematics homework.

Part Two consists of five chapters. Chapter 3 discusses instructional content and its relationship to students' mathematics proficiency. Chapter 4 focuses on instructional practices -- how instruction is delivered. Chapter 5 is devoted to calculator use. Chapter 6 provides information about teachers, and Chapter 7 examines students' home support for learning.



## CHAPTER 3

### What Are Students Taught in Mathematics?

In response to the continuing swell of information about the poor mathematics achievement of American students, educators and policymakers have recommended widespread reforms that are changing the direction of mathematics education. Recent reports have called for fundamental revisions in curriculum, a reexamination of tracking practices, improved textbooks, better assessment, and an increase in the proportions of students in high-school mathematics programs.<sup>3</sup> This chapter focuses on curricular and instructional content issues in Arkansas public schools and their relationship to students' proficiency.

Table 4 provides a profile of the eighth-grade public schools' policies and staffing. Some of the salient results are as follows:

- More than half of the eighth-grade students in Arkansas (59 percent) were in public schools where mathematics was identified as a special priority. This compares to 63 percent for the nation.

<sup>3</sup> Curtis McKnight, et al., *The Underachieving Curriculum: Assessing U.S. School Mathematics from an International Perspective. A National Report on the Second International Mathematics Study* (Champaign, IL: Stipes Publishing Company, 1987).

Lynn Steen, Ed. *Everybody Counts: A Report to the Nation on the Future of Mathematics Education* (Washington, DC: National Academy Press, 1989).

## Arkansas

- In Arkansas, 50 percent of the students could take an algebra course in eighth grade for high school course placement or credit.
- Many of the students in Arkansas (89 percent) were taught mathematics by teachers who teach only one subject.
- About half (50 percent) of the students in Arkansas were typically taught mathematics in a class that was grouped by mathematics ability. Ability grouping was more prevalent across the nation (63 percent).

**TABLE 4 | Mathematics Policies and Practices in Arkansas Eighth-Grade Public Schools**

PERCENTAGE OF STUDENTS

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<b>Percentage of eighth-grade students in public schools that identified mathematics as receiving special emphasis in school-wide goals and objectives, instruction, in-service training, etc.</b>	59 ( 4.2)	70 (10.6)	63 ( 5.9)
<b>Percentage of eighth-grade public-school students who are offered a course in algebra for high school course placement or credit</b>	50 ( 4.2)	60 (10.9)	78 ( 4.6)
<b>Percentage of eighth-grade students in public schools who are taught by teachers who teach only mathematics</b>	89 ( 3.2)	77 (10.6)	91 ( 3.3)
<b>Percentage of eighth-grade students in public schools who are assigned to a mathematics class by their ability in mathematics</b>	50 ( 3.3)	58 ( 8.0)	63 ( 4.0)
<b>Percentage of eighth-grade students in public schools who receive four or more hours of mathematics instruction per week</b>	41 ( 3.2)	51 (11.1)	30 ( 4.4)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

**CURRICULUM COVERAGE**

To place students' mathematics proficiency in a curriculum-related context, it is necessary to examine the extent to which eighth graders in Arkansas are taking mathematics courses. Based on their responses, shown in Table 5:

- A greater percentage of students in Arkansas were taking eighth-grade mathematics (72 percent) than were taking a course in pre-algebra or algebra (26 percent). Across the nation, 62 percent were taking eighth-grade mathematics and 34 percent were taking a course in pre-algebra or algebra.
- Students in Arkansas who were enrolled in pre-algebra or algebra courses exhibited higher average mathematics proficiency than did those who were in eighth-grade mathematics courses. This result is not unexpected since it is assumed that students enrolled in pre-algebra and algebra courses may be the more able students who have already mastered the general eighth-grade mathematics curriculum.

**TABLE 5 | Students' Reports on the Mathematics Class They Are Taking**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>What kind of mathematics class are you taking this year?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Eighth-grade mathematics</b>	72 ( 2.2) 248 ( 1.0)	64 ( 3.7) 241 ( 3.4)	62 ( 2.1) 251 ( 1.4)
<b>Pre-algebra</b>	16 ( 1.8) 270 ( 2.3)	23 ( 4.4) 269 ( 4.6)	19 ( 1.9) 272 ( 2.4)
<b>Algebra</b>	10 ( 1.1) 289 ( 2.4)	11 ( 2.2) 296 ( 4.8)	15 ( 1.2) 296 ( 2.4)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because a small number of students reported taking other mathematics courses. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency.

Further, from Table A5 in the Data Appendix:<sup>4</sup>

- About the same percentage of females (27 percent) and males (26 percent) in Arkansas were enrolled in pre-algebra or algebra courses.
- In Arkansas, 29 percent of White students, 19 percent of Black students, and 11 percent of Hispanic students were enrolled in pre-algebra or algebra courses.
- Similarly, 33 percent of students attending schools in advantaged urban areas, 29 percent in schools in disadvantaged urban areas, 16 percent in schools in extreme rural areas, and 28 percent in schools in areas classified as "other" were enrolled in pre-algebra or algebra courses.

### MATHEMATICS HOMEWORK

To illuminate the relationship between homework and proficiency in mathematics, the assessed students and their teachers were asked to report the amount of time the students spent on mathematics homework each day. Tables 6 and 7 report the teachers' and students' responses, respectively.

According to their teachers, the greatest percentage of eighth-grade students in public schools in Arkansas spent 30 minutes doing mathematics homework each day; according to the students, the greatest percentage spent 30 minutes doing mathematics homework each day. Across the nation, according to their teachers, the largest percentage of students spent either 15 or 30 minutes doing mathematics homework each day, while students reported spending either 15 or 30 minutes daily.

Further, as reported by their teachers (Table 6 and Table A6 in the Data Appendix):

- In Arkansas, 1 percent of the students spent no time each day on mathematics homework, compared to 1 percent for the nation. Moreover, 1 percent of the students in Arkansas and 4 percent of the students in the nation spent an hour or more on mathematics homework each day.

---

<sup>4</sup> For every table in the body of the report that includes estimates of average proficiency, the Data Appendix provides a corresponding table presenting the results for the four subpopulations -- race ethnicity, type of community, parents' education level, and gender.

- The results by race/ethnicity show that 2 percent of White students, 1 percent of Black students, and 0 percent of Hispanic students spent an hour or more on mathematics homework each day. In comparison, 1 percent of White students, 2 percent of Black students, and 3 percent of Hispanic students spent no time doing mathematics homework.
- In addition, 7 percent of students attending schools in advantaged urban areas, 0 percent in schools in disadvantaged urban areas, 2 percent in schools in extreme rural areas, and 1 percent in schools in areas classified as "other" spent an hour or more on mathematics homework daily. In comparison, 8 percent of students attending schools in advantaged urban areas, 0 percent in schools in disadvantaged urban areas, 0 percent in schools in extreme rural areas, and 1 percent in schools in areas classified as "other" spent no time doing mathematics homework.

TABLE 6 Teachers' Reports on the Amount of Time Students Spent on Mathematics Homework Each Day

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>About how much time do students spend on mathematics homework each day?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>None</b>	1 ( 0.3) *** ( ***)	1 ( 1.0) *** ( ***)	1 ( 0.3) *** ( ***)
<b>15 minutes</b>	34 ( 3.4) 253 ( 2.1)	44 ( 7.5) 248 ( 5.1) <sup>!</sup>	43 ( 4.2) 256 ( 2.3)
<b>30 minutes</b>	54 ( 3.4) 258 ( 1.2)	44 ( 7.6) 260 ( 5.4) <sup>!</sup>	43 ( 4.3) 266 ( 2.6)
<b>45 minutes</b>	10 ( 2.6) 261 ( 4.2) <sup>!</sup>	8 ( 2.7) *** ( ***)	10 ( 1.8) 272 ( 5.7) <sup>!</sup>
<b>An hour or more</b>	1 ( 0.5) *** ( ***)	3 ( 1.3) *** ( ***)	4 ( 0.9) 278 ( 5.1) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



**TABLE 7 | Students' Reports on the Amount of Time They Spent on Mathematics Homework Each Day**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<p><i>About how much time do you usually spend each day on mathematics homework?</i></p>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>None</b>	9 ( 0.8) 250 ( 2.5)	11 ( 1.9) 237 ( 5.4)	9 ( 0.8) 251 ( 2.8)
<b>15 minutes</b>	28 ( 1.1) 259 ( 1.3)	25 ( 1.8) 253 ( 3.3)	31 ( 2.0) 264 ( 1.9)
<b>30 minutes</b>	33 ( 1.0) 258 ( 1.2)	33 ( 2.5) 258 ( 3.0)	32 ( 1.2) 263 ( 1.9)
<b>45 minutes</b>	16 ( 0.8) 252 ( 1.8)	17 ( 2.2) 261 ( 2.5)	16 ( 1.0) 266 ( 1.9)
<b>An hour or more</b>	14 ( 0.8) 253 ( 1.8)	14 ( 1.4) 247 ( 4.8)	12 ( 1.1) 258 ( 3.1)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

And, according to the students (Table 7 and Table A7 in the Data Appendix):

- In Arkansas, relatively few of the students (9 percent) reported that they spent no time each day on mathematics homework, compared to 9 percent for the nation. Moreover, 14 percent of the students in Arkansas and 12 percent of students in the nation spent an hour or more each day on mathematics homework.
- The results by race/ethnicity show that 13 percent of White students, 16 percent of Black students, and 12 percent of Hispanic students spent an hour or more on mathematics homework each day. In comparison, 10 percent of White students, 7 percent of Black students, and 3 percent of Hispanic students spent no time doing mathematics homework.

- In addition, 9 percent of students attending schools in advantaged urban areas, 20 percent in schools in disadvantaged urban areas, 15 percent in schools in extreme rural areas, and 13 percent in schools in areas classified as "other" spent an hour or more on mathematics homework daily. In comparison, 12 percent of students attending schools in advantaged urban areas, 14 percent in schools in disadvantaged urban areas, 8 percent in schools in extreme rural areas, and 9 percent in schools in areas classified as "other" spent no time doing mathematics homework.

## INSTRUCTIONAL EMPHASIS

According to the approach of the National Council of Teachers of Mathematics (NCTM), students should be taught a broad range of mathematics topics, including number concepts, computation, estimation, functions, algebra, statistics, probability, geometry, and measurement.<sup>5</sup> Because the Trial State Assessment questions were designed to measure students' knowledge, skills, and understandings in these various content areas -- regardless of the type of mathematics class in which they were enrolled -- the teachers of the assessed students were asked a series of questions about the emphasis they planned to give specific mathematics topics during the school year. Their responses provide an indication of the students' opportunity to learn the various topics covered in the assessment.

For each of 10 topics, the teachers were asked whether they planned to place "heavy," "moderate," or "little or no" emphasis on the topic. Each of the topics corresponded to skills that were measured in one of the five mathematics content areas included in the Trial State Assessment:

- **Numbers and Operations.** Teachers were asked about emphasis placed on five topics: whole number operations, common fractions, decimal fractions, ratio or proportion, and percent.
- **Measurement.** Teachers were asked about emphasis placed on one topic: measurement.
- **Geometry.** Teachers were asked about emphasis placed on one topic: geometry.
- **Data Analysis, Statistics, and Probability.** Teachers were asked about emphasis placed on two topics: tables and graphs, and probability and statistics.
- **Algebra and Functions.** Teachers were asked about emphasis placed on one topic: algebra and functions.

---

<sup>5</sup> National Council of Teachers of Mathematics, *Curriculum and Evaluation Standards for School Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1989).

## *Arkansas*

---

The responses of the assessed students' teachers to the topic emphasis questions for each content area were combined to create a new variable. For each question in a particular content area, a value of 3 was given to "heavy emphasis" responses, 2 to "moderate emphasis" responses, and 1 to "little or no emphasis" responses. Each teacher's responses were then averaged over all questions related to the particular content area.

Table 8 provides the results for the extreme categories -- "heavy emphasis" and "little or no emphasis" -- and the average student proficiency in each content area. For the emphasis questions about numbers and operations, for example, the proficiency reported is the average student performance in the Numbers and Operations content area.

Students whose teachers placed heavy instructional emphasis on Algebra and Functions had higher proficiency in this content area than students whose teachers placed little or no emphasis on Algebra and Functions. Students whose teachers placed heavy instructional emphasis on Numbers and Operations and Measurement had lower proficiency in these content areas than students whose teachers placed little or no emphasis on the same areas.

**TABLE 8 | Teachers' Reports on the Emphasis Given to Specific Mathematics Content Areas**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>Teacher "emphasis" categories by content areas</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Numbers and Operations</b>			
Heavy emphasis	60 ( 3.3) 259 ( 1.2)	59 ( 7.3) 256 ( 3.1)!	49 ( 3.8) 260 ( 1.8)
Little or no emphasis	8 ( 1.1) 288 ( 4.7)	15 ( 4.8) 282 ( 7.7)!	15 ( 2.1) 287 ( 3.4)
<b>Measurement</b>			
Heavy emphasis	17 ( 2.7) 248 ( 3.4)	13 ( 8.8) 242 ( 7.6)!	17 ( 3.0) 250 ( 5.6)
Little or no emphasis	24 ( 2.9) 267 ( 3.1)	22 ( 8.1) 259 (10.7)!	33 ( 4.0) 272 ( 4.0)
<b>Geometry</b>			
Heavy emphasis	16 ( 2.5) 254 ( 2.7)	22 ( 7.0) 253 ( 7.5)!	28 ( 3.8) 260 ( 3.2)
Little or no emphasis	27 ( 2.9) 256 ( 1.9)	22 ( 8.8) 253 ( 8.7)!	21 ( 3.3) 264 ( 5.4)
<b>Data Analysis, Statistics, and Probability</b>			
Heavy emphasis	9 ( 2.3) 259 ( 5.1)!	19 ( 5.9) 274 ( 5.8)!	14 ( 2.2) 269 ( 4.3)
Little or no emphasis	63 ( 3.9) 253 ( 1.9)	54 (10.4) 246 ( 5.4)!	53 ( 4.4) 261 ( 2.9)
<b>Algebra and Functions</b>			
Heavy emphasis	33 ( 2.8) 273 ( 2.1)	42 ( 6.0) 277 ( 5.8)	46 ( 3.6) 275 ( 2.5)
Little or no emphasis	30 ( 3.7) 240 ( 1.9)	21 ( 8.1) 238 ( 6.7)!	20 ( 3.0) 243 ( 3.0)

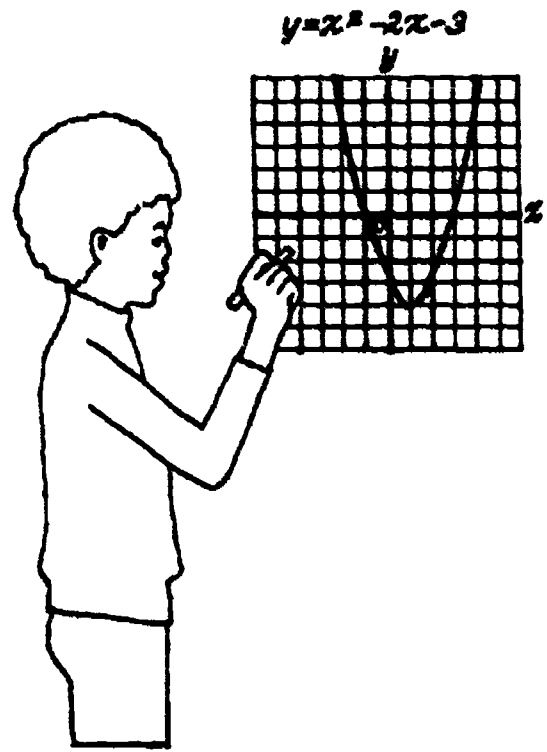
The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Moderate emphasis" category is not included. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency.

### SUMMARY

Although many types of mathematics learning can take place outside of the school environment, there are some topic areas that students are unlikely to study unless they are covered in school. Thus, what students are taught in school becomes an important determinant of their achievement.

The information on curriculum coverage, mathematics homework, and instructional emphasis has revealed the following:

- More than half of the eighth-grade students in Arkansas (59 percent) were in public schools where mathematics was identified as a special priority. This compares to 63 percent for the nation.
- In Arkansas, 50 percent of the students could take an algebra course in eighth grade for high-school course placement or credit.
- A greater percentage of students in Arkansas were taking eighth-grade mathematics (72 percent) than were taking a course in pre-algebra or algebra (26 percent). Across the nation, 62 percent were taking eighth-grade mathematics and 34 percent were taking a course in pre-algebra or algebra.
- According to their teachers, the greatest percentage of eighth-grade students in public schools in Arkansas spent 30 minutes doing mathematics homework each day; according to the students, most of them spent 30 minutes doing mathematics homework each day. Across the nation, teachers reported that the largest percentage of students spent either 15 or 30 minutes doing mathematics homework each day, while students reported either 15 or 30 minutes daily.
- In Arkansas, relatively few of the students (9 percent) reported that they spent no time each day on mathematics homework, compared to 9 percent for the nation. Moreover, 14 percent of the students in Arkansas and 12 percent of students in the nation spent an hour or more each day on mathematics homework.
- Students whose teachers placed heavy instructional emphasis on Algebra and Functions had higher proficiency in this content area than students whose teachers placed little or no emphasis on Algebra and Functions. Students whose teachers placed heavy instructional emphasis on Numbers and Operations and Measurement had lower proficiency in these content areas than students whose teachers placed little or no emphasis on the same areas.



## CHAPTER 4

### How Is Mathematics Instruction Delivered?

Teachers facilitate learning through a variety of instructional practices. Because a particular teaching method may not be equally effective with all types of students, selecting and tailoring methods for students with different styles of learning or for those who come from different cultural backgrounds is an important aspect of teaching.<sup>6</sup>

An inspection of the availability and use of resources for mathematics education can provide insight into how and what students are learning in mathematics. To provide information about how instruction is delivered, students and teachers participating in the Trial State Assessment were asked to report on the use of various teaching and learning activities in their mathematics classrooms.

#### AVAILABILITY OF RESOURCES

Teachers' use of resources is obviously constrained by the availability of those resources. Thus, the assessed students' teachers were asked to what extent they were able to obtain all of the instructional materials and other resources they needed.

---

<sup>6</sup> National Council of Teachers of Mathematics, *Professional Standards for the Teaching of Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1991).

## Arkansas

From Table 9 and Table A9 in the Data Appendix:

- In Arkansas, 19 percent of the eighth-grade students had mathematics teachers who reported getting all of the resources they needed, while 41 percent of the students were taught by teachers who got only some or none of the resources they needed. Across the nation, these figures were 13 percent and 31 percent, respectively.
- In Arkansas, 24 percent of students attending schools in advantaged urban areas, 28 percent in schools in disadvantaged urban areas, 23 percent in schools in extreme rural areas, and 17 percent in schools in areas classified as "other" had mathematics teachers who got all the resources they needed.
- By comparison, in Arkansas, 25 percent of students attending schools in advantaged urban areas, 50 percent in schools in disadvantaged urban areas, 39 percent in schools in extreme rural areas, and 41 percent in schools in areas classified as "other" were in classrooms where only some or no resources were available.
- Students whose teachers got all the resources they needed had mathematics achievement levels similar to those whose teachers got only some or none of the resources they needed.

**TABLE 9 | Teachers' Reports on the Availability of Resources**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<div style="border: 1px dashed black; padding: 5px; margin-bottom: 10px;"> <i>Which of the following statements is true about how well supplied you are by your school system with the instructional materials and other resources you need to teach your class?</i> </div> <p><b>I get all the resources I need.</b></p> <p><b>I get most of the resources I need.</b></p> <p><b>I get some or none of the resources I need.</b></p>	<p><b>Percentage and Proficiency</b></p> <p>19 ( 3.1) 254 ( 3.0)</p> <p>40 ( 3.9) 261 ( 1.9)</p> <p>41 ( 4.1) 253 ( 1.5)</p>	<p><b>Percentage and Proficiency</b></p> <p>8 ( 4.0) 258 (12.2)!</p> <p>71 ( 9.5) 255 ( 3.3)!</p> <p>21 ( 9.7) 257 ( 8.0)!</p>	<p><b>Percentage and Proficiency</b></p> <p>13 ( 2.4) 265 ( 4.2)</p> <p>56 ( 4.0) 265 ( 2.0)</p> <p>31 ( 4.2) 261 ( 2.9)</p>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency.

## PATTERNS IN CLASSROOM INSTRUCTION

Research in education and cognitive psychology has yielded many insights into the types of instructional activities that facilitate students' mathematics learning. Increasing the use of "hands-on" examples with concrete materials and placing problems in real-world contexts to help children construct useful meanings for mathematical concepts are among the recommended approaches.<sup>7</sup> Students' responses to a series of questions on their mathematics instruction provide an indication of the extent to which teachers are making use of the types of student-centered activities suggested by researchers. Table 10 presents data on patterns of classroom practice and Table 11 provides information on materials used for classroom instruction by the mathematics teachers of the assessed students.

According to their teachers:

- Less than half of the students in Arkansas (33 percent) worked mathematics problems in small groups at least once a week; some never worked mathematics problems in small groups (18 percent).
- The largest percentage of the students (79 percent) used objects like rulers, counting blocks, or geometric shapes less than once a week; relatively few never used such objects (8 percent).
- In Arkansas, 80 percent of the students were assigned problems from a mathematics textbook almost every day; 2 percent worked textbook problems about once a week or less.
- Less than half of the students (38 percent) did problems from worksheets at least several times a week; less than half did worksheet problems less than weekly (33 percent).

---

<sup>7</sup> Thomas Romberg, "A Common Curriculum for Mathematics," *Individual Differences and the Common Curriculum. Eighty-second Yearbook of the National Society for the Study of Education* (Chicago, IL: University of Chicago Press, 1983).



TABLE 10 | Teachers' Reports on Patterns of Mathematics Instruction

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>About how often do students work problems in small groups?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>At least once a week</b>	33 ( 3.3) 252 ( 1.7)	44 ( 8.2) 255 ( 4.7)!	50 ( 4.4) 280 ( 2.2)
<b>Less than once a week</b>	48 ( 4.0) 258 ( 1.8)	48 ( 8.3) 258 ( 3.9)!	43 ( 4.1) 284 ( 2.3)
<b>Never</b>	18 ( 3.4) 281 ( 2.1)	7 ( 4.1) *** ( ***)	8 ( 2.0) 277 ( 5.4)!
<i>About how often do students use objects like rulers, counting blocks, or geometric solids?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>At least once a week</b>	13 ( 3.3) 248 ( 4.3)!	19 ( 8.2) 243 ( 4.3)!	22 ( 3.7) 254 ( 3.2)
<b>Less than once a week</b>	79 ( 3.3) 257 ( 1.2)	85 (10.3) 257 ( 3.8)!	89 ( 3.9) 283 ( 1.8)
<b>Never</b>	8 ( 1.5) 289 ( 4.1)	16 ( 8.1) *** ( ***)	9 ( 2.8) 282 ( 5.9)!

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE 11 | Teachers' Reports on Materials for Mathematics Instruction

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>About how often do students do problems from textbooks?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Almost every day</b>	80 ( 2.7) 258 ( 1.2)	75 ( 7.8) 259 ( 3.7)	62 ( 3.4) 267 ( 1.8)
<b>Several times a week</b>	19 ( 2.7) 252 ( 2.7)	22 ( 7.8) 248 ( 5.2) <sup>!</sup>	31 ( 3.1) 254 ( 2.9)
<b>About once a week or less</b>	2 ( 0.6) *** ( ***)	3 ( 2.8) *** ( ***)	7 ( 1.8) 260 ( 5.1) <sup>!</sup>
<i>About how often do students do problems on worksheets?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>At least several times a week</b>	38 ( 3.2) 252 ( 1.3)	30 ( 6.8) 251 ( 3.4) <sup>!</sup>	34 ( 3.8) 256 ( 2.3)
<b>About once a week</b>	29 ( 2.9) 260 ( 2.3)	44 ( 9.1) 256 ( 3.7) <sup>!</sup>	33 ( 3.4) 260 ( 2.3)
<b>Less than weekly</b>	33 ( 3.3) 260 ( 2.3)	27 ( 8.8) 263 ( 6.0) <sup>!</sup>	32 ( 3.6) 274 ( 2.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. <sup>\*\*\*</sup> Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

The next section presents the students' responses to a corresponding set of questions, as well as the relationship of their responses to their mathematics proficiency. It also compares the responses of the students to those of their teachers.

**COLLABORATING IN SMALL GROUPS**

In Arkansas, 55 percent of the students reported never working mathematics problems in small groups (see Table 12); 18 percent of the students worked mathematics problems in small groups at least once a week.

**TABLE 12 | Students' Reports on the Frequency of Small Group Work**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>How often do you work in small groups in your mathematics class?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>At least once a week</b>	18 ( 1.2) 249 ( 1.9)	26 ( 3.9) 251 ( 4.8)	28 ( 2.5) 258 ( 2.7)
<b>Less than once a week</b>	27 ( 1.5) 283 ( 1.8)	26 ( 2.2) 259 ( 3.9)	28 ( 1.4) 267 ( 2.0)
<b>Never</b>	55 ( 2.0) 255 ( 1.1)	49 ( 4.8) 252 ( 2.4)	44 ( 2.9) 261 ( 1.6)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

Examining the subpopulations (Table A12 in the Data Appendix):

- In Arkansas, 20 percent of students attending schools in advantaged urban areas, 31 percent in schools in disadvantaged urban areas, 16 percent in schools in extreme rural areas, and 17 percent in schools in areas classified as "other" worked in small groups at least once a week.
- Further, 16 percent of White students, 26 percent of Black students, and 25 percent of Hispanic students worked mathematics problems in small groups at least once a week.
- Females were as likely as males to work mathematics problems in small groups at least once a week (17 percent and 19 percent, respectively).

## USING MATHEMATICAL OBJECTS

Students were asked to report on the frequency with which they used mathematical objects such as rulers, counting blocks, or geometric solids. Table 13 below and Table A13 in the Data Appendix summarize these data:

- Less than half of the students in Arkansas (44 percent) never used mathematical objects; 21 percent used these objects at least once a week.
- Mathematical objects were used at least once a week by 21 percent of students attending schools in advantaged urban areas, 22 percent in schools in disadvantaged urban areas, 21 percent in schools in extreme rural areas, and 21 percent in schools in areas classified as "other".
- Males were as likely as females to use mathematical objects in their mathematics classes at least once a week (22 percent and 20 percent, respectively).
- In addition, 19 percent of White students, 27 percent of Black students, and 21 percent of Hispanic students used mathematical objects at least once a week.

**TABLE 13 | Students' Reports on the Use of Mathematics Objects**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>How often do you work with objects like rulers, counting blocks, or geometric solids in your mathematics class?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>At least once a week</b>	21 ( 1.5) 247 ( 1.7)	23 ( 3.4) 242 ( 3.6)	28 ( 1.8) 258 ( 2.6)
<b>Less than once a week</b>	35 ( 1.1) 262 ( 1.3)	29 ( 2.5) 261 ( 3.5)	31 ( 1.2) 269 ( 1.5)
<b>Never</b>	44 ( 2.0) 255 ( 1.1)	48 ( 4.5) 254 ( 3.0)	41 ( 2.2) 259 ( 1.6)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

**MATERIALS FOR MATHEMATICS INSTRUCTION**

The percentages of eighth-grade public-school students in Arkansas who frequently worked mathematics problems from textbooks (Table 14) or worksheets (Table 15) indicate that these materials play a major role in mathematics teaching and learning. Regarding the frequency of textbook usage (Table 14 and Table A14 in the Data Appendix):

- Many of the students in Arkansas (81 percent) worked mathematics problems from textbooks almost every day, compared to 74 percent of the students in the nation.
- Textbooks were used almost every day by 85 percent of students attending schools in advantaged urban areas, 72 percent in schools in disadvantaged urban areas, 76 percent in schools in extreme rural areas, and 84 percent in schools in areas classified as "other".

**TABLE 14 | Students' Reports on the Frequency of Mathematics Textbook Use**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <i>How often do you do mathematics problems from textbooks in your mathematics class?</i> </div>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Almost every day</b>	81 ( 1.8) 259 ( 1.0)	78 ( 2.4) 257 ( 2.8)	74 ( 1.9) 267 ( 1.2)
<b>Several times a week</b>	13 ( 0.9) 244 ( 2.0)	14 ( 1.9) 248 ( 4.4)	14 ( 0.8) 252 ( 1.7)
<b>About once a week or less</b>	6 ( 0.9) 236 ( 3.3)	8 ( 2.7) 222 ( 5.3) <sup>a</sup>	12 ( 1.8) 242 ( 4.5)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency.

And, for the frequency of worksheet usage (Table 15 and Table A15 in the Data Appendix):

- Less than half of the students in Arkansas (35 percent) used worksheets at least several times a week, compared to 38 percent in the nation.
- Worksheets were used at least several times a week by 28 percent of students attending schools in advantaged urban areas, 29 percent in schools in disadvantaged urban areas, 52 percent in schools in extreme rural areas, and 31 percent in schools in areas classified as "other".

**TABLE 15 | Students' Reports on the Frequency of Mathematics Worksheet Use**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <i>How often do you do mathematics problems on worksheets in your mathematics class?</i> </div>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>At least several times a week</b>	35 ( 2.5) 249 ( 1.2)	38 ( 4.3) 245 ( 4.3)	38 ( 2.4) 253 ( 2.2)
<b>About once a week</b>	27 ( 1.5) 254 ( 1.6)	32 ( 1.5) 254 ( 2.8)	25 ( 1.2) 261 ( 1.4)
<b>Less than weekly</b>	37 ( 2.5) 283 ( 1.4)	29 ( 3.9) 283 ( 3.3)	37 ( 2.5) 272 ( 1.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

Table 16 compares students' and teachers' responses to questions about the patterns of classroom instruction and materials for mathematics instruction.

TABLE 16 | Comparison of Students' and Teachers' Reports on Patterns of and Materials for Mathematics Instruction

PERCENTAGE OF STUDENTS

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southwest	Nation			
<b>Patterns of classroom instruction</b>						
<b>Percentage of students who work mathematics problems in small groups</b>						
At least once a week	18 ( 1.2)	33 ( 3.3)	26 ( 3.9)	44 ( 8.2)	28 ( 2.5)	50 ( 4.4)
Less than once a week	27 ( 1.5)	48 ( 4.0)	26 ( 2.2)	48 ( 8.3)	28 ( 1.4)	43 ( 4.1)
Never	55 ( 2.0)	18 ( 3.4)	49 ( 4.8)	7 ( 4.1)	44 ( 2.9)	8 ( 2.0)
<b>Percentage of students who use objects like rulers, counting blocks, or geometric solids</b>						
At least once a week	21 ( 1.5)	13 ( 3.3)	23 ( 3.4)	19 ( 8.2)	28 ( 1.8)	22 ( 3.7)
Less than once a week	35 ( 1.1)	79 ( 3.3)	29 ( 2.5)	65 (10.3)	31 ( 1.2)	69 ( 3.9)
Never	44 ( 2.0)	8 ( 1.5)	48 ( 4.5)	16 ( 8.1)	41 ( 2.2)	9 ( 2.6)
<b>Materials for mathematics instruction</b>						
<b>Percentage of students who use a mathematics textbook</b>						
Almost every day	81 ( 1.6)	80 ( 2.7)	78 ( 2.4)	75 ( 7.8)	74 ( 1.9)	62 ( 3.4)
Several times a week	13 ( 0.9)	19 ( 2.7)	14 ( 1.9)	22 ( 7.8)	14 ( 0.8)	31 ( 3.1)
About once a week or less	6 ( 0.9)	2 ( 0.6)	8 ( 2.7)	3 ( 2.8)	12 ( 1.8)	7 ( 1.8)
<b>Percentage of students who use a mathematics worksheet</b>						
At least several times a week	35 ( 2.5)	38 ( 3.2)	38 ( 4.3)	30 ( 6.6)	38 ( 2.4)	34 ( 3.8)
About once a week	27 ( 1.5)	29 ( 2.9)	32 ( 1.5)	44 ( 9.1)	25 ( 1.2)	33 ( 3.4)
Less than weekly	37 ( 2.5)	33 ( 3.3)	29 ( 3.9)	27 ( 8.6)	37 ( 2.5)	32 ( 3.6)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

**SUMMARY**

Because classroom instructional time is typically limited, teachers need to make the best possible use of what is known about effective instructional delivery practices and resources. It appears that mathematics textbooks and worksheets continue to play a major role in mathematics teaching. Although there is some evidence that other instructional resources and practices are emerging, they are not yet commonplace.

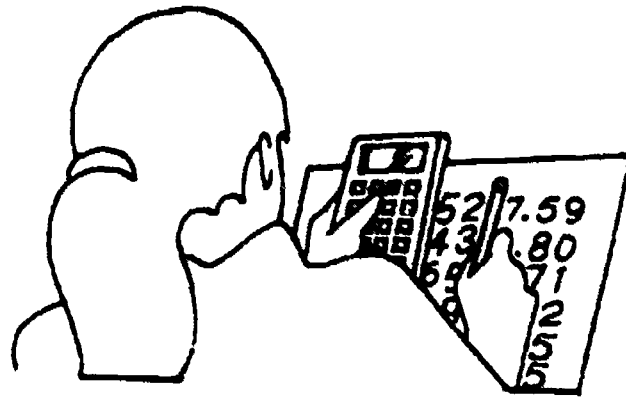
According to the students' mathematics teachers:

- Less than half of the students in Arkansas (33 percent) worked mathematics problems in small groups at least once a week; some never worked in small groups (18 percent).
- The largest percentage of the students (79 percent) used objects like rulers, counting blocks, or geometric shapes less than once a week, and relatively few never used such objects (8 percent).
- In Arkansas, 80 percent of the students were assigned problems from a mathematics textbook almost every day; 2 percent worked textbook problems about once a week or less.
- Less than half of the students (38 percent) did problems from worksheets at least several times a week; less than half did worksheet problems less than weekly (33 percent).

And, according to the students:

- In Arkansas, 55 percent of the students never worked mathematics problems in small groups; 18 percent of the students worked mathematics problems in small groups at least once a week.
- Less than half of the students in Arkansas (44 percent) never used mathematical objects; 21 percent used these objects at least once a week.
- Many of the students in Arkansas (81 percent) worked mathematics problems from textbooks almost every day, compared to 74 percent of students in the nation.
- Less than half of the students in Arkansas (35 percent) used worksheets at least several times a week, compared to 38 percent in the nation.





## CHAPTER 5

### How Are Calculators Used?

Although computation skills are vital, calculators -- and, to a lesser extent, computers -- have drastically changed the methods that can be used to perform calculations. Calculators are important tools for mathematics and students need to be able to use them wisely. The National Council of Teachers of Mathematics and many other educators believe that mathematics teachers should help students become proficient in the use of calculators to free them from time-consuming computations and to permit them to focus on more challenging tasks.<sup>5</sup> The increasing availability of affordable calculators should make it more likely and attractive for students and schools to acquire and use these devices.

Given the prevalence and potential importance of calculators, part of the Trial State Assessment focused on attitudes toward and uses of calculators. Teachers were asked to report the extent to which they encouraged or permitted calculator use for various activities in mathematics class and students were asked about the availability and use of calculators.

---

<sup>5</sup> National Assessment of Educational Progress, *Mathematics Objectives 1990 Assessment* (Princeton, NJ: Educational Testing Service, 1988).

National Council of Teachers of Mathematics, *Curriculum and Evaluation Standards for School Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1989).

## Arkansas

Table 17 provides a profile of Arkansas eighth-grade public schools' policies with regard to calculator use:

- In comparison to 33 percent across the nation, 13 percent of the students in Arkansas had teachers who allowed calculators to be used for tests.
- A smaller percentage of students in Arkansas than in the nation had teachers who permitted unrestricted use of calculators (9 percent and 18 percent, respectively).

**TABLE 17 | Teachers' Reports of Arkansas Policies on Calculator Use**

PERCENTAGE OF STUDENTS			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
Percentage of eighth-grade students in public schools whose teachers permit the <b>unrestricted use of calculators</b>	9 ( 1.7)	6 ( 3.1)	18 ( 3.4)
Percentage of eighth-grade students in public schools whose teachers permit the <b>use of calculators for tests</b>	13 ( 1.9)	15 ( 8.1)	33 ( 4.5)
Percentage of eighth-grade students in public schools whose teachers report that students have <b>access to calculators owned by the school</b>	35 ( 4.1)	56 (11.8)	56 ( 4.6)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

**THE AVAILABILITY OF CALCULATORS**

In Arkansas, most students or their families (96 percent) owned calculators (Table 18); however, fewer students (42 percent) had teachers who explained the use of calculators to them. From Table A18 in the Data Appendix:

- In Arkansas, 39 percent of White students, 49 percent of Black students, and 56 percent of Hispanic students had teachers who explained how to use them.
- Females were as likely as males to have the use of calculators explained to them (41 percent and 43 percent, respectively).

**TABLE 18** | **Students' Reports on Whether They Own a Calculator and Whether Their Teacher Explains How To Use One**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
Do you or your family own a calculator?	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Yes</b>	96 ( 0.5) 257 ( 0.9)	96 ( 1.2) 254 ( 2.4)	97 ( 0.4) 283 ( 1.3)
<b>No</b>	4 ( 0.5) 232 ( 2.6)	4 ( 1.2) *** ( ***)	3 ( 0.4) 234 ( 3.8)
Does your mathematics teacher explain how to use a calculator for mathematics problems?	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Yes</b>	42 ( 2.3) 251 ( 1.3)	46 ( 5.9) 250 ( 3.9)	49 ( 2.3) 258 ( 1.7)
<b>No</b>	58 ( 2.3) 259 ( 1.0)	54 ( 5.9) 256 ( 2.5)	51 ( 2.3) 266 ( 1.5)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

**THE USE OF CALCULATORS**

As previously noted, calculators can free students from tedious computations and allow them to concentrate instead on problem solving and other important skills and content. As part of the Trial State Assessment students were asked how frequently (never, sometimes, almost always) they used calculators for working problems in class, doing problems at home, and taking quizzes or tests. As reported in Table 19:

- In Arkansas, 25 percent of the students never used a calculator to work problems in class, while 50 percent almost always did.
- Some of the students (17 percent) never used a calculator to work problems at home, compared to 27 percent who almost always used one.
- Less than half of the students (33 percent) never used a calculator to take quizzes or tests, while 25 percent almost always did.

**TABLE 19 | Students' Reports on the Use of a Calculator for Problem Solving or Tests**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>How often do you use a calculator for the following tasks?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Working problems in class</b>			
Almost always	50 ( 1.1) 247 ( 1.0)	48 ( 3.0) 243 ( 2.8)	48 ( 1.5) 254 ( 1.5)
Never	25 ( 1.6) 269 ( 1.2)	26 ( 4.0) 266 ( 3.1)	23 ( 1.9) 272 ( 1.4)
<b>Doing problems at home</b>			
Almost always	27 ( 1.2) 252 ( 1.4)	29 ( 3.1) 252 ( 3.6)	30 ( 1.3) 261 ( 1.8)
Never	17 ( 1.0) 262 ( 1.5)	18 ( 1.8) 258 ( 4.4)	19 ( 0.9) 263 ( 1.8)
<b>Taking quizzes or tests</b>			
Almost always	25 ( 1.4) 244 ( 1.6)	31 ( 2.1) 240 ( 3.8)	27 ( 1.4) 253 ( 2.4)
Never	33 ( 1.4) 271 ( 1.0)	35 ( 3.1) 270 ( 3.1)	30 ( 2.0) 274 ( 1.3)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Sometimes" category is not included.

## WHEN TO USE A CALCULATOR

Part of the Trial State Assessment was designed to investigate whether students know when the use of a calculator is helpful and when it is not. There were seven sections of mathematics questions in the assessment; however, each student took only three of those sections. For two of the seven sections, students were given calculators to use. The test administrator provided the students with instructions and practice on how to use a calculator prior to the assessment. During the assessment, students were allowed to choose whether or not to use a calculator for each item in the calculator sections, and they were asked to indicate in their test booklets whether they did or did not use a calculator for each item.

Certain items in the calculator sections were defined as "calculator-active" items -- that is, items that required the student to use the calculator to determine the correct response. Certain other items were defined as "calculator-inactive" items -- items whose solution neither required nor suggested the use of a calculator. The remainder of the items were "calculator-neutral" items, for which the solution to the question did not require the use of a calculator.

In total, there were eight calculator-active items, 13 calculator-neutral items, and 17 calculator-inactive items across the two sections. However, because of the sampling methodology used as part of the Trial State Assessment, not every student took both sections. Some took both sections, some took only one section, and some took neither.

To examine the characteristics of students who generally knew when the use of the calculator was helpful and those who did not, the students who responded to one or both of the calculator sections were categorized into two groups:

- **High** -- students who used the calculator appropriately (i.e., used it for the calculator-active items and did not use it for the calculator-inactive items) at least 85 percent of the time and indicated that they had used the calculator for at least half of the calculator-active items they were presented.
- **Other** -- students who did not use the calculator appropriately at least 85 percent of the time or indicated that they had used the calculator for less than half of the calculator-active items they were presented.

## Arkansas

The data presented in Table 20 and Table A20 in the Data Appendix are highlighted below:

- A smaller percentage of students in Arkansas were in the High group than were in the Other group.
- A smaller percentage of males than females were in the High group.
- In addition, 46 percent of White students, 42 percent of Black students, and 29 percent of Hispanic students were in the High group.

**TABLE 20 | Students' Knowledge of Using Calculators**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<div style="border: 1px solid black; padding: 5px; display: inline-block;">                     "Calculator-use" group                 </div>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>High</b>	45 ( 1.1) 262 ( 1.2)	42 ( 2.4) 264 ( 2.9)	42 ( 1.3) 272 ( 1.6)
<b>Other</b>	55 ( 1.1) 250 ( 1.2)	58 ( 2.4) 247 ( 2.6)	58 ( 1.3) 255 ( 1.5)

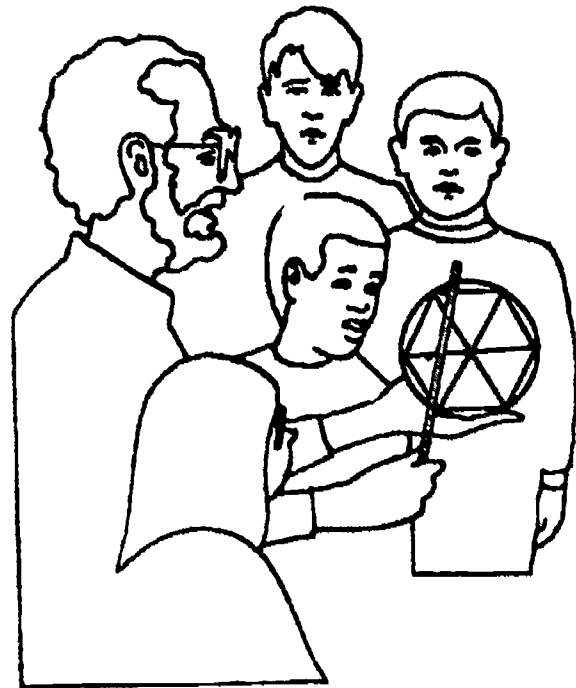
The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

### SUMMARY

Given the prevalence of inexpensive calculators, it may no longer be necessary or useful to devote large portions of instructional time to teaching students how to perform routine calculations by hand. Using calculators to replace this time-consuming process would create more instructional time for other mathematical skill topics, such as problem solving, to be emphasized.

The data related to calculators and their use show that:

- In comparison to 33 percent across the nation, 13 percent of the students in Arkansas had teachers who allowed calculators to be used for tests.
- A smaller percentage of students in Arkansas than in the nation had teachers who permitted unrestricted use of calculators (9 percent and 18 percent, respectively).
- In Arkansas, most students or their families (96 percent) owned calculators; however, fewer students (42 percent) had teachers who explained the use of calculators to them.
- In Arkansas, 25 percent of the students never used a calculator to work problems in class, while 50 percent almost always did.
- Some of the students (17 percent) never used a calculator to work problems at home, compared to 27 percent who almost always used one.
- Less than half of the students (33 percent) never used a calculator to take quizzes or tests, while 25 percent almost always did.



## CHAPTER 6

### Who Is Teaching Eighth-Grade Mathematics?

In recent years, accountability for educational outcomes has become an issue of increasing importance to federal, state, and local governments. As part of their effort to improve the educational process, policymakers have reexamined existing methods of educating and certifying teachers.<sup>9</sup> Many states have begun to raise teacher certification standards and strengthen teacher training programs. As shown in Table 21:

- In Arkansas, 34 percent of the students were being taught by mathematics teachers who reported having at least a master's or education specialist's degree. This compares to 44 percent for students across the nation.
- More than half of the students (57 percent) had mathematics teachers who had the highest level of teaching certification available. This is similar to the figure for the nation, where 66 percent of the students were taught by mathematics teachers who were certified at the highest level available in their states.
- Almost all of the students (94 percent) had mathematics teachers who had a mathematics (middle school or secondary) teaching certificate. This compares to 84 percent for the nation.

---

<sup>9</sup> National Council of Teachers of Mathematics, *Professional Standards for the Teaching of Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1991).



TABLE 21 | **Profile of Eighth-Grade Public-School Mathematics Teachers**

1990 NAEP TRIAL STATE ASSESSMENT	PERCENTAGE OF STUDENTS		
	Arkansas	Southeast	Nation
<b>Percentage of students whose mathematics teachers reported having the following degrees</b>	<b>Percentage</b>	<b>Percentage</b>	<b>Percentage</b>
Bachelor's degree	66 ( 3.9)	56 ( 8.2)	56 ( 4.2)
Master's or specialist's degree	34 ( 3.9)	39 ( 8.4)	42 ( 4.2)
Doctorate or professional degree	0 ( 0.1)	5 ( 5.1)	2 ( 1.4)
<b>Percentage of students whose mathematics teachers have the following types of teaching certificates that are recognized by Arkansas</b>			
No regular certification	2 ( 1.4)	5 ( 2.3)	4 ( 1.2)
Regular certification but less than the highest available	40 ( 4.2)	53 (10.4)	29 ( 4.3)
Highest certification available (permanent or long-term)	57 ( 4.3)	42 (10.7)	66 ( 4.3)
<b>Percentage of students whose mathematics teachers have the following types of teaching certificates that are recognized by Arkansas</b>			
Mathematics (middle school or secondary)	94 ( 2.0)	84 ( 5.1)	84 ( 2.2)
Education (elementary or middle school)	2 ( 1.1)	14 ( 4.6)	12 ( 2.6)
Other	4 ( 1.7)	2 ( 1.5)	4 ( 1.5)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within + 2 standard errors of the estimate for the sample.

## EDUCATIONAL BACKGROUND

Although mathematics teachers are held responsible for providing high-quality instruction to their students, there is a concern that many teachers have had limited exposure to content and concepts in the subject area. Accordingly, the Trial State Assessment gathered details on the teachers' educational backgrounds -- more specifically, their undergraduate and graduate majors and their in-service training.

Teachers' responses to questions concerning their undergraduate and graduate fields of study (Table 22) show that:

- In Arkansas, 51 percent of the eighth-grade public-school students were being taught mathematics by teachers who had an undergraduate major in mathematics. In comparison, 43 percent of the students across the nation had mathematics teachers with the same major.
- About one-quarter of the eighth-grade public-school students in Arkansas (27 percent) were taught mathematics by teachers who had a graduate major in mathematics. Across the nation, 22 percent of the students were taught by teachers who majored in mathematics in graduate school.

**TABLE 22 | Teachers' Reports on Their Undergraduate and Graduate Fields of Study**

	PERCENTAGE OF STUDENTS		
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
What was your undergraduate major?	<b>Percentage</b>	<b>Percentage</b>	<b>Percentage</b>
Mathematics	51 ( 4.7)	44 ( 9.0)	43 ( 3.9)
Education	35 ( 4.2)	43 ( 9.0)	35 ( 3.8)
Other	14 ( 3.1)	14 ( 8.5)	22 ( 3.3)
What was your graduate major?	<b>Percentage</b>	<b>Percentage</b>	<b>Percentage</b>
Mathematics	27 ( 3.5)	15 ( 5.4)	22 ( 3.4)
Education	24 ( 3.5)	43 ( 9.8)	38 ( 3.5)
Other or no graduate level study	49 ( 4.1)	41 ( 8.1)	40 ( 3.4)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

## Arkansas

Teachers' responses to questions concerning their in-service training for the year up to the Trial State Assessment (Table 23) show that:

- In Arkansas, 47 percent of the eighth-grade public-school students had teachers who spent at least 16 hours on in-service education dedicated to mathematics or the teaching of mathematics. Across the nation, 39 percent of the students had teachers who spent at least that much time on similar types of in-service training.
- Relatively few of the students in Arkansas (8 percent) had mathematics teachers who spent no time on in-service education devoted to mathematics or the teaching of mathematics. Nationally, 11 percent of the students had mathematics teachers who spent no time on similar in-service training.

**TABLE 23 | Teachers' Reports on Their In-Service Training**

PERCENTAGE OF STUDENTS			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <i>During the last year, how much time in total have you spent on in-service education in mathematics or the teaching of mathematics?</i> </div> <p>None One to 15 hours 16 hours or more</p>	<p>Percentage</p> <p>8 ( 2.5) 45 ( 4.1) 47 ( 3.8)</p>	<p>Percentage</p> <p>11 ( 6.0) 46 (12.0) 43 (10.1)</p>	<p>Percentage</p> <p>11 ( 2.1) 51 ( 4.1) 39 ( 3.8)</p>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

### SUMMARY

Recent results from international studies have shown that students from the United States do not compare favorably with students from other nations in mathematics and science achievement.<sup>10</sup> Further, results from NAEP assessments have indicated that students' achievement in mathematics and science is much lower than educators and the public would like it to be.<sup>11</sup> In curriculum areas requiring special attention and improvement, such as mathematics, it is particularly important to have well-qualified teachers. When performance differences across states and territories are described, variations in teacher qualifications and practices may point to areas worth further exploration. There is no guarantee that individuals with a specific set of credentials will be effective teachers; however, it is likely that relevant training and experience do contribute to better teaching.

The information about teachers' educational backgrounds and experience reveals that:

- In Arkansas, 34 percent of the assessed students were being taught by mathematics teachers who reported having at least a master's or education specialist's degree. This compares to 44 percent for students across the nation.
- More than half of the students (57 percent) had mathematics teachers who had the highest level of teaching certification available. This is similar to the figure for the nation, where 66 percent of students were taught by mathematics teachers who were certified at the highest level available in their states.
- In Arkansas, 51 percent of the eighth-grade public-school students were being taught mathematics by teachers who had an undergraduate major in mathematics. In comparison, 43 percent of the students across the nation had mathematics teachers with the same major.
- About one-quarter of the eighth-grade public-school students in Arkansas (27 percent) were taught mathematics by teachers who had a graduate major in mathematics. Across the nation, 22 percent of the students were taught by teachers who majored in mathematics in graduate school.

---

<sup>10</sup> Archie E. Lapointe, Nancy A. Mead, and Gary W. Phillips, *A World of Differences: An International Assessment of Mathematics and Science* (Princeton, NJ: Center for the Assessment of Educational Progress, Educational Testing Service, 1988).

<sup>11</sup> Ina V.S. Mullis, John A. Dossey, Eugene H. Owen, and Gary W. Phillips, *The State of Mathematics Achievement: NAEP's 1990 Assessment of the Nation and the Trial Assessment of the States* (Princeton, NJ: National Assessment of Educational Progress, Educational Testing Service, 1991).

## *Arkansas*

---

- In Arkansas, 47 percent of the eighth-grade public-school students had teachers who spent at least 16 hours on in-service education dedicated to mathematics or the teaching of mathematics. Across the nation, 39 percent of the students had teachers who spent at least that much time on similar types of in-service training.
- Relatively few of the students in Arkansas (8 percent) had mathematics teachers who spent no time on in-service education devoted to mathematics or the teaching of mathematics. Nationally, 11 percent of the students had mathematics teachers who spent no time on similar in-service training.



## CHAPTER 7

# The Conditions Beyond School that Facilitate Mathematics Learning and Teaching

Because students spend much more time out of school each day than they do in school, it is reasonable to expect that out-of-school factors greatly influence students' attitudes and behaviors in school. Parents and guardians can therefore play an important role in the education of their children. Family expectations, encouragement, and participation in student learning experiences are powerful influences. Together, teachers and parents can help build students' motivation to learn and can broaden their interest in mathematics and other subjects.

To examine the relationship between home environment and mathematics proficiency, students participating in the Trial State Assessment were asked a series of questions about themselves, their parents or guardians, and home factors related to education.

**AMOUNT OF READING MATERIALS IN THE HOME**

The number and types of reading and reference materials in the home may be an indicator of the value placed by parents on learning and schooling. Students participating in the Trial State Assessment were asked about the availability of newspapers, magazines, books, and an encyclopedia at home. Average mathematics proficiency associated with having zero to two, three, or four of these types of materials in the home is shown in Table 24 and Table A24 in the Data Appendix.

**TABLE 24 | Students' Reports on Types of Reading Materials in the Home**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<p><i>Does your family have, or receive on a regular basis, any of the following items: more than 25 books, an encyclopedia, newspapers, magazines?</i></p>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Zero to two types</b>	23 ( 0.7) 244 ( 1.3)	28 ( 2.3) 235 ( 3.4)	21 ( 1.0) 244 ( 2.0)
<b>Three types</b>	31 ( 1.0) 253 ( 1.4)	29 ( 2.4) 248 ( 4.4)	30 ( 1.0) 258 ( 1.7)
<b>Four types</b>	47 ( 1.2) 263 ( 1.2)	46 ( 2.7) 266 ( 2.8)	48 ( 1.3) 272 ( 1.5)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

The data for Arkansas reveal that:

- Students in Arkansas who had all four of these types of materials in the home showed higher mathematics proficiency than did students with zero to two types of materials. This is similar to the results for the nation, where students who had all four types of materials showed higher mathematics proficiency than did students who had zero to two types.

- A smaller percentage of Black and Hispanic students had all four types of these reading materials in their homes than did White students.
- A greater percentage of students attending schools in advantaged urban areas than in disadvantaged urban areas, extreme rural areas, or areas classified as "other" had all four types of these reading materials in their homes.

**HOURS OF TELEVISION WATCHED PER DAY**

Excessive television watching is generally seen as detracting from time spent on educational pursuits. Students participating in the Trial State Assessment were asked to report on the amount of television they watched each day (Table 25).

**TABLE 25 | Students' Reports on the Amount of Time Spent Watching Television Each Day**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>How much television do you usually watch each day?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>One hour or less</b>	8 ( 0.5) 255 ( 2.5)	12 ( 1.3) 282 ( 5.2)	12 ( 0.8) 289 ( 2.2)
<b>Two hours</b>	16 ( 0.8) 280 ( 1.9)	19 ( 2.1) 258 ( 4.2)	21 ( 0.9) 268 ( 1.8)
<b>Three hours</b>	22 ( 0.8) 281 ( 1.8)	22 ( 1.9) 258 ( 3.3)	22 ( 0.8) 285 ( 1.7)
<b>Four to five hours</b>	33 ( 1.1) 257 ( 0.9)	28 ( 1.8) 251 ( 3.6)	28 ( 1.1) 280 ( 1.7)
<b>Six hours or more</b>	20 ( 0.9) 245 ( 1.5)	18 ( 1.4) 236 ( 2.8)	16 ( 1.0) 245 ( 1.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.



From Table 25 and Table A25 in the Data Appendix:

- In Arkansas, average mathematics proficiency was lowest for students who spent six hours or more watching television each day.
- Relatively few of the eighth-grade public-school students in Arkansas (8 percent) watched one hour or less of television each day; 20 percent watched six hours or more.
- About the same percentage of males and females tended to watch six or more hours of television daily. Similarly, about the same percentage of males and females watched one hour or less per day.
- In addition, 16 percent of White students, 33 percent of Black students, and 22 percent of Hispanic students watched six hours or more of television each day. In comparison, 9 percent of White students, 6 percent of Black students, and 10 percent of Hispanic students tended to watch only an hour or less.

### STUDENT ABSENTEEISM

Excessive absenteeism may also be an obstacle to students' success in school. To examine the relationship of student absenteeism to mathematics proficiency, the students participating in the Trial State Assessment were asked to report on the number of days of school they missed during the one-month period preceding the assessment.

From Table 26 and Table A26 in the Data Appendix:

- In Arkansas, average mathematics proficiency was lowest for students who missed three or more days of school.
- Less than half of the students in Arkansas (42 percent) did not miss any school days in the month prior to the assessment, while 23 percent missed three days or more.
- In addition, 24 percent of White students, 20 percent of Black students, and 17 percent of Hispanic students missed three or more days of school.

## Arkansas

- Similarly, 32 percent of students attending schools in advantaged urban areas, 29 percent in schools in disadvantaged urban areas, 20 percent in schools in extreme rural areas, and 21 percent in schools in areas classified as "other" missed three or more days of school.

**TABLE 26 | Students' Reports on the Number of Days of School Missed**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
<i>How many days of school did you miss last month?</i>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>None</b>	42 ( 1.1) 260 ( 1.3)	46 ( 1.8) 253 ( 3.4)	45 ( 1.1) 265 ( 1.8)
<b>One or two days</b>	36 ( 1.0) 257 ( 1.2)	32 ( 1.7) 260 ( 2.6)	32 ( 0.9) 266 ( 1.5)
<b>Three days or more</b>	23 ( 1.0) 247 ( 1.8)	22 ( 1.5) 242 ( 3.7)	23 ( 1.1) 250 ( 1.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

### STUDENTS' PERCEPTIONS OF MATHEMATICS

According to the National Council of Teachers of Mathematics, learning mathematics should require students not only to master essential skills and concepts but also to develop confidence in their mathematical abilities and to value mathematics as a discipline.<sup>12</sup> Students were asked if they agreed or disagreed with five statements designed to elicit their perceptions of mathematics. These included statements about:

- **Personal experience** with mathematics, including students' enjoyment of mathematics and level of confidence in their mathematics abilities: *I like mathematics; I am good in mathematics.*
- **Value** of mathematics, including students' perceptions of its present utility and its expected relevance to future work and life requirements: *Almost all people use mathematics in their jobs; mathematics is not more for boys than for girls.*
- **The nature** of mathematics, including students' ability to identify the salient features of the discipline: *Mathematics is useful for solving everyday problems.*

A student "perception index" was developed to examine students' perceptions of and attitudes toward mathematics. For each of the five statements, students who responded "strongly agree" were given a value of 1 (indicating very positive attitudes about the subject), those who responded "agree" were given a value of 2, and those who responded "undecided," "disagree," or "strongly disagree" were given a value of 3. Each student's responses were averaged over the five statements. The students were then assigned a perception index according to whether they tended to strongly agree with the statements (an index of 1), tended to agree with the statements (an index of 2), or tended to be undecided, to disagree, or to strongly disagree with the statements (an index of 3).

Table 27 provides the data for the students' attitudes toward mathematics as defined by their perception index. The following results were observed for Arkansas:

- Average mathematics proficiency was highest for students who were in the "strongly agree" category and lowest for students who were in the "undecided, disagree, strongly disagree" category.
- About one-quarter of the students (28 percent) were in the "strongly agree" category (perception index of 1). This compares to 27 percent across the nation.
- About one-quarter of the students in Arkansas (24 percent), compared to 24 percent across the nation, were in the "undecided, disagree, or strongly disagree" category (perception index of 3).

---

<sup>12</sup> National Council of Teachers of Mathematics, *Curriculum and Evaluation Standards for School Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1989).

**TABLE 27 | Students' Perceptions of Mathematics**

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY			
1990 NAEP TRIAL STATE ASSESSMENT	Arkansas	Southeast	Nation
Student "perception index" groups	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>Strongly agree</b> ("perception index" of 1)	28 ( 1.0) 263 ( 1.4)	30 ( 2.7) 265 ( 3.7)	27 ( 1.3) 271 ( 1.9)
<b>Agree</b> ("perception index" of 2)	48 ( 1.2) 257 ( 1.2)	45 ( 2.1) 251 ( 3.4)	49 ( 1.0) 262 ( 1.7)
<b>Undecided, disagree, strongly disagree</b> ("perception index" of 3)	24 ( 0.9) 247 ( 1.2)	25 ( 3.0) 244 ( 2.7)	24 ( 1.2) 251 ( 1.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

### SUMMARY

Some out-of-school factors cannot be changed, but others can be altered in a positive way to influence a student's learning and motivation. Partnerships among students, parents, teachers, and the larger community can affect the educational environment in the home, resulting in more out-of-school reading and an increased value placed on educational achievement, among other desirable outcomes.

The data related to out-of-school factors show that:

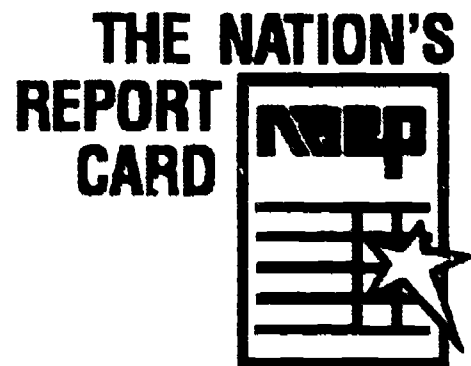
- Students in Arkansas who had four types of reading materials (an encyclopedia, newspapers, magazines, and more than 25 books) at home showed higher mathematics proficiency than did students with zero to two types of materials. This is similar to the results for the nation, where students who had all four types of materials showed higher mathematics proficiency than did students who had zero to two types.

014

## Arkansas

---

- Relatively few of the eighth-grade public-school students in Arkansas (8 percent) watched one hour or less of television each day; 20 percent watched six hours or more. Average mathematics proficiency was lowest for students who spent six hours or more watching television each day.
- Less than half of the students in Arkansas (42 percent) did not miss any school days in the month prior to the assessment, while 23 percent missed three days or more. Average mathematics proficiency was lowest for students who missed three or more days of school.
- About one-quarter of the students (28 percent) were in the "strongly agree" category relating to students' perceptions of mathematics. Average mathematics proficiency was highest for students who were in the "strongly agree" category and lowest for students who were in the "undecided, disagree, strongly disagree" category.



## PROCEDURAL APPENDIX

This appendix provides an overview of the technical details of the 1990 Trial State Assessment Program. It includes a discussion of the assessment design, the mathematics framework and objectives upon which the assessment was based, and the procedures used to analyze the results.

The objectives for the assessment were developed through a consensus process managed by the Council of Chief State School Officers, and the items were developed through a similar process managed by Educational Testing Service. The development of the Trial State Assessment Program benefitted from the involvement of hundreds of representatives from State Education Agencies who attended numerous NETWORK meetings, served on committees, reviewed the framework, objectives, and questions, and, in general, provided important suggestions on all aspects of the program.

### Assessment Design

The 1990 Trial State Assessment was based on a *focused balanced incomplete block (BIB) spiral matrix design* -- a design that enables broad coverage of mathematics content while minimizing the burden for any one student.

In total, 137 cognitive mathematics items were developed for the assessment, including 35 open-ended items. The first step in implementing the BIB design required dividing the entire set of mathematics items into seven units called *blocks*. Each block was designed to be completed in 15 minutes.

The blocks were then assembled into assessment booklets so that each booklet contained two background questionnaires -- the first consisting of general background questions and the second consisting of mathematics background questions -- and three blocks of cognitive mathematics items. Students were given five minutes to complete each of the background questionnaires and 45 minutes to complete the three 15-minute blocks of mathematics items. Thus, the entire assessment required approximately 55 minutes of student time.

In accordance with the BIB design, the blocks were assigned to the assessment booklets so that each block appeared in exactly three booklets and each block appeared with every other block in one booklet. Seven assessment booklets were used in the Trial State Assessment Program. The booklets were *spiraled* or interleaved in a systematic sequence so that each booklet appeared an appropriate number of times in the sample. The students within an assessment session were assigned booklets in the order in which the booklets were spiraled. Thus, students in any given session received a variety of different booklets and only a small number of students in the session received the same booklet.

### Assessment Content

The framework and objectives for the Trial State Assessment Program were developed using a broad-based consensus process, as described in the introduction to this report.<sup>1</sup> The assessment framework consisted of two dimensions: mathematical content areas and abilities. The five content areas assessed were Numbers and Operations; Measurement; Geometry; Data Analysis, Statistics, and Probability; and Algebra and Functions (see Figure A1). The three mathematical ability areas assessed were Conceptual Understanding, Procedural Knowledge, and Problem Solving (see Figure A2).

### Data Analysis and Scales

Once the assessments had been conducted and information from the assessment booklets had been compiled in a database, the assessment data were weighted to match known population proportions and adjusted for nonresponse. Analyses were then conducted to determine the percentages of students who gave various responses to each cognitive and background question.

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, each 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.

---

<sup>1</sup> National Assessment of Educational Progress, *Mathematics Objectives 1990 Assessment* (Princeton, NJ: Educational Testing Service, 1988).



**FIGURE A1 | Content Areas Assessed**

**Numbers and Operations**

This content area focuses on students' understanding of numbers (whole numbers, fractions, decimals, integers) and their application to real-world situations, as well as computational and estimation situations. Understanding numerical relationships as expressed in ratios, proportions, and percents is emphasized. Students' abilities in estimation, mental computation, use of calculators, generalization of numerical patterns, and verification of results are also included.

**Measurement**

This content area focuses on students' ability to describe real-world objects using numbers. Students are asked to identify attributes, select appropriate units, apply measurement concepts, and communicate measurement-related ideas to others. Questions are included that require an ability to read instruments using metric, customary, or nonstandard units, with emphasis on precision and accuracy. Questions requiring estimation, measurements, and applications of measurements of length, time, money, temperature, mass/weight, area, volume, capacity, and angles are also included in this content area.

**Geometry**

This content area focuses on students' knowledge of geometric figures and relationships and on their skills in working with this knowledge. These skills are important at all levels of schooling as well as in practical applications. Students need to be able to model and visualize geometric figures in one, two, and three dimensions and to communicate geometric ideas. In addition, students should be able to use informal reasoning to establish geometric relationships.

**Data Analysis, Statistics, and Probability**

This content area focuses on data representation and analysis across all disciplines and reflects the importance and prevalence of these activities in our society. Statistical knowledge and the ability to interpret data are necessary skills in the contemporary world. Questions emphasize appropriate methods for gathering data, the visual exploration of data, and the development and evaluation of arguments based on data analysis.

**Algebra and Functions**

This content area is broad in scope, covering algebraic and functional concepts in more informal, exploratory ways for the eighth-grade Trial State Assessment. Proficiency in this concept area requires both manipulative facility and conceptual understanding: it involves the ability to use algebra as a means of representation and algebraic processing as a problem-solving tool. Functions are viewed not only in terms of algebraic formulas, but also in terms of verbal descriptions, tables of values, and graphs.





**FIGURE A2 | Mathematical Abilities**

The following three categories of mathematical abilities are not to be construed as hierarchical. For example, problem solving involves interactions between conceptual knowledge and procedural skills, but what is considered complex problem solving at one grade level may be considered conceptual understanding or procedural knowledge at another.

**Conceptual Understanding**

Students demonstrate conceptual understanding in mathematics when they provide evidence that they can recognize, label, and generate examples and counterexamples of concepts; can use and interrelate models, diagrams, and varied representations of concepts; can identify and apply principles; know and can apply facts and definitions; can compare, contrast, and integrate related concepts and principles; can recognize, interpret, and apply the signs, symbols, and terms used to represent concepts; and can interpret the assumptions and relations involving concepts in mathematical settings. Such understandings are essential to performing procedures in a meaningful way and applying them in problem-solving situations.

**Procedural Knowledge**

Students demonstrate procedural knowledge in mathematics when they provide evidence of their ability to select and apply appropriate procedures correctly, verify and justify the correctness of a procedure using concrete models or symbolic methods, and 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 in an efficient manner. It also encompasses the abilities to read and produce graphs and tables, execute geometric constructions, and perform noncomputational skills such as rounding and ordering.

**Problem Solving**

In problem solving, students are required to use their reasoning and analytic abilities when they encounter new situations. Problem solving includes the ability 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, and proportional); and judge the reasonableness and correctness of solutions.

A scale ranging from 0 to 500 was created to report performance for each content area. Each content-area scale was based on the distribution of student performance across all three grades assessed in the 1990 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 area scales, where the weight for each content area was proportional to the relative importance assigned to the content area in the specifications developed by the Mathematics Objectives Panel.

### Scale Anchoring

Scale anchoring is a method for defining performance along a scale. Traditionally, performance on educational scales has been defined by norm-referencing -- that is, by comparing students at a particular scale level to other students. In contrast, the NAEP scale anchoring is accomplished by describing what students at selected levels know and can do.

The scale anchoring process for the 1990 Trial State Assessment began with the selection of four levels -- 200, 250, 300, and 350 -- on the 0-to-500 scale. Although proficiency levels below 200 and above 350 could theoretically have been defined, they were not because so few students performed at the extreme ends of the scale. Any attempts to define levels at the extremes would therefore have been highly speculative.

To define performance at each of the four levels on the scale, NAEP analyzed sets of mathematics items from the 1990 assessment that discriminated well between adjacent levels. The criteria for selecting these "benchmark" items were as follows:

- To define performance at level 200, items were chosen that were answered correctly by at least 65 percent of the students whose proficiency was at or near 200 on the scale.
- To define performance at each of the higher levels on the scale, items were chosen that were: a) answered correctly by at least 65 percent of students whose proficiency was at or near that level; *and* b) answered incorrectly by a majority (at least 50 percent) of the students performing at or near the next lower level.
- The percentage of students at a level who answered the item correctly had to be at least 30 points higher than the percentage of students at the next lower level who answered it correctly.

Once these empirically selected sets of questions had been identified, mathematics educators analyzed the questions and used their expert judgment to characterize the knowledge, skills, and understandings of students performing at each level. Each of the four proficiency levels was defined by describing the types of mathematics questions that most students attaining that proficiency level would be able to perform successfully. Figure 3 in Chapter 1 provides a summary of the levels and their characteristic skills. Example questions for each level are provided in Figure A3, together with data on the estimated proportion of students at or above each of the four proficiency levels who correctly answered each question.<sup>2</sup>

### Questionnaires for Teachers and Schools

As part of the Trial State Assessment, questionnaires were given to the mathematics teachers of assessed students and to the principal or other administrator in each participating school.

A Policy Analysis and Use Panel drafted a set of policy issues and guidelines and made recommendations concerning the design of these questionnaires. For the 1990 assessment, the teacher and school questionnaires focused on six educational areas: curriculum, instructional practices, teacher qualifications, educational standards and reform, school conditions, and conditions outside of the school that facilitate learning and instruction. Similar to the development of the materials given to students, the policy guidelines and the teacher and school questionnaires were prepared through an iterative process that involved extensive development, field testing, and review by external advisory groups.

### MATHEMATICS TEACHER QUESTIONNAIRE

The questionnaire for eighth-grade mathematics teachers consisted of two parts. The first requested information about the teacher, such as race/ethnicity and gender, as well as academic degrees held, teaching certification, training in mathematics, and ability to get instructional resources. In the second part, teachers were asked to provide information on each class they taught that included one or more students who participated in the Trial State Assessment Program. The information included, among other things, the amount of time spent on mathematics instruction and homework, the extent to which textbooks or worksheets were used, the instructional emphasis placed on different mathematical topics, and the use of various instructional approaches. Because of the nature of the sampling for the Trial State Assessment, the responses to the mathematics teacher questionnaire do not necessarily represent all eighth-grade mathematics teachers in a state or territory. Rather, they represent the teachers of the particular students being assessed.

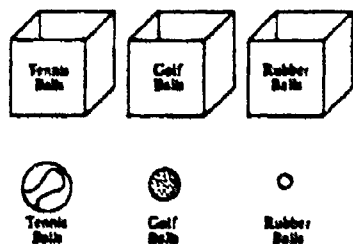
---

<sup>2</sup> Since there were insufficient numbers of eighth-grade questions at levels 200 and 350, one of the questions exemplifying level 200 is from the fourth-grade national assessment and one exemplifying level 350 is from the twelfth-grade national assessment.

FIGURE A3 | Example Items for Mathematics Proficiency Levels

**Level 200: Simple Additive Reasoning and Problem Solving with Whole Numbers**

**EXAMPLE 1**



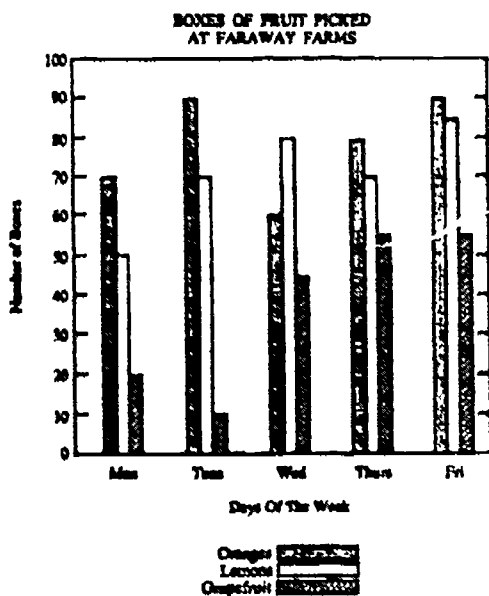
Grade 4  
 Overall Percentage Correct: 73%  
 Percentage Correct for Anchor Levels:  

200	250	300	350
65	91	100	—

7. Linda had three large boxes all the same size and three different kinds of balls as shown above. If she fills each box with the kind of balls shown, which box will have the fewest balls in it?

- Ⓐ The box with the tennis balls
- Ⓑ The box with the golf balls
- Ⓒ The box with the rubber balls
- Ⓓ You can't tell.

**EXAMPLE 2**



Grade 4  
 Overall Percentage Correct: 80%  
 Percentage Correct for Anchor Levels:  

200	250	300	350
75	91	100	—

Grade 8  
 Overall Percentage Correct: 89%  
 Percentage Correct for Anchor Levels:  

200	250	300	350
76	87	96	100

9. How many boxes of oranges were picked on Thursday?

- Ⓐ 55
- Ⓑ 60
- Ⓒ 70
- Ⓓ 80
- Ⓔ 90
- Ⓕ I don't know.

92

FIGURE A3 | Example Items for Mathematics Proficiency Levels  
(continued)

**Level 250: Simple Multiplicative Reasoning and Two-Step Problem Solving**

**EXAMPLE 1**

7. What is the value of  $n + 5$  when  $n = 3$ ?

Answer: \_\_\_\_\_

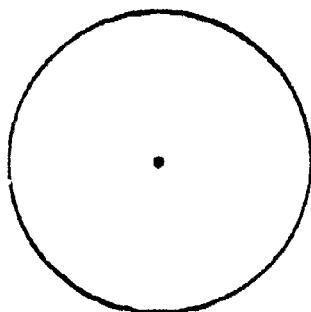
Grade 8  
Overall Percentage Correct: 76%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
28        60        95        98

**EXAMPLE 2**

HAIR COLOR SURVEY RESULTS

Color of Hair	Percentage
Blond	17
Brown	30
Black	33
Totals	100

The table above shows the results of a survey of hair color. On the circle below, make a circle graph to illustrate the data in the table. Label each part of the circle graph with the correct hair color.



Grade 8  
Overall Percentage Correct: 73%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
21        68        92        92

Did you use the calculator on this question?

Yes     No

**EXAMPLE 3**

6. Kathleen is packing baseballs into boxes. Each box holds 6 baseballs. She has 24 balls. Which number sentence will help her find out how many boxes she will need?

- Ⓐ  $24 - 6 = \square$
- Ⓑ  $24 + 6 = \square$
- Ⓒ  $24 \div 6 = \square$
- Ⓓ  $24 \times 6 = \square$
- Ⓔ I don't know.

Grade 8  
Overall Percentage Correct: 77%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
37        71        95        100

**FIGURE A3 | Example Items for Mathematics Proficiency Levels**  
(continued)

**Level 300: Reasoning and Problem Solving Involving Fractions, Decimals, Percents, Elementary Geometric Properties, and Simple Algebraic Manipulations**

**EXAMPLE 1**



10. Which of the following shows the result of flipping the above triangle over the line  $l$ ?

- (A)
- (B)
- (C)
- (D)
- (E)

Grade 8  
Overall Percentage Correct: 60%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
33        49        77        90

Grade 12  
Overall Percentage Correct: 75%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
—        46        79        95

**EXAMPLE 2**

In the model room that a class is building, a car 15 feet long is represented by a scale model 3 inches long. If the same scale is used, a house 35 feet high would be represented by a scale model how many inches high?

- (A)  $\frac{45}{15}$
- (B) 3
- (C) 5
- (D) 7
- (E)  $\frac{25}{3}$

Did you use the calculator on this question?

- Yes     No

Grade 8  
Overall Percentage Correct: 59%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
17        46        86        99

**FIGURE A3 | Example Items for Mathematics Proficiency Levels**  
(continued)

**Level 350: Reasoning and Problem Solving Involving Geometric Relationships, Algebraic Equations, and Beginning Statistics and Probability**

**EXAMPLE 1**

► Questions 16-17 refer to the following pattern of dot-figures.



16. If this pattern of dot-figures is continued, how many dots will be in the 100th figure?

- Ⓐ 100
- Ⓑ 101
- Ⓒ 199
- Ⓓ 200
- Ⓔ 201

Grade 8  
Overall Percentage Correct: 34%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
13       19       53       88

Grade 12  
Overall Percentage Correct: 49%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
—       22       48       90

**EXAMPLE 2**

17. Explain how you found your answer to question 16.

Answer: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Grade 8  
Overall Percentage Correct: 15%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
1       4       28       74

Grade 12  
Overall Percentage Correct: 27%  
Percentage Correct for Anchor Levels:  
200    250    300    350  
—       3       22       74

### SCHOOL CHARACTERISTICS AND POLICIES QUESTIONNAIRE

An extensive school questionnaire was completed by principals or other administrators in the schools participating in the Trial State Assessment. In addition to questions about the individuals who completed the questionnaires, there were questions about school policies, course offerings, and special priority areas, among other topics.

It is important to note that in this report, as in all NAEP reports, the student is always the unit of analysis, even when information from the teacher or school questionnaire is being reported. Having the student as the unit of analysis makes it possible to describe the instruction received by representative samples of eighth-grade students in public schools. Although this approach may provide a different perspective from that which would be obtained by simply collecting information from a sample of eighth-grade mathematics teachers or from a sample of schools, it is consistent with NAEP's goal of providing information about the educational context and performance of students.

### Estimating Variability

The statistics reported by NAEP (average proficiencies, percentages of students at or above particular scale-score levels, and percentages of students responding in certain ways to background questions) are *estimates* of the corresponding information for the population of eighth-grade students in public schools in a state. These estimates are based on the performance of a carefully selected, representative *sample* of eighth-grade public-school students from the state or territory.

If a different representative sample of students were selected and the assessment repeated, it is likely that the estimates might vary somewhat, and both of these sample estimates might differ somewhat from the value of the mean or percentage that would be obtained if every eighth-grade public-school student in the state or territory were assessed. Virtually all statistics that are based on samples (including those in NAEP) are subject to a certain degree of uncertainty. The uncertainty attributable to using samples of students is referred to as *sampling error*.

Like almost all estimates based on assessment measures, NAEP's total group and subgroup proficiency estimates are subject to a second source of uncertainty, in addition to sampling error. As previously noted, each student who participated in the Trial State Assessment was administered a subset of questions from the total set of questions. If each student had been administered a different, but equally appropriate, set of the assessment questions -- or the entire set of questions -- somewhat different estimates of total group and subgroup proficiency might have been obtained. Thus, a second source of uncertainty arises because each student was administered a subset of the total pool of questions.



In addition to reporting estimates of average proficiencies, proportions of students at or above particular scale-score levels, and proportions of students giving various responses to background questions, this report also provides estimates of the magnitude of the uncertainty associated with these statistics. These measures of the uncertainty are called *standard errors* and are given in parentheses in each of the tables in the report. The standard errors of the estimates of mathematics proficiency statistics reflect both sources of uncertainty discussed above. The standard errors of the other statistics (such as the proportion of students answering a background question in a certain way or the proportion of students in certain racial/ethnic groups) reflect only sampling error. NAEP uses a methodology called the jackknife procedure to estimate these standard errors.

## Drawing Inferences from the Results

One of the goals of the Trial State Assessment Program is to make inferences about the overall population of eighth-grade students in public schools in each participating state and territory based on the particular sample of students assessed. One uses the results from the sample -- taking into account the uncertainty associated with all samples -- to make inferences about the population.

The use of *confidence intervals*, based on the standard errors, provides a way to make inferences about the population means and proportions in a manner that reflects the uncertainty associated with the sample estimates. An estimated sample mean proficiency  $\pm 2$  standard errors represents a *95 percent confidence interval* for the corresponding population quantity. This means that with approximately 95 percent certainty, the average performance of the entire population of interest (e.g., all eighth-grade students in public schools in a state or territory) is within  $\pm 2$  standard errors of the sample mean.

As an example, suppose that the average mathematics proficiency of the students in a particular state's sample were 256 with a standard error of 1.2. A 95 percent confidence interval for the population quantity would be as follows:

$$\begin{aligned} \text{Mean} \pm 2 \text{ standard errors} &= 256 \pm 2 \cdot (1.2) = 256 \pm 2.4 = \\ &256 - 2.4 \text{ and } 256 + 2.4 = 253.6, 258.4 \end{aligned}$$

Thus, one can conclude with 95 percent certainty that the average proficiency for the entire population of eighth-grade students in public schools in that state is between 253.6 and 258.4.

Similar confidence intervals can be constructed for percentages, *provided that the percentages are not extremely large (greater than 90 percent) or extremely small (less than 10 percent)*. For extreme percentages, confidence intervals constructed in the above manner may not be appropriate and procedures for obtaining accurate confidence intervals are quite complicated.

## Analyzing Subgroup Differences in Proficiencies and Proportions

In addition to the overall results, this report presents outcomes separately for a variety of important subgroups. Many of these subgroups are defined by shared characteristics of students, such as their gender, race/ethnicity, and the type of community in which their school is located. Other subgroups are defined by students' responses to background questions such as *About how much time do you usually spend each day on mathematics homework?* Still other subgroups are defined by the responses of the assessed students' mathematics teachers to questions in the mathematics teacher questionnaire.

As an example, one might be interested in answering the question: *Do students who reported spending 45 minutes or more doing mathematics homework each day exhibit higher average mathematics proficiency than students who reported spending 15 minutes or less?*

To answer the question posed above, one begins by comparing the average mathematics proficiency for the two groups being analyzed. If the mean for the group who reported spending 45 minutes or more on mathematics homework is higher, one may be tempted to conclude that that group does have higher achievement than the group who reported spending 15 minutes or less on homework. However, even though the means differ, there may be no real difference in performance between the two groups in the population because of the uncertainty associated with the estimated average proficiency of the groups in the sample. Remember that the intent is to make a statement about the entire population, not about the particular sample that was assessed. The data from the sample are used to make inferences about the population as a whole.

As discussed in the previous section, each estimated sample mean proficiency (or proportion) has a degree of uncertainty associated with it. It is therefore possible that if all students in the population had been assessed, rather than a sample of students, or if the assessment had been repeated with a different sample of students or a different, but equivalent, set of questions, the performances of various groups would have been different. Thus, to determine whether there is a *real* difference between the mean proficiency (or proportion of a certain attribute) for two groups in the population, one must obtain an estimate of the degree of uncertainty associated with the difference between the proficiency means or proportions of those groups for the sample. This estimate of the degree of uncertainty -- called *the standard error of the difference* between the groups -- is obtained by taking the square of each group's standard error, summing these squared standard errors, and then taking the square root of this sum.

Similar to the manner in which the standard error for an individual group mean or proportion is used, the *standard error of the difference* can be used to help determine whether differences between groups in the population are real. The difference between the mean proficiency or proportion of the two groups  $\pm 2$  *standard errors of the difference* represents an approximate 95 percent confidence interval. If the resulting interval includes zero, one should conclude that there is insufficient evidence to claim a real difference between groups in the population. If the interval does not contain zero, the difference between groups is *statistically significant* (different) at the .05 level.

## Arkansas

As an example, suppose that one were interested in determining whether the average mathematics proficiency of eighth-grade females is higher than that of eighth-grade males in a particular state's public schools. Suppose that the sample estimates of the mean proficiencies and standard errors for females and males were as follows:

Group	Average Proficiency	Standard Error
Female	259	2.0
Male	255	2.1

The difference between the estimates of the mean proficiencies of females and males is four points (259 - 255). The standard error of this difference is

$$\sqrt{2.0^2 + 2.1^2} = 2.9$$

Thus, an approximate 95 percent confidence interval for this difference is

Mean difference  $\pm$  2 standard errors of the difference =

$$4 \pm 2 \cdot (2.9) = 4 \pm 5.8 = 4 - 5.8 \text{ and } 4 + 5.8 = -1.8, 9.8$$

The value zero is within this confidence interval, which extends from -1.8 to 9.8 (i.e., zero is between -1.8 and 9.8). Thus, one should conclude that there is insufficient evidence to claim a difference in average mathematics proficiency between the population of eighth-grade females and males in public schools in the state.<sup>3</sup>

Throughout this report, when the mean proficiency or proportions for two groups were compared, procedures like the one described above were used to draw the conclusions that are presented. If a statement appears in the report indicating that a particular group had *higher (or lower)* average proficiency than a second group, the 95 percent confidence interval for the difference between groups did not contain zero. When a statement indicates that the average proficiency or proportion of some attribute was *about the same* for two groups, the confidence interval included zero, and thus no difference could be assumed between the groups. The reader is cautioned to avoid drawing conclusions solely on the basis of the magnitude of the differences. A difference between two groups in the sample that appears to be slight may represent a statistically significant difference in the population because of the magnitude of the standard errors. Conversely, a difference that appears to be large may not be statistically significant.

<sup>3</sup> The procedure described above (especially the estimation of the standard error of the difference) is, in a strict sense, only appropriate when the statistics being compared come from independent samples. For certain comparisons in the report, the groups were not independent. In those cases, a different (and more appropriate) estimate of the *standard error of the difference* was used.

The procedures described in this section, and the certainty ascribed to intervals (e.g., a 95 percent confidence interval), are based on statistical theory that assumes that only one confidence interval or test of statistical significance is being performed. However, in each chapter of this report, many different groups are being compared (i.e., multiple sets of confidence intervals are being analyzed). When one considers sets of confidence intervals, statistical theory indicates that the certainty associated with the entire set of intervals is less than that attributable to each individual comparison from the set. If one wants to hold the certainty level for the set of comparisons at a particular level (e.g., .95), adjustments (called multiple comparison procedures) must be made to the methods described in the previous section. One such procedure -- the *Bonferroni method* -- was used in the analyses described in this report to form confidence intervals for the differences between groups whenever sets of comparisons were considered. Thus, the confidence intervals in the text that are based on sets of comparisons are more conservative than those described on the previous pages. A more detailed description of the use of the Bonferroni procedure appears in the Trial State Assessment technical report.

### Statistics with Poorly Determined Standard Errors

The standard errors for means and proportions reported by NAEP are statistics and therefore are subject to a certain degree of uncertainty. In certain cases, typically when the standard error is based on a small number of students, or when the group of students is enrolled in a small number of schools, the amount of uncertainty associated with the standard errors may be quite large. Throughout this report, estimates of standard errors subject to a large degree of uncertainty are followed by the symbol "!". In such cases, the standard errors -- and any confidence intervals or significance tests involving these standard errors -- should be interpreted cautiously. Further details concerning procedures for identifying such standard errors are discussed in the Trial State Assessment technical report.

### Minimum Subgroup Sample Sizes

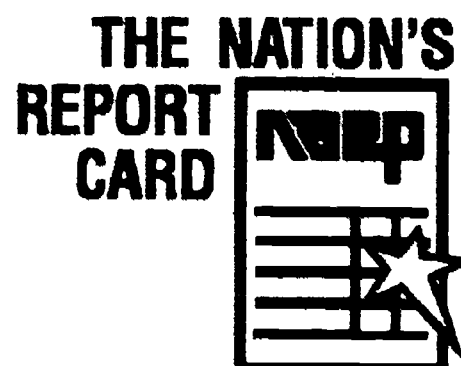
Results for mathematics proficiency and background variables were tabulated and reported for groups defined by race/ethnicity and type of school community, as well as by gender and parents' education level. NAEP collects data for five racial/ethnic subgroups (White, Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaskan Native) and four types of communities (Advantaged Urban, Disadvantaged Urban, Extreme Rural, and Other Communities). However, in many states or territories, and for some regions of the country, the number of students in some of these groups was not sufficiently high to permit accurate estimation of proficiency and/or background variable results. As a result, data are not provided for the subgroups with very small sample sizes. For results to be reported for any subgroup, a minimum sample size of 62 students was required. This number was determined by computing the sample size required to detect an effect size of .2 with a probability of .8 or greater.

The effect size of .2 pertains to the *true* difference between the average proficiency of the subgroup in question and the average proficiency for the total eighth-grade public-school population in the state or territory, divided by the standard deviation of the proficiency in the total population. If the *true* difference between subgroup and total group mean is .2 total-group standard deviation units, then a sample size of at least 62 is required to detect such a difference with a probability of .8. Further details about the procedure for determining minimum sample size appear in the Trial State Assessment technical report.

### **Describing the Size of Percentages**

Some of the percentages reported in the text of the report are given quantitative descriptions. For example, the number of students being taught by teachers with master's degrees in mathematics 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 descriptive phrases used in the report and the rules used to select them are shown below.

Percentage	Description of Text in Report
$p = 0$	None
$0 < p \leq 10$	Relatively few
$10 < p \leq 20$	Some
$20 < p \leq 30$	About one-quarter
$30 < p \leq 44$	Less than half
$44 < p \leq 55$	About half
$55 < p \leq 69$	More than half
$69 < p \leq 79$	About three-quarters
$79 < p \leq 89$	Many
$89 < p < 100$	Almost all
$p = 100$	All



## DATA APPENDIX

For each of the tables in the main body of the report that presents mathematics proficiency results, this appendix contains corresponding data for each level of the four reporting subpopulations -- race/ethnicity, type of community, parents' education level, and gender.

# Arkansas

**TABLE A5 | Students' Reports on the Mathematics Class They Are Taking**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Eighth-grade Mathematics	Pre-algebra	Algebra
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	72 ( 2.2) 248 ( 1.0)	18 ( 1.9) 270 ( 2.3)	10 ( 1.1) 289 ( 2.4)
Nation	62 ( 2.1) 251 ( 1.4)	19 ( 1.9) 272 ( 2.4)	15 ( 1.2) 298 ( 2.4)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	69 ( 2.5) 257 ( 1.0)	17 ( 2.1) 275 ( 2.7)	12 ( 1.2) 295 ( 1.8)
Nation	59 ( 2.5) 259 ( 1.8)	21 ( 2.4) 277 ( 2.2)	17 ( 1.5) 300 ( 2.3)
<b>Black</b>			
State	77 ( 3.3) 225 ( 1.4)	12 ( 2.9) 247 ( 2.4) <sup>!</sup>	7 ( 2.1) *** ( ***)
Nation	72 ( 4.7) 232 ( 3.4)	16 ( 3.0) 246 ( 6.4)	9 ( 2.2) *** ( ***)
<b>Hispanic</b>			
State	85 ( 3.9) 228 ( 3.2)	8 ( 3.4) *** ( ***)	3 ( 1.5) *** ( ***)
Nation	75 ( 4.4) 240 ( 2.4)	13 ( 3.9) *** ( ***)	6 ( 1.5) *** ( ***)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	63 ( 9.5) 258 ( 6.2) <sup>!</sup>	13 ( 8.7) *** ( ***)	20 ( 8.3) *** ( ***)
Nation	55 ( 9.4) 269 ( 2.5) <sup>!</sup>	22 ( 7.9) *** ( ***)	21 ( 4.4) *** ( ***)
<b>Disadvantaged urban</b>			
State	69 ( 4.2) 229 ( 7.1) <sup>!</sup>	20 ( 3.7) *** ( ***)	10 ( 3.0) *** ( ***)
Nation	65 ( 6.0) 240 ( 4.0) <sup>!</sup>	16 ( 4.1) *** ( ***)	14 ( 3.3) 287 ( 4.2) <sup>!</sup>
<b>Extreme rural</b>			
State	81 ( 5.6) 251 ( 1.8)	12 ( 4.0) 268 ( 6.1) <sup>!</sup>	5 ( 2.4) *** ( ***)
Nation	74 ( 4.5) 249 ( 3.1) <sup>!</sup>	14 ( 5.0) *** ( ***)	7 ( 2.2) *** ( ***)
<b>Other</b>			
State	69 ( 2.3) 249 ( 1.3)	17 ( 2.2) 272 ( 2.9)	12 ( 1.6) 288 ( 3.1)
Nation	61 ( 2.2) 251 ( 2.0)	20 ( 2.1) 272 ( 2.8)	16 ( 1.4) 294 ( 2.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because a small number of students reported taking other mathematics courses. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A5 | Students' Reports on the Mathematics Class  
(continued) | They Are Taking

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Eighth-grade Mathematics	Pre-algebra	Algebra
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	72 ( 2.2)	16 ( 1.9)	10 ( 1.1)
Nation	248 ( 1.0)	270 ( 2.3)	289 ( 2.4)
	62 ( 2.1)	19 ( 1.9)	15 ( 1.2)
	251 ( 1.4)	272 ( 2.4)	296 ( 2.4)
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	86 ( 2.7)	9 ( 2.4)	3 ( 1.0)
Nation	242 ( 1.6)	*** ( ***)	*** ( ***)
	77 ( 3.7)	13 ( 3.4)	3 ( 1.1)
	241 ( 2.1)	*** ( ***)	*** ( ***)
<b>HS graduate</b>			
State	78 ( 2.5)	13 ( 2.3)	6 ( 1.3)
Nation	245 ( 1.2)	265 ( 3.3)	*** ( ***)
	70 ( 2.6)	18 ( 2.4)	8 ( 1.1)
	249 ( 1.9)	266 ( 3.5)	277 ( 5.2)
<b>Some college</b>			
State	68 ( 3.2)	21 ( 3.0)	10 ( 1.5)
Nation	258 ( 1.8)	277 ( 3.3)	*** ( ***)
	60 ( 3.1)	21 ( 2.9)	15 ( 1.9)
	257 ( 2.1)	276 ( 2.8)	295 ( 3.2)
<b>College graduate</b>			
State	59 ( 2.8)	19 ( 2.1)	19 ( 2.0)
Nation	255 ( 1.6)	272 ( 2.8)	296 ( 2.1)
	53 ( 2.7)	21 ( 2.3)	24 ( 1.7)
	259 ( 1.5)	278 ( 2.8)	303 ( 2.3)
<b>GENDER</b>			
<b>Male</b>			
State	72 ( 2.1)	15 ( 1.9)	10 ( 1.1)
Nation	250 ( 1.3)	271 ( 2.9)	292 ( 3.2)
	63 ( 2.1)	18 ( 1.8)	15 ( 1.2)
	252 ( 1.6)	275 ( 2.9)	299 ( 2.5)
<b>Female</b>			
State	72 ( 2.6)	16 ( 2.1)	10 ( 1.5)
Nation	247 ( 1.2)	269 ( 2.4)	287 ( 2.4)
	61 ( 2.6)	20 ( 2.3)	15 ( 1.7)
	251 ( 1.5)	266 ( 3.0)	293 ( 2.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because a small number of students reported taking other mathematics courses. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



Arkansas

TABLE A6 Teachers' Reports on the Amount of Time Students Spent on Mathematics Homework Each Day

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	None	15 Minutes	30 Minutes	45 Minutes	An Hour or More
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>					
State	1 ( 0.3) *** ( ***)	34 ( 3.4)	54 ( 3.4)	10 ( 2.6)	1 ( 0.5) *** ( ***)
Nation	1 ( 0.3) *** ( ***)	43 ( 4.2)	43 ( 4.3)	10 ( 1.9)	4 ( 0.9) 278 ( 5.1)!
		258 ( 2.3)	266 ( 2.6)	272 ( 5.7)!	
<b>RACE/ETHNICITY</b>					
<b>White</b>					
State	1 ( 0.2) *** ( ***)	33 ( 3.8)	54 ( 3.5)	10 ( 2.5)	2 ( 0.6) *** ( ***)
Nation	1 ( 0.3) *** ( ***)	39 ( 4.5)	45 ( 5.1)	11 ( 2.4)	4 ( 0.9) 279 ( 5.8)!
		266 ( 2.2)	276 ( 2.7)	277 ( 7.8)!	
<b>Black</b>					
State	2 ( 0.9) *** ( ***)	34 ( 4.8)	51 ( 5.8)	12 ( 5.4)	1 ( 0.3) *** ( ***)
Nation	1 ( 0.7) *** ( ***)	55 ( 7.8)	40 ( 6.7)	3 ( 1.2)	2 ( 0.8) *** ( ***)
		232 ( 3.1)	248 ( 5.3)	*** ( ***)	
<b>Hispanic</b>					
State	3 ( 1.1) *** ( ***)	32 ( 7.2)	54 ( 7.1)	10 ( 6.5)	0 ( 0.0) *** ( ***)
Nation	1 ( 0.8) *** ( ***)	46 ( 7.8)	34 ( 6.8)	13 ( 2.9)	7 ( 2.1) *** ( ***)
		245 ( 3.0)!	251 ( 4.2)!	*** ( ***)	
<b>TYPE OF COMMUNITY</b>					
<b>Advantaged urban</b>					
State	8 ( 4.8) *** ( ***)	20 ( 6.6)	59 (11.0)	6 ( 6.2)	7 ( 4.8) *** ( ***)
Nation	1 ( 0.9) *** ( ***)	61 (11.3)	32 ( 8.6)	5 ( 3.4)	0 ( 0.0) *** ( ***)
		273 ( 3.1)!	*** ( ***)	*** ( ***)	
<b>Disadvantaged urban</b>					
State	0 ( 0.0) *** ( ***)	44 (14.5)	52 (13.7)	5 ( 2.7)	0 ( 0.0) *** ( ***)
Nation	0 ( 0.0) *** ( ***)	233 ( 2.8)!	244 (13.1)!	12 ( 5.9)	10 ( 6.2) *** ( ***)
		41 (12.6)	36 ( 9.4)	*** ( ***)	
		236 ( 2.1)!	253 ( 9.0)!		
<b>Extreme rural</b>					
State	0 ( 0.0) *** ( ***)	32 ( 7.4)	51 ( 8.3)	15 ( 8.8)	2 ( 1.8) *** ( ***)
Nation	0 ( 0.0) *** ( ***)	254 ( 5.4)!	257 ( 2.9)!	251 ( 8.5)!	10 ( 7.3) *** ( ***)
		68 (14.9)	14 (10.9)	8 ( 5.6)	
		253 ( 5.4)!	*** ( ***)	*** ( ***)	
<b>Other</b>					
State	1 ( 0.3) *** ( ***)	34 ( 4.5)	55 ( 4.4)	9 ( 2.5)	1 ( 0.4) *** ( ***)
Nation	1 ( 0.4) *** ( ***)	256 ( 2.5)	258 ( 1.6)	266 ( 5.2)!	4 ( 1.1) 282 (11.6)!
		37 ( 4.3)	49 ( 5.1)	10 ( 2.4)	
		256 ( 3.1)	265 ( 2.5)	276 ( 8.6)!	

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A6  
(continued)

**Teachers' Reports on the Amount of Time  
Students Spent on Mathematics Homework  
Each Day**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	None	15 Minutes	30 Minutes	45 Minutes	An Hour or More
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>					
State	1 ( 0.3) *** ( ***)	34 ( 3.4) 253 ( 2.1)	54 ( 3.4) 258 ( 1.2)	10 ( 2.6) 261 ( 4.2)!	1 ( 0.5) *** ( ***)
Nation	1 ( 0.3) *** ( ***)	43 ( 4.2) 258 ( 2.3)	43 ( 4.3) 266 ( 2.6)	10 ( 1.9) 272 ( 5.7)!	4 ( 0.9) 278 ( 5.4)!
<b><u>PARENTS' EDUCATION</u></b>					
<b>HS non-graduate</b>					
State	1 ( 0.6) *** ( ***)	35 ( 4.9) 248 ( 3.6)	53 ( 5.1) 245 ( 2.0)	11 ( 4.2) *** ( ***)	1 ( 0.7) *** ( ***)
Nation	1 ( 0.8) *** ( ***)	49 ( 6.3) 240 ( 2.8)	40 ( 6.1) 246 ( 3.7)	6 ( 1.7) *** ( ***)	4 ( 1.3) *** ( ***)
<b>HS graduate</b>					
State	1 ( 0.4) *** ( ***)	36 ( 3.9) 247 ( 2.9)	51 ( 3.5) 250 ( 1.6)	11 ( 3.3) 253 ( 3.2)!	0 ( 0.4) *** ( ***)
Nation	1 ( 0.5) *** ( ***)	43 ( 5.2) 249 ( 3.1)	44 ( 5.8) 258 ( 2.7)	9 ( 3.1) *** ( ***)	3 ( 1.0) *** ( ***)
<b>Some college</b>					
State	1 ( 0.6) *** ( ***)	33 ( 4.3) 262 ( 2.9)	54 ( 4.0) 268 ( 1.8)	11 ( 3.4) *** ( ***)	1 ( 0.4) *** ( ***)
Nation	1 ( 0.9) *** ( ***)	44 ( 5.4) 265 ( 2.6)	43 ( 5.8) 270 ( 3.8)	7 ( 2.1) *** ( ***)	4 ( 1.0) *** ( ***)
<b>College graduate</b>					
State	1 ( 0.2) *** ( ***)	31 ( 3.3) 262 ( 2.4)	57 ( 3.6) 268 ( 1.7)	10 ( 2.2) 273 ( 5.6)!	2 ( 0.8) *** ( ***)
Nation	0 ( 0.3) *** ( ***)	40 ( 4.7) 265 ( 2.5)	44 ( 4.1) 277 ( 3.0)	11 ( 2.3) 287 ( 6.1)!	5 ( 1.3) *** ( ***)
<b><u>GENDER</u></b>					
<b>Male</b>					
State	1 ( 0.3) *** ( ***)	35 ( 3.7) 254 ( 2.1)	53 ( 3.5) 260 ( 1.6)	10 ( 2.6) 261 ( 5.8)!	1 ( 0.5) *** ( ***)
Nation	1 ( 0.3) *** ( ***)	44 ( 4.4) 257 ( 2.9)	43 ( 4.3) 268 ( 2.9)	9 ( 1.9) 273 ( 7.3)!	5 ( 1.3) 279 ( 7.7)!
<b>Female</b>					
State	1 ( 0.5) *** ( ***)	32 ( 3.6) 252 ( 2.5)	54 ( 3.6) 256 ( 1.6)	11 ( 2.9) 261 ( 3.5)!	2 ( 0.6) *** ( ***)
Nation	1 ( 0.4) *** ( ***)	41 ( 4.4) 255 ( 2.1)	43 ( 4.7) 264 ( 2.8)	11 ( 2.0) 272 ( 5.7)!	4 ( 0.9) *** ( ***)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

# Arkansas

**TABLE A7 | Students' Reports on the Amount of Time They Spent on Mathematics Homework Each Day**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	None	15 Minutes	30 Minutes	45 Minutes	An Hour or More
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>					
State	9 ( 0.8)	28 ( 1.1)	33 ( 1.0)	18 ( 0.8)	14 ( 0.8)
Nation	9 ( 0.8)	31 ( 2.0)	32 ( 1.2)	16 ( 1.0)	12 ( 1.1)
	250 ( 2.5)	259 ( 1.3)	258 ( 1.2)	252 ( 1.8)	253 ( 1.8)
	251 ( 2.8)	264 ( 1.9)	263 ( 1.9)	266 ( 1.9)	258 ( 3.1)
<b>RACE/ETHNICITY</b>					
<b>White</b>					
State	10 ( 1.0)	29 ( 1.3)	32 ( 1.2)	15 ( 1.0)	13 ( 0.9)
Nation	10 ( 1.0)	33 ( 2.4)	32 ( 1.3)	15 ( 0.9)	11 ( 1.3)
	256 ( 2.7)	268 ( 1.1)	267 ( 1.2)	263 ( 1.9)	262 ( 2.0)
	258 ( 3.4)	270 ( 1.9)	270 ( 2.1)	277 ( 2.2)	268 ( 3.3)
<b>Black</b>					
State	7 ( 1.1)	25 ( 2.3)	33 ( 2.1)	19 ( 1.5)	16 ( 1.7)
Nation	7 ( 1.5)	26 ( 2.5)	33 ( 2.7)	18 ( 2.3)	16 ( 1.9)
	*** ( ***)	230 ( 2.9)	231 ( 1.5)	230 ( 2.3)	231 ( 3.0)
	*** ( ***)	241 ( 3.8)	237 ( 3.5)	240 ( 3.6)	232 ( 3.7)
<b>Hispanic</b>					
State	3 ( 1.9)	21 ( 3.7)	41 ( 4.8)	22 ( 4.1)	12 ( 3.5)
Nation	12 ( 1.8)	27 ( 3.0)	30 ( 2.6)	17 ( 2.1)	14 ( 1.7)
	*** ( ***)	246 ( 3.6)	248 ( 3.4)	241 ( 4.3)	*** ( ***)
<b>TYPE OF COMMUNITY</b>					
<b>Advantaged urban</b>					
State	12 ( 3.4)	37 ( 4.6)	28 ( 4.7)	14 ( 2.9)	9 ( 0.9)
Nation	8 ( 2.5)	41 ( 12.5)	31 ( 6.6)	12 ( 3.3)	7 ( 3.4)
	*** ( ***)	278 ( 3.0) <sup>!</sup>	280 ( 4.6) <sup>!</sup>	*** ( ***)	*** ( ***)
<b>Disadvantaged urban</b>					
State	14 ( 2.2)	25 ( 3.8)	28 ( 4.5)	13 ( 2.0)	20 ( 2.7)
Nation	12 ( 3.7)	24 ( 3.3)	31 ( 3.0)	20 ( 1.9)	14 ( 2.2)
	*** ( ***)	253 ( 4.9) <sup>!</sup>	247 ( 4.7) <sup>!</sup>	250 ( 4.8) <sup>!</sup>	*** ( ***)
<b>Extreme rural</b>					
State	8 ( 1.7)	24 ( 1.9)	36 ( 2.7)	17 ( 1.8)	15 ( 1.6)
Nation	8 ( 2.3)	36 ( 4.6)	31 ( 2.9)	18 ( 3.8)	7 ( 2.7)
	*** ( ***)	260 ( 3.5) <sup>!</sup>	255 ( 5.1) <sup>!</sup>	*** ( ***)	*** ( ***)
<b>Other</b>					
State	9 ( 1.1)	29 ( 1.4)	32 ( 1.2)	17 ( 0.9)	13 ( 1.0)
Nation	9 ( 1.0)	30 ( 1.8)	32 ( 1.3)	15 ( 1.1)	13 ( 1.1)
	254 ( 3.3)	260 ( 1.6)	259 ( 1.3)	252 ( 2.3)	255 ( 2.6)
	250 ( 3.8)	263 ( 2.3)	264 ( 2.3)	267 ( 2.1)	258 ( 3.6)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

*Arkansas*

**TABLE A7** | **Students' Reports on the Amount of Time They Spent on Mathematics Homework Each Day**  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	None	15 Minutes	30 Minutes	45 Minutes	An Hour or More
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>					
State	9 ( 0.8)	28 ( 1.1)	33 ( 1.0)	16 ( 0.8)	14 ( 0.8)
Nation	250 ( 2.5)	259 ( 1.3)	258 ( 1.2)	252 ( 1.8)	253 ( 1.8)
	9 ( 0.8)	31 ( 2.0)	32 ( 1.2)	16 ( 1.0)	12 ( 1.1)
	251 ( 2.8)	264 ( 1.9)	263 ( 1.9)	266 ( 1.9)	258 ( 3.1)
<b><u>PARENTS' EDUCATION</u></b>					
<b>HS non-graduate</b>					
State	11 ( 1.7)	30 ( 2.8)	28 ( 2.8)	19 ( 2.3)	12 ( 2.2)
Nation	*** ( ***)	246 ( 2.9)	248 ( 3.0)	*** ( ***)	*** ( ***)
	17 ( 3.0)	26 ( 3.3)	34 ( 4.4)	12 ( 2.5)	10 ( 2.2)
	*** ( ***)	246 ( 4.0)	246 ( 2.6)	*** ( ***)	*** ( ***)
<b>HS graduate</b>					
State	9 ( 1.1)	28 ( 1.4)	34 ( 1.4)	14 ( 1.1)	15 ( 1.2)
Nation	240 ( 3.3)	254 ( 1.7)	250 ( 1.7)	243 ( 3.0)	249 ( 2.4)
	10 ( 1.7)	33 ( 2.2)	31 ( 1.9)	16 ( 1.4)	11 ( 1.5)
	246 ( 4.2)	259 ( 3.2)	254 ( 2.4)	256 ( 2.8)	244 ( 3.4)
<b>Some college</b>					
State	9 ( 1.6)	27 ( 2.6)	33 ( 2.5)	18 ( 1.8)	13 ( 1.6)
Nation	*** ( ***)	269 ( 2.7)	268 ( 2.5)	261 ( 2.8)	*** ( ***)
	9 ( 1.2)	30 ( 2.7)	36 ( 2.1)	14 ( 1.8)	11 ( 1.5)
	*** ( ***)	266 ( 3.0)	266 ( 2.6)	274 ( 3.5)	*** ( ***)
<b>College graduate</b>					
State	8 ( 1.0)	27 ( 1.8)	33 ( 1.6)	17 ( 1.2)	15 ( 1.2)
Nation	266 ( 3.9)	269 ( 1.8)	267 ( 1.9)	265 ( 2.6)	262 ( 3.4)
	7 ( 0.9)	31 ( 3.4)	31 ( 2.0)	18 ( 1.2)	14 ( 1.9)
	265 ( 3.6)	275 ( 2.0)	275 ( 2.5)	278 ( 3.2)	271 ( 2.8)
<b><u>GENDER</u></b>					
<b>Male</b>					
State	11 ( 1.2)	30 ( 1.4)	30 ( 1.4)	16 ( 1.0)	13 ( 1.0)
Nation	250 ( 3.5)	262 ( 1.8)	259 ( 1.7)	253 ( 2.6)	253 ( 2.2)
	11 ( 1.1)	34 ( 2.4)	29 ( 1.3)	15 ( 1.2)	11 ( 1.4)
	255 ( 3.9)	264 ( 2.8)	266 ( 2.4)	265 ( 3.0)	258 ( 4.1)
<b>Female</b>					
State	7 ( 0.8)	28 ( 1.5)	36 ( 1.5)	17 ( 1.1)	15 ( 1.2)
Nation	251 ( 3.5)	256 ( 1.8)	256 ( 1.4)	252 ( 2.5)	253 ( 2.7)
	7 ( 0.9)	28 ( 2.0)	35 ( 1.7)	17 ( 1.0)	13 ( 1.3)
	246 ( 4.1)	263 ( 1.5)	260 ( 2.0)	267 ( 2.4)	258 ( 3.3)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

# Arkansas

**TABLE A8 | Teachers' Reports on the Emphasis Given To Specific Mathematics Content Areas**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Numbers and Operations		Measurement		Geometry	
	Heavy Emphasis	Little or No Emphasis	Heavy Emphasis	Little or No Emphasis	Heavy Emphasis	Little or No Emphasis
<b>TOTAL</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
State	60 ( 3.3)	8 ( 1.1)	17 ( 2.7)	24 ( 2.9)	15 ( 2.5)	27 ( 2.9)
Nation	259 ( 1.2)	288 ( 4.7)	246 ( 3.4)	267 ( 3.1)	254 ( 2.7)	256 ( 1.9)
	49 ( 3.8)	15 ( 2.1)	17 ( 3.0)	33 ( 4.0)	22 ( 3.8)	21 ( 3.3)
	260 ( 1.8)	287 ( 3.4)	250 ( 5.8)	272 ( 4.0)	260 ( 3.2)	264 ( 5.4)
<b>RACE/ETHNICITY</b>						
<b>White</b>						
State	61 ( 3.3)	8 ( 1.2)	16 ( 3.0)	25 ( 3.2)	15 ( 2.8)	28 ( 3.2)
Nation	266 ( 1.2)	295 ( 3.6)	259 ( 3.1)	275 ( 2.9)	266 ( 2.9)	264 ( 2.9)
	48 ( 3.7)	16 ( 2.4)	14 ( 3.4)	36 ( 4.7)	27 ( 4.4)	22 ( 3.4)
	267 ( 2.2)	289 ( 3.5)	259 ( 6.9)	277 ( 4.3)	265 ( 3.3)	273 ( 5.8)
<b>Black</b>						
State	57 ( 8.2)	5 ( 2.2)	19 ( 3.9)	19 ( 4.1)	18 ( 3.5)	24 ( 3.8)
Nation	237 ( 2.4)	*** ( ***)	217 ( 4.9)	233 ( 5.2)	224 ( 4.4)	228 ( 3.0)
	54 ( 7.3)	11 ( 3.3)	25 ( 7.4)	23 ( 5.7)	33 ( 7.9)	24 ( 7.9)
	243 ( 4.3)	*** ( ***)	228 ( 2.8)	238 ( 8.1)	242 ( 5.6)	233 ( 4.7)
<b>Hispanic</b>						
State	67 ( 7.0)	5 ( 2.3)	20 ( 4.5)	15 ( 3.6)	18 ( 5.5)	19 ( 4.6)
Nation	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	47 ( 8.7)	8 ( 2.2)	23 ( 4.1)	34 ( 5.8)	27 ( 6.8)	18 ( 5.5)
	246 ( 4.6)	*** ( ***)	*** ( ***)	255 ( 4.4)	*** ( ***)	*** ( ***)
<b>TYPE OF COMMUNITY</b>						
<b>Advantaged urban</b>						
State	66 (12.3)	13 (10.5)	21 ( 6.7)	35 (13.7)	24 ( 9.4)	44 (14.4)
Nation	270 ( 5.0)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	28 (13.0)	16 ( 4.2)	9 ( 7.0)	40 ( 8.5)	38 ( 9.4)	13 ( 3.2)
	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	267 ( 4.9)	*** ( ***)
<b>Disadvantaged urban</b>						
State	56 (12.9)	4 ( 3.5)	24 ( 8.1)	23 ( 7.3)	17 ( 5.6)	32 (15.7)
Nation	244 ( 5.8)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	48 (12.1)	9 ( 4.0)	39 (10.3)	21 ( 6.5)	33 (11.8)	18 ( 7.8)
	255 ( 6.3)	*** ( ***)	238 ( 8.4)	*** ( ***)	248 ( 8.2)	*** ( ***)
<b>Extreme rural</b>						
State	66 ( 9.0)	2 ( 1.4)	5 ( 2.8)	13 ( 6.1)	11 ( 5.7)	11 ( 5.2)
Nation	262 ( 2.5)	*** ( ***)	*** ( ***)	273 ( 6.5)	*** ( ***)	259 ( 4.5)
	53 (12.4)	6 ( 3.6)	6 ( 4.9)	32 (11.7)	9 ( 6.1)	16 ( 7.9)
	257 ( 7.1)	*** ( ***)	*** ( ***)	265 ( 9.1)	*** ( ***)	*** ( ***)
<b>Other</b>						
State	59 ( 3.5)	10 ( 1.5)	21 ( 4.2)	26 ( 3.9)	16 ( 3.2)	31 ( 3.8)
Nation	259 ( 1.5)	289 ( 5.7)	244 ( 3.7)	266 ( 3.9)	252 ( 3.4)	255 ( 2.6)
	52 ( 4.1)	16 ( 2.7)	16 ( 3.9)	34 ( 5.3)	28 ( 4.8)	24 ( 4.3)
	260 ( 2.3)	286 ( 3.6)	253 ( 7.1)	270 ( 4.6)	260 ( 3.9)	265 ( 5.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Moderate emphasis" category is not included. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

100

# Arkansas

**TABLE A8 | Teachers' Reports on the Emphasis Given to Specific Mathematics Content Areas**  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Numbers and Operations		Measurement		Geometry	
	Heavy Emphasis	Little or No Emphasis	Heavy Emphasis	Little or No Emphasis	Heavy Emphasis	Little or No Emphasis
<b>TOTAL</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
State	60 ( 3.3)	8 ( 1.1)	17 ( 2.7)	24 ( 2.9)	16 ( 2.5)	27 ( 2.9)
Nation	259 ( 1.2)	288 ( 4.7)	246 ( 3.4)	267 ( 3.1)	254 ( 2.7)	256 ( 1.9)
	49 ( 3.8)	15 ( 2.1)	17 ( 3.0)	33 ( 4.0)	28 ( 3.8)	21 ( 3.3)
	260 ( 1.8)	287 ( 3.4)	250 ( 5.8)	272 ( 4.0)	260 ( 3.2)	264 ( 5.4)
<b>PARENTS' EDUCATION</b>						
<b>HS non-graduate</b>						
State	63 ( 5.5)	5 ( 1.4)	18 ( 3.5)	14 ( 3.4)	18 ( 3.9)	20 ( 3.4)
Nation	253 ( 2.3)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	244 ( 4.8)
	60 ( 6.9)	7 ( 2.3)	22 ( 5.3)	25 ( 5.3)	32 ( 6.3)	20 ( 6.7)
	251 ( 3.4)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
<b>HS graduate</b>						
State	62 ( 4.0)	4 ( 1.0)	19 ( 3.6)	21 ( 3.4)	16 ( 2.8)	25 ( 3.5)
Nation	254 ( 1.7)	*** ( ***)	239 ( 4.5)	255 ( 3.2)	242 ( 4.1)	245 ( 2.4)
	55 ( 4.8)	11 ( 2.8)	17 ( 3.9)	27 ( 5.0)	27 ( 4.5)	24 ( 5.1)
	259 ( 2.9)	*** ( ***)	251 ( 6.1)	253 ( 4.7)	255 ( 4.2)	246 ( 4.8)
<b>Some college</b>						
State	59 ( 3.3)	6 ( 1.3)	13 ( 3.0)	25 ( 3.8)	14 ( 3.0)	31 ( 4.3)
Nation	287 ( 2.2)	*** ( ***)	*** ( ***)	276 ( 4.7)	*** ( ***)	268 ( 3.1)
	47 ( 4.4)	17 ( 3.3)	12 ( 2.7)	39 ( 5.5)	27 ( 5.0)	23 ( 4.1)
	265 ( 2.6)	284 ( 4.1)	*** ( ***)	279 ( 4.5)	262 ( 4.8)	270 ( 4.7)
<b>College graduate</b>						
State	57 ( 3.5)	14 ( 1.9)	15 ( 2.2)	30 ( 3.7)	15 ( 2.5)	30 ( 3.2)
Nation	268 ( 1.7)	295 ( 4.0)	257 ( 4.5)	278 ( 3.6)	268 ( 4.5)	268 ( 2.9)
	44 ( 4.1)	19 ( 2.4)	16 ( 3.3)	37 ( 3.8)	26 ( 3.4)	21 ( 2.9)
	269 ( 2.6)	298 ( 3.4)	264 ( 7.2)	283 ( 3.8)	270 ( 3.8)	280 ( 6.4)
<b>GENDER</b>						
<b>Male</b>						
State	60 ( 3.5)	8 ( 1.3)	17 ( 3.0)	25 ( 3.1)	14 ( 2.2)	29 ( 3.2)
Nation	260 ( 1.6)	290 ( 6.3)	251 ( 3.7)	269 ( 4.3)	259 ( 4.4)	257 ( 2.3)
	48 ( 4.1)	14 ( 2.1)	17 ( 3.3)	32 ( 3.9)	29 ( 4.1)	20 ( 3.3)
	261 ( 2.5)	287 ( 4.4)	258 ( 6.7)	275 ( 4.8)	263 ( 3.8)	266 ( 6.8)
<b>Female</b>						
State	60 ( 3.5)	7 ( 1.2)	16 ( 2.6)	22 ( 2.9)	17 ( 3.0)	25 ( 2.9)
Nation	259 ( 1.3)	286 ( 4.6)	241 ( 3.8)	264 ( 3.4)	249 ( 3.4)	255 ( 2.4)
	51 ( 3.9)	15 ( 2.4)	17 ( 3.2)	35 ( 4.3)	27 ( 3.9)	23 ( 3.5)
	260 ( 2.0)	286 ( 3.3)	241 ( 5.4)	268 ( 4.1)	256 ( 3.3)	263 ( 5.0)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Moderate emphasis" category is not included. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

# Arkansas

**TABLE A8 | Teachers' Reports on the Emphasis Given To Specific Mathematics Content Areas**  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Data Analysis, Statistics, and Probability		Algebra and Functions	
	Heavy Emphasis	Little or No Emphasis	Heavy Emphasis	Little or No Emphasis
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>				
State	9 ( 2.3) 259 ( 5.1) <sup>!</sup>	63 ( 3.9) 253 ( 1.9)	33 ( 2.8) 273 ( 2.1)	30 ( 3.7) 240 ( 1.9)
Nation	14 ( 2.2) 269 ( 4.3)	53 ( 4.4) 261 ( 2.9)	46 ( 3.6) 275 ( 2.5)	20 ( 3.0) 243 ( 3.0)
<b><u>RACE/ETHNICITY</u></b>				
<b>White</b>				
State	10 ( 2.8) 268 ( 4.0) <sup>!</sup>	61 ( 4.3) 266 ( 1.8)	35 ( 3.4) 260 ( 2.1)	27 ( 3.7) 249 ( 2.0)
Nation	14 ( 2.4) 276 ( 4.1)	53 ( 5.0) 271 ( 3.1)	48 ( 4.2) 281 ( 3.0)	18 ( 2.8) 251 ( 3.3)
<b>Black</b>				
State	6 ( 2.4) *** ( ***)	73 ( 5.7) 222 ( 2.2)	28 ( 3.5) 248 ( 4.9)	39 ( 6.4) 224 ( 3.0)
Nation	14 ( 3.4) *** ( ***)	53 ( 8.2) 225 ( 4.3)	39 ( 7.1) 253 ( 6.3)	27 ( 8.9) 226 ( 2.2) <sup>!</sup>
<b>Hispanic</b>				
State	13 ( 5.4) *** ( ***)	63 ( 5.8) *** ( ***)	21 ( 4.9) *** ( ***)	34 ( 8.8) *** ( ***)
Nation	15 ( 4.1) *** ( ***)	56 ( 6.3) 246 ( 4.4)	46 ( 5.9) 257 ( 4.0) <sup>!</sup>	18 ( 4.2) *** ( ***)
<b><u>TYPE OF COMMUNITY</u></b>				
<b>Advantaged urban</b>				
State	7 ( 4.9) *** ( ***)	70 (12.8) 273 (13.2) <sup>!</sup>	40 (13.0) *** ( ***)	26 ( 7.7) *** ( ***)
Nation	11 ( 6.6) *** ( ***)	65 (19.4) 284 ( 7.4) <sup>!</sup>	41 ( 8.9) 296 ( 7.9) <sup>!</sup>	18 ( 5.3) *** ( ***)
<b>Disadvantaged urban</b>				
State	4 ( 2.1) *** ( ***)	57 (13.8) 238 (10.7) <sup>!</sup>	27 ( 9.5) *** ( ***)	38 (16.0) *** ( ***)
Nation	19 ( 9.4) *** ( ***)	34 (11.4) 236 ( 8.2) <sup>!</sup>	53 (11.8) 254 ( 6.3) <sup>!</sup>	20 ( 9.4) *** ( ***)
<b>Extreme rural</b>				
State	21 ( 8.1) 262 ( 5.0) <sup>!</sup>	54 (11.3) 249 ( 5.2) <sup>!</sup>	27 ( 7.6) 266 ( 4.4) <sup>!</sup>	32 (10.0) 244 ( 4.1) <sup>!</sup>
Nation	5 ( 5.4) *** ( ***)	65 (16.9) 254 ( 6.7) <sup>!</sup>	33 ( 8.1) *** ( ***)	42 (16.0) 241 ( 5.9) <sup>!</sup>
<b>Other</b>				
State	6 ( 1.7) 252 (10.1) <sup>!</sup>	67 ( 4.3) 254 ( 1.9)	35 ( 3.1) 275 ( 2.7)	30 ( 3.7) 240 ( 2.3)
Nation	15 ( 2.9) 267 ( 4.7)	53 ( 5.2) 260 ( 3.4)	47 ( 4.3) 276 ( 2.8)	17 ( 3.3) 245 ( 4.4) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Moderate emphasis" category is not included. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. <sup>\*\*\*</sup> Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A8 | Teachers' Reports on the Emphasis Given To  
(continued) | Specific Mathematics Content Areas

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Data Analysis, Statistics, and Probability		Algebra and Functions	
	Heavy Emphasis	Little or No Emphasis	Heavy Emphasis	Little or No Emphasis
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>				
State	9 ( 2.3) 259 ( 5.1) <sup>!</sup>	63 ( 3.9) 253 ( 1.9)	33 ( 2.8) 273 ( 2.1)	30 ( 3.7) 240 ( 1.9)
Nation	14 ( 2.2) 269 ( 4.3)	53 ( 4.4) 261 ( 2.9)	46 ( 3.6) 275 ( 2.5)	20 ( 3.0) 243 ( 3.0)
<b>PARENTS' EDUCATION</b>				
<b>HS non-graduate</b>				
State	13 ( 4.3) *** ( ***)	56 ( 5.0) 239 ( 4.0)	21 ( 3.3) 256 ( 6.0)	34 ( 5.3) 233 ( 3.3)
Nation	9 ( 3.0) *** ( ***)	53 ( 7.7) 240 ( 6.2)	28 ( 5.2) *** ( ***)	29 ( 6.9) *** ( ***)
<b>HS graduate</b>				
State	10 ( 2.5) 247 ( 6.6) <sup>!</sup>	84 ( 4.3) 245 ( 2.5)	27 ( 3.5) 264 ( 2.6)	34 ( 4.5) 237 ( 2.4)
Nation	17 ( 3.7) 261 ( 6.0) <sup>!</sup>	54 ( 5.4) 247 ( 2.9)	44 ( 4.8) 265 ( 3.5)	23 ( 3.9) 239 ( 3.4)
<b>Some college</b>				
State	10 ( 3.1) *** ( ***)	63 ( 5.2) 264 ( 3.0)	34 ( 3.9) 281 ( 2.8)	28 ( 4.6) 251 ( 3.6)
Nation	13 ( 2.5) *** ( ***)	57 ( 5.8) 270 ( 3.7)	48 ( 4.8) 278 ( 3.0)	17 ( 3.1) *** ( ***)
<b>College graduate</b>				
State	7 ( 1.9) *** ( ***)	65 ( 3.8) 265 ( 2.5)	43 ( 2.8) 282 ( 1.8)	25 ( 3.0) 245 ( 3.0)
Nation	15 ( 2.4) 282 ( 4.5)	53 ( 4.4) 275 ( 3.8)	50 ( 3.9) 288 ( 3.0)	18 ( 2.4) 249 ( 4.0)
<b>GENDER</b>				
<b>Male</b>				
State	9 ( 2.4) 260 ( 5.7) <sup>!</sup>	63 ( 4.1) 254 ( 2.0)	34 ( 3.0) 273 ( 2.6)	30 ( 3.7) 238 ( 2.2)
Nation	13 ( 2.2) 275 ( 5.8)	54 ( 4.7) 260 ( 3.5)	44 ( 4.1) 276 ( 3.2)	22 ( 3.6) 243 ( 3.0)
<b>Female</b>				
State	10 ( 2.5) 258 ( 5.5) <sup>!</sup>	64 ( 4.1) 253 ( 2.4)	32 ( 3.0) 272 ( 2.5)	31 ( 4.1) 241 ( 2.4)
Nation	16 ( 2.4) 263 ( 4.4)	53 ( 4.5) 262 ( 2.8)	48 ( 3.6) 274 ( 2.7)	18 ( 2.9) 244 ( 3.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Moderate emphasis" category is not included. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



**TABLE A9 | Teachers' Reports on the Availability of Resources**

 PERCENTAGE OF STUDENTS AND  
 AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	I Get All the Resources I Need	I Get Most of the Resources I Need	I Get Some or None of the Resources I Need
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b>TOTAL</b>			
State	19 ( 3.1)	40 ( 3.9)	41 ( 4.1)
Nation	254 ( 3.0)	261 ( 1.9)	253 ( 1.5)
	13 ( 2.4)	56 ( 4.0)	31 ( 4.2)
	265 ( 4.2)	265 ( 2.0)	261 ( 2.9)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	19 ( 3.5)	41 ( 4.3)	40 ( 4.5)
Nation	262 ( 2.0)	270 ( 1.5)	262 ( 1.3)
	11 ( 2.5)	58 ( 4.6)	30 ( 4.6)
	275 ( 3.5) <sup>!</sup>	270 ( 2.3)	267 ( 3.3)
<b>Black</b>			
State	17 ( 5.3)	37 ( 6.6)	46 ( 6.7)
Nation	229 ( 3.4) <sup>!</sup>	233 ( 2.1) <sup>!</sup>	229 ( 1.5)
	15 ( 4.2)	52 ( 6.6)	33 ( 7.2)
	241 ( 5.3) <sup>!</sup>	242 ( 2.4)	236 ( 4.9)
<b>Hispanic</b>			
State	29 ( 6.0)	39 ( 5.6)	32 ( 4.8)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	23 ( 7.6)	44 ( 4.9)	34 ( 7.7)
	246 ( 7.7) <sup>!</sup>	250 ( 2.9)	244 ( 3.0) <sup>!</sup>
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	24 (10.5)	51 ( 7.8)	25 (10.3)
Nation	*** ( ***)	275 ( 7.4) <sup>!</sup>	*** ( ***)
	38 ( 9.2)	59 ( 8.9)	3 ( 3.1)
	272 ( 8.5) <sup>!</sup>	286 ( 1.3) <sup>!</sup>	*** ( ***)
<b>Disadvantaged urban</b>			
State	28 (13.5)	23 ( 7.9)	50 (14.3)
Nation	*** ( ***)	*** ( ***)	240 (11.7) <sup>!</sup>
	10 ( 6.8)	40 (13.1)	50 (14.5)
	*** ( ***)	251 ( 5.4) <sup>!</sup>	253 ( 5.5) <sup>!</sup>
<b>Extreme rural</b>			
State	23 ( 9.7)	39 (12.0)	39 (11.4)
Nation	249 ( 4.1) <sup>!</sup>	259 ( 4.3) <sup>!</sup>	253 ( 3.1) <sup>!</sup>
	2 ( 2.6)	54 (10.4)	43 (10.3)
	*** ( ***)	260 ( 8.8) <sup>!</sup>	257 ( 5.0) <sup>!</sup>
<b>Other</b>			
State	17 ( 4.7)	42 ( 5.0)	41 ( 5.0)
Nation	259 ( 2.7) <sup>!</sup>	261 ( 2.3)	254 ( 1.9)
	11 ( 2.9)	58 ( 5.4)	31 ( 5.6)
	265 ( 3.9) <sup>!</sup>	264 ( 2.1)	263 ( 4.2)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

10

# Arkansas

**TABLE A9 Teachers' Reports on the Availability of Resources**  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	I Get All the Resources I Need	I Get Most of the Resources I Need	I Get Some or None of the Resources I Need
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	19 ( 3.1) 254 ( 3.0)	40 ( 3.9) 261 ( 1.9)	41 ( 4.1) 253 ( 1.5)
Nation	13 ( 2.4) 265 ( 4.2)	58 ( 4.0) 265 ( 2.0)	31 ( 4.2) 261 ( 2.9)
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	23 ( 4.5) *** ( ***)	34 ( 4.6) 246 ( 2.9)	43 ( 5.3) 244 ( 2.5)
Nation	8 ( 2.6) *** ( ***)	54 ( 5.7) 244 ( 2.7)	38 ( 6.3) 243 ( 3.5)!
<b>HS graduate</b>			
State	19 ( 3.4) 248 ( 2.8)	37 ( 4.4) 252 ( 2.3)	44 ( 4.9) 247 ( 1.8)
Nation	10 ( 2.5) 253 ( 4.8)!	54 ( 4.9) 256 ( 1.9)	35 ( 4.9) 256 ( 2.8)
<b>Some college</b>			
State	18 ( 3.9) 264 ( 4.3)!	43 ( 5.3) 270 ( 2.7)	39 ( 5.0) 264 ( 1.9)
Nation	13 ( 3.3) *** ( ***)	62 ( 4.3) 269 ( 2.5)	25 ( 4.1) 267 ( 3.8)
<b>College graduate</b>			
State	17 ( 3.2) 268 ( 3.6)	44 ( 3.9) 271 ( 2.3)	39 ( 3.9) 261 ( 2.1)
Nation	15 ( 2.9) 276 ( 5.4)!	56 ( 4.9) 276 ( 2.2)	30 ( 5.1) 273 ( 3.7)
<b>GENDER</b>			
<b>Male</b>			
State	18 ( 3.0) 256 ( 3.7)	40 ( 4.2) 262 ( 2.3)	42 ( 4.3) 255 ( 1.5)
Nation	13 ( 2.6) 264 ( 5.0)!	57 ( 4.0) 265 ( 2.6)	30 ( 4.0) 264 ( 3.3)
<b>Female</b>			
State	20 ( 3.4) 253 ( 2.9)	40 ( 3.9) 260 ( 1.9)	40 ( 4.2) 251 ( 2.0)
Nation	13 ( 2.4) 266 ( 3.9)	55 ( 4.4) 264 ( 2.0)	32 ( 4.7) 257 ( 3.0)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A10a | Teachers' Reports on the Frequency of Small Group Work

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	33 ( 3.3)	48 ( 4.0)	18 ( 3.4)
Nation	252 ( 1.7)	258 ( 1.6)	261 ( 2.1)
	50 ( 4.4)	43 ( 4.1)	8 ( 2.0)
	260 ( 2.2)	264 ( 2.3)	277 ( 5.4) <sup>!</sup>
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	30 ( 3.2)	51 ( 4.0)	19 ( 3.8)
Nation	264 ( 1.9)	266 ( 1.4)	267 ( 2.2)
	49 ( 4.8)	43 ( 4.5)	8 ( 2.3)
	265 ( 2.7)	271 ( 2.2)	285 ( 4.9) <sup>!</sup>
<b>Black</b>			
State	47 ( 6.8)	41 ( 6.0)	12 ( 3.2)
Nation	230 ( 2.0)	231 ( 2.1)	235 ( 3.8) <sup>!</sup>
	47 ( 8.1)	45 ( 7.0)	9 ( 4.1)
	240 ( 3.4)	238 ( 4.0)	*** ( ***)
<b>Hispanic</b>			
State	32 ( 5.8)	40 ( 9.7)	28 (10.0)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	64 ( 7.2)	32 ( 6.9)	4 ( 1.4)
	246 ( 2.5)	247 ( 6.3) <sup>!</sup>	*** ( ***)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	26 ( 9.8)	53 (10.2)	21 ( 8.6)
Nation	*** ( ***)	272 ( 8.3) <sup>!</sup>	*** ( ***)
	39 (22.9)	41 (17.9)	20 (12.2)
	*** ( ***)	273 ( 6.0) <sup>!</sup>	*** ( ***)
<b>Disadvantaged urban</b>			
State	84 ( 7.8)	12 ( 8.1)	4 ( 3.0)
Nation	240 ( 5.3) <sup>!</sup>	*** ( ***)	*** ( ***)
	70 (11.7)	21 ( 9.0)	9 ( 8.5)
	248 ( 4.8) <sup>!</sup>	249 ( 8.7) <sup>!</sup>	*** ( ***)
<b>Extreme rural</b>			
State	36 (10.4)	54 (10.0)	9 ( 6.1)
Nation	255 ( 4.2) <sup>!</sup>	255 ( 3.3) <sup>!</sup>	*** ( ***)
	35 (14.6)	56 (17.1)	9 ( 9.6)
	255 ( 5.5) <sup>!</sup>	258 ( 5.9) <sup>!</sup>	*** ( ***)
<b>Other</b>			
State	27 ( 3.5)	50 ( 4.1)	23 ( 4.5)
Nation	253 ( 2.4)	259 ( 1.8)	280 ( 2.5) <sup>!</sup>
	50 ( 4.4)	44 ( 4.5)	6 ( 1.8)
	260 ( 2.4)	264 ( 2.8)	277 ( 8.3) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. <sup>\*\*\*</sup> Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A10a | Teachers' Reports on the Frequency of Small  
(continued) | Group Work

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	33 ( 3.3)	48 ( 4.0)	18 ( 3.4)
Nation	252 ( 1.7)	258 ( 1.6)	281 ( 2.1)
	50 ( 4.4)	43 ( 4.1)	8 ( 2.0)
	260 ( 2.2)	264 ( 2.3)	277 ( 5.4) <sup>!</sup>
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	34 ( 4.7)	50 ( 5.5)	16 ( 4.3)
Nation	243 ( 3.8)	248 ( 2.0)	*** ( ***)
	60 ( 6.4)	39 ( 6.5)	1 ( 1.4)
	244 ( 3.2)	244 ( 3.2) <sup>!</sup>	*** ( ***)
<b>HS graduate</b>			
State	34 ( 4.1)	48 ( 4.8)	19 ( 4.2)
Nation	246 ( 2.1)	251 ( 1.9)	254 ( 2.7) <sup>!</sup>
	49 ( 4.8)	45 ( 5.1)	6 ( 2.5)
	252 ( 2.8)	257 ( 2.7)	*** ( ***)
<b>Some college</b>			
State	33 ( 4.1)	48 ( 5.2)	19 ( 5.3)
Nation	263 ( 3.0)	268 ( 2.3)	270 ( 1.9) <sup>!</sup>
	51 ( 5.2)	42 ( 5.1)	7 ( 2.3)
	266 ( 3.1)	268 ( 3.2)	*** ( ***)
<b>College graduate</b>			
State	32 ( 3.0)	51 ( 3.3)	18 ( 2.5)
Nation	260 ( 2.6)	270 ( 1.8)	272 ( 3.1)
	46 ( 5.2)	43 ( 4.4)	11 ( 2.7)
	271 ( 2.6)	276 ( 3.0)	285 ( 4.9) <sup>!</sup>
<b>GENDER</b>			
<b>Male</b>			
State	33 ( 3.4)	49 ( 3.9)	18 ( 3.5)
Nation	254 ( 2.5)	259 ( 1.7)	262 ( 2.6)
	50 ( 4.5)	42 ( 4.0)	8 ( 2.1)
	261 ( 3.0)	265 ( 3.1)	278 ( 5.3) <sup>!</sup>
<b>Female</b>			
State	34 ( 3.5)	48 ( 4.4)	18 ( 3.6)
Nation	251 ( 1.8)	257 ( 2.0)	259 ( 2.5)
	50 ( 4.7)	43 ( 4.7)	7 ( 2.1)
	259 ( 2.2)	263 ( 2.1)	275 ( 6.6) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A10b | Teachers' Reports on the Use of Mathematical Objects

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	13 ( 3.3)	79 ( 3.3)	8 ( 1.5)
Nation	248 ( 4.3) <sup>!</sup>	257 ( 1.2)	269 ( 4.1)
	22 ( 3.7)	69 ( 3.9)	9 ( 2.6)
	254 ( 3.2)	263 ( 1.9)	282 ( 5.9) <sup>!</sup>
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	11 ( 3.2)	81 ( 3.3)	8 ( 1.8)
Nation	283 ( 3.2) <sup>!</sup>	264 ( 1.0)	279 ( 4.8) <sup>!</sup>
	17 ( 4.0)	72 ( 4.2)	10 ( 2.7)
	281 ( 3.8) <sup>!</sup>	269 ( 2.1)	288 ( 6.2) <sup>!</sup>
<b>Black</b>			
State	21 ( 6.5)	71 ( 6.6)	8 ( 1.4)
Nation	226 ( 2.7) <sup>!</sup>	232 ( 1.1)	*** ( ***)
	22 ( 5.9)	70 ( 6.3)	8 ( 3.9)
	233 ( 5.9) <sup>!</sup>	241 ( 2.9)	*** ( ***)
<b>Hispanic</b>			
State	18 ( 6.4)	76 ( 6.4)	6 ( 2.6)
Nation	*** ( ***)	235 ( 3.9)	*** ( ***)
	39 ( 7.5)	55 ( 7.3)	7 ( 2.6)
	247 ( 3.8)	245 ( 3.8) <sup>!</sup>	*** ( ***)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	7 ( 6.0)	81 (10.0)	12 (10.3)
Nation	*** ( ***)	288 ( 3.4) <sup>!</sup>	*** ( ***)
	23 (14.4)	63 (11.5)	15 ( 9.3)
	*** ( ***)	278 ( 5.6) <sup>!</sup>	*** ( ***)
<b>Disadvantaged urban</b>			
State	40 (12.4)	32 (10.5)	27 (16.9)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	39 (11.4)	59 (12.1)	2 ( 1.8)
	247 ( 7.5) <sup>!</sup>	253 ( 7.0) <sup>!</sup>	*** ( ***)
<b>Extreme rural</b>			
State	21 ( 9.4)	79 ( 9.4)	0 ( 0.0)
Nation	253 ( 5.2) <sup>!</sup>	256 ( 2.6)	*** ( ***)
	27 (14.9)	65 (14.6)	8 ( 3.9)
	*** ( ***)	262 ( 2.8) <sup>!</sup>	*** ( ***)
<b>Other</b>			
State	8 ( 3.4)	83 ( 3.2)	9 ( 1.7)
Nation	248 ( 5.9) <sup>!</sup>	257 ( 1.3)	272 ( 4.6) <sup>!</sup>
	19 ( 4.3)	72 ( 5.0)	9 ( 3.3)
	253 ( 3.9) <sup>!</sup>	263 ( 2.2)	281 ( 7.1) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A10b | Teachers' Reports on the Use of Mathematical  
(continued) | Objects

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	13 ( 3.3) 248 ( 4.3) <sup>!</sup>	78 ( 3.3) 257 ( 1.2)	8 ( 1.5) 289 ( 4.1)
Nation	22 ( 3.7) 254 ( 3.2)	69 ( 3.9) 263 ( 1.9)	9 ( 2.6) 282 ( 5.9) <sup>!</sup>
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	15 ( 4.7) *** ( ***)	80 ( 4.8) 247 ( 1.7)	5 ( 1.4) *** ( ***)
Nation	25 ( 5.6) *** ( ***)	66 ( 7.2) 243 ( 2.2)	9 ( 6.5) *** ( ***)
<b>HS graduate</b>			
State	13 ( 3.5) 238 ( 4.0) <sup>!</sup>	81 ( 3.7) 251 ( 1.4)	6 ( 1.7) *** ( ***)
Nation	23 ( 4.8) 248 ( 4.0) <sup>!</sup>	70 ( 5.3) 255 ( 2.2)	7 ( 2.8) *** ( ***)
<b>Some college</b>			
State	11 ( 3.2) *** ( ***)	82 ( 3.7) 267 ( 1.7)	7 ( 2.0) *** ( ***)
Nation	18 ( 4.0) 261 ( 4.4) <sup>!</sup>	73 ( 4.3) 269 ( 2.3)	9 ( 2.4) *** ( ***)
<b>College graduate</b>			
State	13 ( 3.0) 263 ( 5.7) <sup>!</sup>	74 ( 3.0) 266 ( 1.5)	13 ( 2.8) 277 ( 4.7)
Nation	20 ( 3.9) 266 ( 3.5) <sup>!</sup>	69 ( 3.7) 274 ( 2.2)	11 ( 2.5) 297 ( 4.2) <sup>!</sup>
<b>GENDER</b>			
<b>Male</b>			
State	12 ( 3.2) 251 ( 5.1) <sup>!</sup>	80 ( 3.3) 258 ( 1.4)	7 ( 1.4) 274 ( 4.8)
Nation	22 ( 4.1) 255 ( 4.1)	69 ( 4.1) 265 ( 2.1)	8 ( 2.0) 287 ( 7.2) <sup>!</sup>
<b>Female</b>			
State	14 ( 3.6) 245 ( 4.6) <sup>!</sup>	77 ( 3.6) 256 ( 1.3)	9 ( 1.7) 265 ( 4.7)
Nation	21 ( 3.6) 254 ( 3.3)	69 ( 4.2) 262 ( 1.9)	10 ( 3.3) 278 ( 6.0) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. <sup>\*\*\*</sup> Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A11a | Teachers' Reports on the Frequency of Mathematics Textbook Use

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Almost Every Day	Several Times a Week	About Once a Week or Less
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b>TOTAL</b>			
State	80 ( 2.7)	19 ( 2.7)	2 ( 0.6)
Nation	258 ( 1.2)	252 ( 2.7)	*** ( ***)
	62 ( 3.4)	31 ( 3.1)	7 ( 1.8)
	267 ( 1.8)	254 ( 2.9)	260 ( 5.1)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	82 ( 2.8)	17 ( 2.8)	1 ( 0.5)
Nation	266 ( 1.0)	263 ( 2.2)	*** ( ***)
	64 ( 3.7)	28 ( 3.2)	8 ( 2.3)
	272 ( 1.9)	264 ( 3.4)	264 ( 5.4)
<b>Black</b>			
State	73 ( 5.4)	24 ( 5.4)	3 ( 1.0)
Nation	232 ( 1.3)	229 ( 2.8)	*** ( ***)
	56 ( 7.7)	41 ( 7.9)	2 ( 1.4)
	244 ( 4.0)	233 ( 3.9)	*** ( ***)
<b>Hispanic</b>			
State	69 ( 6.5)	25 ( 6.8)	6 ( 2.8)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	61 ( 6.8)	32 ( 5.3)	8 ( 2.3)
	251 ( 3.1)	240 ( 4.3)	*** ( ***)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	74 ( 9.4)	24 ( 9.4)	2 ( 1.2)
Nation	278 ( 4.8)	*** ( ***)	*** ( ***)
	63 (15.9)	23 ( 5.2)	14 (14.6)
	283 ( 7.3)	*** ( ***)	*** ( ***)
<b>Disadvantaged urban</b>			
State	64 (11.6)	34 (10.7)	2 ( 1.8)
Nation	246 ( 9.3)	*** ( ***)	*** ( ***)
	68 (10.7)	31 (11.1)	4 ( 2.2)
	252 ( 4.7)	243 ( 8.0)	*** ( ***)
<b>Extreme rural</b>			
State	78 ( 8.1)	22 ( 8.1)	0 ( 0.1)
Nation	256 ( 2.6)	253 ( 6.1)	*** ( ***)
	50 (10.6)	40 (10.0)	10 ( 7.3)
	268 ( 4.0)	247 ( 7.6)	*** ( ***)
<b>Other</b>			
State	82 ( 3.1)	18 ( 2.9)	2 ( 1.2)
Nation	259 ( 1.3)	253 ( 3.3)	*** ( ***)
	63 ( 3.9)	31 ( 3.5)	6 ( 1.9)
	267 ( 2.3)	255 ( 3.1)	257 ( 5.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A11a | Teachers' Reports on the Frequency of  
(continued) | Mathematics Textbook Use

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Almost Every Day	Several Times a Week	About Once a Week or Less
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	80 ( 2.7)	19 ( 2.7)	2 ( 0.6)
	258 ( 1.2)	252 ( 2.7)	*** ( ***)
Nation	62 ( 3.4)	31 ( 3.1)	7 ( 1.8)
	267 ( 1.8)	254 ( 2.9)	280 ( 5.1)!
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	79 ( 4.4)	18 ( 4.5)	2 ( 1.4)
	247 ( 1.9)	*** ( ***)	*** ( ***)
Nation	67 ( 5.5)	27 ( 5.2)	6 ( 2.1)
	245 ( 3.2)	*** ( ***)	*** ( ***)
<b>HS graduate</b>			
State	79 ( 3.2)	19 ( 3.2)	2 ( 0.5)
	250 ( 1.5)	247 ( 2.7)	*** ( ***)
Nation	61 ( 4.4)	34 ( 3.7)	6 ( 1.5)
	257 ( 2.5)	250 ( 2.9)	*** ( ***)
<b>Some college</b>			
State	79 ( 3.4)	20 ( 3.4)	1 ( 0.6)
	267 ( 1.8)	264 ( 3.1)	*** ( ***)
Nation	68 ( 4.2)	26 ( 3.7)	6 ( 1.9)
	272 ( 2.7)	258 ( 5.2)	*** ( ***)
<b>College graduate</b>			
State	82 ( 2.5)	16 ( 2.5)	2 ( 0.8)
	269 ( 1.4)	258 ( 4.4)	*** ( ***)
Nation	61 ( 4.0)	31 ( 3.9)	8 ( 3.1)
	281 ( 2.2)	265 ( 3.1)	*** ( ***)
<b>GENDER</b>			
<b>Male</b>			
State	81 ( 2.6)	18 ( 2.6)	2 ( 0.6)
	259 ( 1.5)	257 ( 2.8)	*** ( ***)
Nation	60 ( 3.7)	33 ( 3.4)	7 ( 1.9)
	269 ( 2.1)	256 ( 3.6)	281 ( 6.7)!
<b>Female</b>			
State	79 ( 3.3)	19 ( 3.3)	1 ( 0.6)
	258 ( 1.4)	247 ( 3.1)	*** ( ***)
Nation	65 ( 3.6)	28 ( 3.3)	7 ( 2.2)
	266 ( 1.8)	253 ( 2.5)	*** ( ***)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution - the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



TABLE A11b | Teachers' Reports on the Frequency of Mathematics Worksheet Use

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Several Times a Week	About Once a Week	Less than Weekly
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	38 ( 3.2)	29 ( 2.9)	33 ( 3.3)
Nation	252 ( 1.3)	260 ( 2.3)	260 ( 2.3)
	34 ( 3.8)	33 ( 3.4)	32 ( 3.6)
	256 ( 2.3)	260 ( 2.3)	274 ( 2.7)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	38 ( 3.3)	29 ( 3.0)	35 ( 3.7)
Nation	261 ( 1.4)	268 ( 2.1)	268 ( 1.7)
	32 ( 4.1)	33 ( 3.5)	35 ( 3.8)
	264 ( 2.7)	264 ( 2.7)	279 ( 2.8)
<b>Black</b>			
State	44 ( 5.1)	30 ( 5.2)	26 ( 5.0)
Nation	228 ( 1.8)	234 ( 2.7)	232 ( 2.6) <sup>!</sup>
	45 ( 7.5)	31 ( 7.6)	23 ( 6.3)
	232 ( 3.1) <sup>!</sup>	243 ( 2.3) <sup>!</sup>	248 ( 7.0) <sup>!</sup>
<b>Hispanic</b>			
State	38 ( 6.3)	18 ( 4.2)	44 ( 5.9)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	41 ( 7.7)	26 ( 5.3)	33 ( 7.5)
	242 ( 3.2) <sup>!</sup>	244 ( 5.1) <sup>!</sup>	257 ( 2.3) <sup>!</sup>
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	24 (11.2)	29 ( 8.3)	47 (16.2)
Nation	*** ( ***)	*** ( ***)	290 ( 5.1) <sup>!</sup>
	59 (13.9)	20 ( 6.0)	21 ( 8.2)
	273 ( 3.4) <sup>!</sup>	*** ( ***)	*** ( ***)
<b>Disadvantaged urban</b>			
State	29 ( 7.9)	30 ( 7.2)	41 (13.3)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	50 (13.9)	22 (11.2)	28 (10.7)
	237 ( 2.4) <sup>!</sup>	258 ( 8.3) <sup>!</sup>	263 ( 4.1) <sup>!</sup>
<b>Extreme rural</b>			
State	56 ( 8.0)	18 ( 6.4)	26 ( 7.5)
Nation	255 ( 1.6)	259 ( 7.1) <sup>!</sup>	253 ( 4.7) <sup>!</sup>
	27 (14.3)	49 (12.7)	24 (10.1)
	*** ( ***)	258 ( 6.7) <sup>!</sup>	*** ( ***)
<b>Other</b>			
State	33 ( 4.4)	34 ( 4.1)	33 ( 5.2)
Nation	250 ( 2.1)	261 ( 2.6)	261 ( 2.0)
	30 ( 4.4)	35 ( 4.3)	36 ( 4.2)
	256 ( 3.3)	259 ( 2.8)	272 ( 2.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. <sup>\*\*\*</sup> Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A11b | Teachers' Reports on the Frequency of  
(continued) | Mathematics Worksheet Use

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Several Times a Week	About Once a Week	Less than Weekly
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>			
State	38 ( 3.2) 252 ( 1.9)	29 ( 2.9) 260 ( 2.3)	33 ( 3.3) 260 ( 2.3)
Nation	34 ( 3.8) 256 ( 2.3)	33 ( 3.4) 260 ( 2.3)	32 ( 3.6) 274 ( 2.7)
<b><u>PARENTS' EDUCATION</u></b>			
<b>HS non-graduate</b>			
State	38 ( 5.0) 244 ( 2.9)	27 ( 3.9) 247 ( 3.8)	35 ( 4.4) 246 ( 2.9)
Nation	35 ( 6.0) 239 ( 3.5)	29 ( 6.3) *** ( ***)	36 ( 6.9) 250 ( 4.5)!
<b>HS graduate</b>			
State	41 ( 3.8) 245 ( 1.8)	29 ( 3.2) 252 ( 2.5)	29 ( 3.6) 253 ( 2.6)
Nation	35 ( 5.3) 250 ( 3.8)	36 ( 4.5) 250 ( 2.7)	30 ( 4.8) 263 ( 3.4)
<b>Some college</b>			
State	38 ( 4.1) 262 ( 2.5)	29 ( 3.5) 269 ( 3.3)	33 ( 4.2) 270 ( 2.7)
Nation	33 ( 4.7) 260 ( 2.8)	32 ( 4.0) 266 ( 4.2)	35 ( 4.1) 278 ( 2.6)
<b>College graduate</b>			
State	35 ( 3.3) 262 ( 2.2)	30 ( 3.6) 270 ( 2.7)	36 ( 4.1) 270 ( 3.2)
Nation	35 ( 3.8) 264 ( 2.6)	32 ( 3.4) 271 ( 2.4)	33 ( 3.5) 289 ( 2.9)
<b><u>GENDER</u></b>			
<b>Male</b>			
State	36 ( 3.4) 252 ( 1.9)	31 ( 3.1) 261 ( 2.5)	33 ( 3.4) 262 ( 2.7)
Nation	35 ( 4.1) 257 ( 3.2)	35 ( 3.6) 261 ( 2.8)	31 ( 3.5) 275 ( 3.2)
<b>Female</b>			
State	40 ( 3.3) 251 ( 1.9)	27 ( 3.0) 259 ( 3.0)	33 ( 3.4) 257 ( 2.3)
Nation	34 ( 4.1) 254 ( 2.1)	32 ( 3.7) 258 ( 2.3)	34 ( 4.1) 273 ( 2.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A12 | Students' Reports on the Frequency of Small Group Work

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	18 ( 1.2)	27 ( 1.5)	55 ( 2.0)
Nation	249 ( 1.9)	263 ( 1.6)	255 ( 1.1)
	28 ( 2.5)	28 ( 1.4)	44 ( 2.9)
	256 ( 2.7)	267 ( 2.0)	261 ( 1.6)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	16 ( 1.3)	28 ( 1.8)	57 ( 2.4)
Nation	264 ( 1.8)	271 ( 1.4)	262 ( 1.0)
	27 ( 2.9)	29 ( 1.7)	44 ( 3.5)
	268 ( 3.1)	272 ( 1.8)	270 ( 1.7)
<b>Black</b>			
State	26 ( 2.7)	24 ( 2.0)	51 ( 3.3)
Nation	226 ( 2.0)	236 ( 2.3)	231 ( 1.5)
	28 ( 3.0)	24 ( 3.6)	48 ( 4.7)
	234 ( 3.0)	245 ( 4.6)	234 ( 3.1)
<b>Hispanic</b>			
State	25 ( 3.8)	23 ( 5.0)	52 ( 5.2)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	37 ( 5.2)	22 ( 3.6)	41 ( 5.0)
	242 ( 3.9)	250 ( 3.4)	240 ( 2.6)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	20 ( 8.9)	29 ( 8.6)	51 (16.7)
Nation	*** ( ***)	*** ( ***)	270 ( 4.3) <sup>!</sup>
	27 (13.9)	33 ( 4.5)	40 (13.4)
	*** ( ***)	286 ( 5.4) <sup>!</sup>	279 ( 3.5) <sup>!</sup>
<b>Disadvantaged urban</b>			
State	31 ( 6.3)	29 ( 3.1)	40 ( 4.6)
Nation	*** ( ***)	*** ( ***)	239 ( 7.2) <sup>!</sup>
	31 ( 5.7)	20 ( 2.8)	49 ( 6.3)
	245 ( 4.0) <sup>!</sup>	267 ( 6.4) <sup>!</sup>	245 ( 3.7) <sup>!</sup>
<b>Extreme rural</b>			
State	16 ( 2.1)	25 ( 2.7)	59 ( 3.2)
Nation	248 ( 4.1)	262 ( 4.3)	253 ( 1.5)
	34 (10.8)	27 ( 3.8)	39 (11.6)
	249 ( 5.2) <sup>!</sup>	264 ( 3.5) <sup>!</sup>	256 ( 6.2) <sup>!</sup>
<b>Other</b>			
State	17 ( 1.6)	26 ( 1.9)	56 ( 2.7)
Nation	252 ( 2.9)	264 ( 1.5)	253 ( 1.3)
	27 ( 2.6)	28 ( 1.7)	45 ( 3.3)
	260 ( 3.3)	264 ( 2.1)	262 ( 2.2)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

**TABLE A12 | Students' Reports on the Frequency of Small Group Work**  
 (continued)

 PERCENTAGE OF STUDENTS AND  
 AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b>TOTAL</b>			
State	18 ( 1.2)	27 ( 1.5)	55 ( 2.0)
Nation	249 ( 1.9)	263 ( 1.6)	255 ( 1.1)
	28 ( 2.5)	28 ( 1.4)	44 ( 2.9)
	258 ( 2.7)	267 ( 2.0)	261 ( 1.6)
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	20 ( 2.7)	18 ( 3.0)	81 ( 4.0)
Nation	244 ( 4.0)	*** ( ***)	244 ( 2.0)
	29 ( 4.5)	29 ( 3.0)	42 ( 4.5)
	242 ( 3.4)	244 ( 3.0)	242 ( 2.7)
<b>HS graduate</b>			
State	16 ( 1.6)	28 ( 1.8)	56 ( 2.0)
Nation	244 ( 2.6)	254 ( 2.0)	248 ( 1.2)
	28 ( 3.0)	28 ( 1.8)	43 ( 3.4)
	251 ( 3.7)	261 ( 2.8)	252 ( 1.7)
<b>Some college</b>			
State	15 ( 1.9)	29 ( 2.7)	58 ( 3.2)
Nation	259 ( 3.3)	273 ( 2.7)	264 ( 1.8)
	27 ( 3.9)	27 ( 2.4)	46 ( 3.8)
	265 ( 3.6)	268 ( 3.3)	266 ( 2.1)
<b>College graduate</b>			
State	20 ( 1.6)	27 ( 1.8)	53 ( 2.6)
Nation	258 ( 2.8)	275 ( 2.3)	266 ( 1.9)
	28 ( 3.0)	28 ( 1.9)	44 ( 3.8)
	270 ( 2.7)	278 ( 2.8)	275 ( 2.2)
<b>GENDER</b>			
<b>Male</b>			
State	19 ( 1.3)	26 ( 1.7)	54 ( 2.0)
Nation	248 ( 2.1)	264 ( 2.0)	257 ( 1.4)
	31 ( 2.9)	28 ( 1.7)	41 ( 2.9)
	259 ( 3.3)	268 ( 2.6)	262 ( 1.8)
<b>Female</b>			
State	17 ( 1.5)	27 ( 1.8)	56 ( 2.5)
Nation	250 ( 2.5)	262 ( 1.8)	253 ( 1.3)
	26 ( 2.4)	27 ( 1.8)	47 ( 3.2)
	257 ( 2.8)	266 ( 1.7)	260 ( 1.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A13 | Students' Reports on the Use of Mathematics Objects

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>			
State	21 ( 1.5)	35 ( 1.1)	44 ( 2.0)
Nation	247 ( 1.7)	262 ( 1.3)	255 ( 1.1)
	28 ( 1.8)	31 ( 1.2)	41 ( 2.2)
	258 ( 2.6)	269 ( 1.5)	259 ( 1.6)
<b><u>RACE/ETHNICITY</u></b>			
<b>White</b>			
State	19 ( 1.7)	37 ( 1.4)	44 ( 2.4)
Nation	258 ( 1.8)	270 ( 1.2)	264 ( 1.2)
	27 ( 1.9)	33 ( 1.6)	40 ( 2.5)
	266 ( 2.6)	275 ( 1.6)	268 ( 1.8)
<b>Black</b>			
State	27 ( 1.9)	29 ( 1.8)	44 ( 2.1)
Nation	226 ( 1.9)	234 ( 1.4)	231 ( 1.9)
	27 ( 3.3)	27 ( 3.2)	46 ( 4.5)
	234 ( 3.7)	248 ( 4.5)	232 ( 2.6)
<b>Hispanic</b>			
State	21 ( 4.0)	32 ( 4.9)	47 ( 5.3)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	38 ( 4.2)	25 ( 2.0)	40 ( 4.0)
	241 ( 4.6)	253 ( 4.3)	240 ( 1.9)
<b><u>TYPE OF COMMUNITY</u></b>			
<b>Advantaged urban</b>			
State	21 ( 4.3)	45 ( 8.7)	34 (11.2)
Nation	*** ( ***)	277 ( 8.3)!	*** ( ***)
	36 (10.3)	33 ( 4.8)	32 (11.1)
	278 ( 8.1)!	284 ( 3.2)!	281 ( 5.9)!
<b>Disadvantaged urban</b>			
State	22 ( 2.8)	20 ( 2.5)	58 ( 4.1)
Nation	*** ( ***)	*** ( ***)	242 ( 7.6)!
	35 ( 6.6)	19 ( 2.1)	46 ( 6.4)
	249 ( 5.3)!	256 ( 5.7)!	246 ( 4.8)!
<b>Extreme rural</b>			
State	21 ( 2.8)	41 ( 2.2)	38 ( 3.4)
Nation	251 ( 4.6)!	259 ( 2.2)	252 ( 2.1)
	21 ( 3.1)	37 ( 4.7)	43 ( 5.0)
	*** ( ***)	282 ( 4.7)!	251 ( 5.2)!
<b>Other</b>			
State	21 ( 1.9)	35 ( 1.2)	45 ( 2.4)
Nation	247 ( 1.9)	283 ( 1.7)	258 ( 1.4)
	27 ( 2.0)	31 ( 1.4)	41 ( 2.4)
	256 ( 2.9)	270 ( 1.8)	260 ( 2.2)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A13 | Students' Reports on the Use of Mathematics Objects  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Once a Week	Less Than Once a Week	*Never
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>			
State	21 ( 1.5)	35 ( 1.1)	44 ( 2.0)
Nation	247 ( 1.7)	262 ( 1.3)	255 ( 1.1)
	28 ( 1.8)	31 ( 1.2)	41 ( 2.2)
	258 ( 2.6)	269 ( 1.5)	259 ( 1.6)
<b><u>PARENTS' EDUCATION</u></b>			
<b>HS non-graduate</b>			
State	24 ( 3.3)	33 ( 3.0)	43 ( 3.7)
Nation	240 ( 2.8)	250 ( 3.3)	243 ( 2.5)
	27 ( 4.2)	26 ( 2.7)	47 ( 5.0)
	237 ( 3.0)	253 ( 3.5)	240 ( 2.3)
<b>HS graduate</b>			
State	22 ( 2.4)	35 ( 1.6)	43 ( 2.7)
Nation	247 ( 2.3)	253 ( 2.1)	247 ( 1.5)
	27 ( 2.7)	31 ( 2.4)	43 ( 3.3)
	250 ( 2.4)	259 ( 2.7)	253 ( 2.1)
<b>Some college</b>			
State	16 ( 1.9)	41 ( 3.3)	42 ( 4.2)
Nation	260 ( 4.5)	269 ( 2.1)	265 ( 2.1)
	29 ( 2.6)	36 ( 2.3)	35 ( 2.6)
	261 ( 3.5)	274 ( 2.2)	263 ( 2.1)
<b>College graduate</b>			
State	19 ( 1.4)	34 ( 1.6)	46 ( 2.0)
Nation	252 ( 2.8)	273 ( 1.9)	267 ( 1.8)
	30 ( 2.5)	32 ( 2.0)	38 ( 2.6)
	269 ( 3.0)	278 ( 2.0)	275 ( 2.0)
<b><u>GENDER</u></b>			
<b>Male</b>			
State	22 ( 1.5)	35 ( 1.5)	43 ( 2.0)
Nation	248 ( 2.3)	253 ( 1.8)	257 ( 1.5)
	32 ( 2.0)	30 ( 1.5)	38 ( 2.2)
	258 ( 2.9)	271 ( 2.1)	260 ( 1.8)
<b>Female</b>			
State	20 ( 1.9)	35 ( 1.5)	45 ( 2.4)
Nation	246 ( 2.3)	260 ( 1.5)	254 ( 1.4)
	25 ( 2.0)	31 ( 1.9)	44 ( 2.6)
	257 ( 3.0)	268 ( 1.5)	257 ( 1.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

**TABLE A14 | Students' Reports on the Frequency of Mathematics Textbook Use**

 PERCENTAGE OF STUDENTS AND  
 AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Almost Every Day	Several Times a Week	About Once a Week or Less
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	81 ( 1.6)	13 ( 0.9)	6 ( 0.9)
Nation	259 ( 1.0)	244 ( 2.0)	236 ( 3.3)
	74 ( 1.9)	14 ( 0.8)	12 ( 1.8)
	267 ( 1.2)	252 ( 1.7)	242 ( 4.5)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	84 ( 1.8)	11 ( 1.0)	5 ( 1.0)
Nation	267 ( 0.9)	256 ( 2.3)	246 ( 3.7) <sup>!</sup>
	76 ( 2.5)	13 ( 0.8)	11 ( 2.2)
	274 ( 1.3)	258 ( 2.2)	252 ( 5.1) <sup>!</sup>
<b>Black</b>			
State	74 ( 2.8)	18 ( 1.9)	8 ( 1.5)
Nation	233 ( 1.3)	224 ( 2.3)	*** ( ***)
	71 ( 2.8)	15 ( 1.7)	14 ( 3.2)
	240 ( 2.9)	232 ( 3.1)	223 ( 6.1) <sup>!</sup>
<b>Hispanic</b>			
State	71 ( 4.3)	20 ( 3.9)	8 ( 2.8)
Nation	237 ( 3.7)	*** ( ***)	*** ( ***)
	61 ( 3.7)	21 ( 2.9)	17 ( 2.7)
	249 ( 2.3)	242 ( 5.1)	224 ( 3.4)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	85 ( 4.4)	9 ( 3.1)	6 ( 1.8)
Nation	275 ( 4.3) <sup>!</sup>	*** ( ***)	*** ( ***)
	73 (11.1)	13 ( 1.7)	14 (10.4)
	266 ( 4.6) <sup>!</sup>	*** ( ***)	*** ( ***)
<b>Disadvantaged urban</b>			
State	72 ( 5.9)	18 ( 3.0)	10 ( 5.4)
Nation	243 ( 5.3) <sup>!</sup>	*** ( ***)	*** ( ***)
	69 ( 2.8)	15 ( 2.5)	15 ( 2.2)
	253 ( 3.7) <sup>!</sup>	243 ( 4.4) <sup>!</sup>	235 ( 6.5) <sup>!</sup>
<b>Extreme rural</b>			
State	76 ( 5.6)	13 ( 2.8)	11 ( 3.3)
Nation	256 ( 2.3)	255 ( 4.0) <sup>!</sup>	*** ( ***)
	68 (11.3)	15 ( 3.6)	17 ( 6.2)
	263 ( 4.2) <sup>!</sup>	*** ( ***)	*** ( ***)
<b>Other</b>			
State	84 ( 1.6)	12 ( 1.1)	4 ( 0.7)
Nation	260 ( 1.1)	243 ( 2.1)	*** ( ***)
	75 ( 2.2)	14 ( 1.0)	10 ( 1.9)
	267 ( 1.6)	252 ( 2.6)	239 ( 4.3) <sup>!</sup>

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A14 | Students' Reports on the Frequency of  
(continued) | Mathematics Textbook Use

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Almost Every Day	Several Times a Week	About Once a Week or Less
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>			
State	81 ( 1.6) 259 ( 1.0)	13 ( 0.9) 244 ( 2.0)	6 ( 0.9) 236 ( 3.3)
Nation	74 ( 1.9) 267 ( 1.2)	14 ( 0.8) 252 ( 1.7)	12 ( 1.8) 242 ( 4.5)
<b><u>PARENTS' EDUCATION</u></b>			
<b>HS non-graduate</b>			
State	78 ( 2.6) 248 ( 1.8)	15 ( 2.3) *** ( ***)	7 ( 1.5) *** ( ***)
Nation	64 ( 3.4) 245 ( 2.3)	18 ( 2.0) *** ( ***)	18 ( 3.1) *** ( ***)
<b>HS graduate</b>			
State	78 ( 2.4) 252 ( 1.1)	15 ( 1.6) 242 ( 3.0)	7 ( 1.2) *** ( ***)
Nation	71 ( 3.6) 258 ( 1.6)	16 ( 1.8) 249 ( 3.2)	13 ( 2.8) 239 ( 3.4)
<b>Some college</b>			
State	81 ( 2.5) 269 ( 1.5)	12 ( 1.6) *** ( ***)	7 ( 1.8) *** ( ***)
Nation	80 ( 2.0) 270 ( 1.9)	11 ( 1.2) *** ( ***)	9 ( 1.7) *** ( ***)
<b>College graduate</b>			
State	86 ( 1.6) 269 ( 1.3)	10 ( 1.1) 250 ( 4.1)	4 ( 0.7) *** ( ***)
Nation	77 ( 2.7) 279 ( 1.8)	13 ( 0.8) 260 ( 2.8)	10 ( 2.3) 257 ( 6.4)
<b><u>GENDER</u></b>			
<b>Male</b>			
State	81 ( 1.7) 260 ( 1.2)	14 ( 1.2) 248 ( 2.6)	5 ( 0.8) 236 ( 3.7)
Nation	72 ( 2.4) 268 ( 1.6)	16 ( 1.2) 252 ( 2.5)	12 ( 2.1) 242 ( 6.1)
<b>Female</b>			
State	82 ( 2.0) 258 ( 1.0)	12 ( 1.0) 240 ( 2.4)	6 ( 1.4) 237 ( 4.7)
Nation	76 ( 1.8) 285 ( 1.3)	13 ( 1.0) 250 ( 2.5)	11 ( 1.6) 242 ( 3.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).



TABLE A15 | Students' Reports on the Frequency of Mathematics Worksheet Use

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Several Times a Week	About Once a Week	Less Than Weekly
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	35 ( 2.5)	27 ( 1.5)	37 ( 2.5)
Nation	249 ( 1.2)	254 ( 1.6)	263 ( 1.4)
	38 ( 2.4)	25 ( 1.2)	37 ( 2.5)
	253 ( 2.2)	261 ( 1.4)	272 ( 1.9)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	32 ( 3.0)	26 ( 1.7)	42 ( 3.1)
Nation	260 ( 1.0)	284 ( 1.7)	270 ( 1.4)
	35 ( 2.9)	24 ( 1.3)	41 ( 3.0)
	262 ( 2.5)	269 ( 1.5)	277 ( 2.0)
<b>Black</b>			
State	42 ( 2.6)	33 ( 2.2)	25 ( 1.9)
Nation	226 ( 2.1)	232 ( 2.1)	235 ( 2.0)
	48 ( 3.8)	32 ( 2.7)	20 ( 3.1)
	232 ( 4.3)	241 ( 2.9)	241 ( 4.4)
<b>Hispanic</b>			
State	48 ( 4.6)	23 ( 3.6)	29 ( 4.0)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	44 ( 4.1)	25 ( 3.4)	32 ( 4.3)
	238 ( 3.9)	247 ( 3.3)	248 ( 3.3)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	28 ( 3.8)	27 ( 2.6)	45 ( 5.9)
Nation	*** ( ***)	*** ( ***)	282 ( 6.1)!
	50 ( 9.0)	19 ( 4.9)	31 ( 9.3)
	271 ( 3.3)!	*** ( ***)	289 ( 5.3)!
<b>Disadvantaged urban</b>			
State	29 ( 5.1)	32 ( 3.8)	39 ( 7.7)
Nation	*** ( ***)	*** ( ***)	245 ( 7.2)!
	37 ( 5.8)	23 ( 3.6)	41 ( 6.7)
	240 ( 4.8)!	253 ( 4.1)!	255 ( 4.2)!
<b>Extreme rural</b>			
State	52 ( 7.3)	23 ( 3.5)	25 ( 4.8)
Nation	254 ( 2.1)	254 ( 4.0)!	256 ( 2.9)!
	42 (10.1)	30 ( 4.4)	28 ( 7.5)
	249 ( 4.0)!	256 ( 3.4)!	267 ( 7.3)!
<b>Other</b>			
State	31 ( 2.9)	29 ( 1.9)	41 ( 3.7)
Nation	248 ( 1.5)	255 ( 2.1)	266 ( 1.5)
	36 ( 2.9)	26 ( 1.2)	38 ( 2.9)
	252 ( 3.0)	261 ( 2.1)	272 ( 1.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

**TABLE A15 | Students' Reports on the Frequency of Mathematics Worksheet Use**  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	At Least Several Times a Week	About Once a Week	Less Than Weekly
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b><u>TOTAL</u></b>			
State	35 ( 2.5)	27 ( 1.5)	37 ( 2.5)
Nation	249 ( 1.2)	254 ( 1.6)	263 ( 1.4)
	38 ( 2.4)	25 ( 1.2)	37 ( 2.5)
	253 ( 2.2)	261 ( 1.4)	272 ( 1.9)
<b><u>PARENTS' EDUCATION</u></b>			
<b>HS non-graduate</b>			
State	43 ( 4.3)	27 ( 3.4)	30 ( 4.3)
Nation	241 ( 3.0)	245 ( 2.4)	250 ( 3.2)
	41 ( 4.5)	30 ( 2.7)	29 ( 4.0)
	235 ( 3.1)	243 ( 2.7)	253 ( 2.8)
<b>HS graduate</b>			
State	35 ( 2.7)	28 ( 2.0)	37 ( 2.7)
Nation	245 ( 1.7)	247 ( 2.2)	254 ( 2.0)
	40 ( 3.2)	29 ( 2.2)	32 ( 3.8)
	247 ( 2.7)	256 ( 2.5)	262 ( 2.2)
<b>Some college</b>			
State	35 ( 3.5)	24 ( 2.2)	41 ( 3.6)
Nation	281 ( 2.1)	263 ( 2.9)	271 ( 2.3)
	34 ( 3.4)	26 ( 2.2)	40 ( 3.6)
	259 ( 2.3)	269 ( 2.8)	271 ( 2.8)
<b>College graduate</b>			
State	32 ( 2.1)	29 ( 1.7)	39 ( 2.8)
Nation	257 ( 1.8)	265 ( 2.2)	276 ( 2.0)
	38 ( 2.8)	22 ( 1.8)	41 ( 2.6)
	284 ( 2.6)	273 ( 2.5)	285 ( 2.3)
<b><u>GENDER</u></b>			
<b>Male</b>			
State	35 ( 2.5)	28 ( 1.7)	37 ( 2.6)
Nation	251 ( 1.7)	255 ( 1.9)	265 ( 1.9)
	39 ( 2.7)	25 ( 1.6)	35 ( 2.7)
	253 ( 2.7)	263 ( 2.3)	274 ( 2.4)
<b>Female</b>			
State	36 ( 2.9)	27 ( 1.7)	38 ( 2.7)
Nation	247 ( 1.6)	254 ( 2.1)	262 ( 1.6)
	37 ( 2.5)	25 ( 1.5)	38 ( 2.6)
	253 ( 2.1)	259 ( 1.8)	269 ( 2.2)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

# Arkansas

**TABLE A18 | Students' Reports on Whether They Own a Calculator and Whether Their Teacher Explains How to Use One**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Own a Calculator		Teacher Explains Calculator Use	
	Yes	No	Yes	No
<b><u>TOTAL</u></b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
State	96 ( 0.5)	4 ( 0.5)	42 ( 2.3)	56 ( 2.3)
Nation	257 ( 0.9)	232 ( 2.6)	251 ( 1.3)	259 ( 1.0)
	97 ( 0.4)	3 ( 0.4)	49 ( 2.3)	51 ( 2.3)
	263 ( 1.3)	234 ( 3.8)	256 ( 1.7)	266 ( 1.5)
<b><u>RACE/ETHNICITY</u></b>				
<b>White</b>				
State	96 ( 0.5)	2 ( 0.5)	39 ( 2.4)	61 ( 2.4)
Nation	265 ( 0.9)	*** ( ***)	262 ( 1.3)	267 ( 1.1)
	96 ( 0.3)	2 ( 0.3)	46 ( 2.6)	54 ( 2.6)
	270 ( 1.5)	*** ( ***)	266 ( 1.8)	273 ( 1.8)
<b>Black</b>				
State	92 ( 1.5)	8 ( 1.5)	49 ( 3.0)	51 ( 3.0)
Nation	231 ( 1.2)	*** ( ***)	227 ( 1.8)	233 ( 1.4)
	93 ( 1.5)	7 ( 1.5)	53 ( 4.9)	47 ( 4.8)
	237 ( 2.8)	*** ( ***)	235 ( 3.6)	239 ( 2.7)
<b>Hispanic</b>				
State	95 ( 2.5)	5 ( 2.5)	56 ( 7.4)	44 ( 7.4)
Nation	233 ( 3.5)	*** ( ***)	*** ( ***)	*** ( ***)
	92 ( 1.2)	8 ( 1.2)	63 ( 4.3)	37 ( 4.3)
	245 ( 2.7)	*** ( ***)	243 ( 3.4)	245 ( 2.9)
<b><u>TYPE OF COMMUNITY</u></b>				
<b>Advantaged urban</b>				
State	98 ( 0.9)	2 ( 0.9)	43 (11.8)	57 (11.8)
Nation	270 ( 5.5) <sup>†</sup>	*** ( ***)	*** ( ***)	271 ( 5.2) <sup>†</sup>
	99 ( 1.0)	1 ( 1.0)	45 (12.2)	55 (12.2)
	281 ( 3.8) <sup>†</sup>	*** ( ***)	276 ( 2.5) <sup>†</sup>	285 ( 6.4) <sup>†</sup>
<b>Disadvantaged urban</b>				
State	93 ( 1.7)	7 ( 1.7)	58 ( 6.6)	42 ( 6.6)
Nation	239 ( 5.0) <sup>†</sup>	*** ( ***)	233 ( 4.6) <sup>†</sup>	247 ( 7.6) <sup>†</sup>
	94 ( 1.2)	6 ( 1.2)	53 ( 7.5)	47 ( 7.5)
	250 ( 3.5) <sup>†</sup>	*** ( ***)	247 ( 4.1) <sup>†</sup>	251 ( 3.6) <sup>†</sup>
<b>Extreme rural</b>				
State	97 ( 0.7)	3 ( 0.7)	40 ( 4.4)	60 ( 4.4)
Nation	255 ( 2.0)	*** ( ***)	252 ( 2.8)	257 ( 2.1)
	96 ( 1.3)	4 ( 1.3)	42 ( 8.7)	58 ( 8.7)
	257 ( 3.9) <sup>†</sup>	*** ( ***)	251 ( 4.8) <sup>†</sup>	261 ( 4.4) <sup>†</sup>
<b>Other</b>				
State	97 ( 0.7)	3 ( 0.7)	41 ( 2.9)	59 ( 2.9)
Nation	258 ( 1.1)	*** ( ***)	253 ( 1.5)	261 ( 1.3)
	97 ( 0.5)	3 ( 0.5)	50 ( 2.7)	50 ( 2.7)
	263 ( 1.7)	233 ( 5.4)	256 ( 2.1)	266 ( 2.0)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. <sup>†</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A18  
(continued)**Students' Reports on Whether They Own a  
Calculator and Whether Their Teacher Explains  
How To Use One**PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Own a Calculator		Teacher Explains Calculator Use	
	Yes	No	Yes	No
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>				
State	96 ( 0.5)	4 ( 0.5)	42 ( 2.3)	58 ( 2.3)
Nation	257 ( 0.9)	232 ( 2.8)	251 ( 1.3)	259 ( 1.0)
	97 ( 0.4)	3 ( 0.4)	48 ( 2.3)	51 ( 2.3)
	263 ( 1.3)	234 ( 3.8)	258 ( 1.7)	266 ( 1.5)
<b>PARENTS' EDUCATION</b>				
<b>HS non-graduate</b>				
State	93 ( 1.6)	7 ( 1.6)	42 ( 3.6)	58 ( 3.6)
Nation	246 ( 1.7)	*** ( ***)	244 ( 2.8)	246 ( 2.0)
	92 ( 1.6)	8 ( 1.6)	53 ( 4.6)	47 ( 4.6)
	243 ( 2.0)	*** ( ***)	242 ( 2.9)	243 ( 2.5)
<b>HS graduate</b>				
State	96 ( 0.8)	4 ( 0.8)	43 ( 3.0)	57 ( 3.0)
Nation	250 ( 1.0)	*** ( ***)	246 ( 1.9)	251 ( 1.3)
	97 ( 0.6)	3 ( 0.8)	54 ( 3.0)	46 ( 3.0)
	255 ( 1.5)	*** ( ***)	252 ( 1.9)	258 ( 2.0)
<b>Some college</b>				
State	97 ( 0.6)	3 ( 0.8)	38 ( 3.2)	62 ( 3.2)
Nation	266 ( 1.5)	*** ( ***)	261 ( 2.5)	269 ( 1.6)
	96 ( 0.9)	4 ( 0.9)	48 ( 3.2)	52 ( 3.2)
	268 ( 1.8)	*** ( ***)	265 ( 2.4)	268 ( 2.2)
<b>College graduate</b>				
State	98 ( 0.5)	2 ( 0.5)	41 ( 2.1)	59 ( 2.1)
Nation	267 ( 1.3)	*** ( ***)	259 ( 2.1)	272 ( 1.3)
	99 ( 0.2)	1 ( 0.2)	46 ( 2.6)	54 ( 2.6)
	275 ( 1.6)	*** ( ***)	268 ( 2.2)	280 ( 1.9)
<b>GENDER</b>				
<b>Male</b>				
State	97 ( 0.5)	3 ( 0.5)	43 ( 2.2)	57 ( 2.2)
Nation	258 ( 1.2)	*** ( ***)	253 ( 1.6)	261 ( 1.4)
	97 ( 0.5)	3 ( 0.5)	51 ( 2.6)	49 ( 2.6)
	264 ( 1.7)	*** ( ***)	258 ( 2.1)	269 ( 2.1)
<b>Female</b>				
State	96 ( 0.7)	4 ( 0.7)	41 ( 2.7)	59 ( 2.7)
Nation	255 ( 1.1)	*** ( ***)	250 ( 1.8)	258 ( 1.3)
	97 ( 0.5)	3 ( 0.5)	47 ( 2.5)	53 ( 2.5)
	262 ( 1.3)	*** ( ***)	258 ( 1.7)	263 ( 1.6)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A19 | Students' Reports on the Use of a Calculator for Problem Solving or Tests

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Working Problems in Class		Doing Problems at Home		Taking Quizzes or Tests	
	Almost Always	Never	Almost Always	Never	Almost Always	Never
<b>TOTAL</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
State	50 ( 1.1)	25 ( 1.8)	27 ( 1.2)	17 ( 1.0)	25 ( 1.4)	33 ( 1.4)
Nation	247 ( 1.0)	269 ( 1.2)	252 ( 1.4)	262 ( 1.5)	244 ( 1.6)	271 ( 1.0)
	48 ( 1.5)	23 ( 1.9)	30 ( 1.3)	19 ( 0.9)	27 ( 1.4)	30 ( 2.0)
	254 ( 1.5)	272 ( 1.4)	281 ( 1.8)	263 ( 1.8)	253 ( 2.4)	274 ( 1.3)
<b>RACE/ETHNICITY</b>						
<b>White</b>						
State	48 ( 1.3)	28 ( 2.0)	27 ( 1.4)	18 ( 1.4)	21 ( 1.2)	37 ( 1.8)
Nation	257 ( 1.0)	274 ( 1.2)	260 ( 1.5)	267 ( 1.5)	256 ( 1.8)	275 ( 1.0)
	48 ( 1.7)	24 ( 2.2)	31 ( 1.5)	18 ( 1.2)	25 ( 1.6)	32 ( 2.3)
	262 ( 1.7)	278 ( 1.3)	270 ( 1.7)	269 ( 2.3)	263 ( 2.6)	279 ( 1.2)
<b>Black</b>						
State	60 ( 2.4)	17 ( 2.0)	26 ( 1.7)	12 ( 1.2)	37 ( 2.3)	21 ( 1.4)
Nation	225 ( 1.4)	244 ( 2.7)	229 ( 2.1)	240 ( 3.2)	223 ( 1.6)	246 ( 1.9)
	57 ( 3.2)	20 ( 3.9)	31 ( 2.9)	18 ( 1.9)	38 ( 3.3)	24 ( 3.1)
	232 ( 2.4)	249 ( 4.0)	233 ( 3.3)	248 ( 5.5)	230 ( 3.6)	251 ( 4.1)
<b>Hispanic</b>						
State	62 ( 4.4)	8 ( 2.9)	26 ( 4.0)	11 ( 2.9)	32 ( 6.5)	12 ( 3.8)
Nation	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	51 ( 2.9)	16 ( 3.5)	26 ( 3.2)	21 ( 2.1)	26 ( 2.7)	22 ( 3.1)
	239 ( 2.8)	252 ( 3.3)	238 ( 4.8)	244 ( 3.1)	237 ( 3.2)	256 ( 4.2)
<b>TYPE OF COMMUNITY</b>						
<b>Advantaged urban</b>						
State	45 ( 4.3)	17 ( 7.7)	27 ( 5.0)	15 ( 5.6)	19 ( 3.5)	28 ( 8.8)
Nation	257 ( 7.3) <sup>!</sup>	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	51 ( 5.4)	23 ( 10.7)	32 ( 6.1)	15 ( 2.4)	31 ( 3.8)	28 ( 9.8)
	270 ( 4.7) <sup>!</sup>	*** ( ***)	274 ( 4.8) <sup>!</sup>	*** ( ***)	281 ( 7.6) <sup>!</sup>	285 ( 4.2) <sup>!</sup>
<b>Disadvantaged urban</b>						
State	56 ( 4.0)	15 ( 2.8)	26 ( 3.4)	14 ( 2.3)	31 ( 4.4)	26 ( 3.9)
Nation	228 ( 5.1) <sup>!</sup>	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	52 ( 3.1)	22 ( 4.5)	30 ( 3.3)	24 ( 2.3)	27 ( 2.9)	27 ( 4.8)
	241 ( 3.8) <sup>!</sup>	259 ( 5.4) <sup>!</sup>	246 ( 5.2) <sup>!</sup>	254 ( 4.8) <sup>!</sup>	240 ( 4.9) <sup>!</sup>	263 ( 5.0) <sup>!</sup>
<b>Extreme rural</b>						
State	49 ( 2.0)	23 ( 3.6)	27 ( 3.3)	15 ( 2.4)	25 ( 2.5)	29 ( 2.4)
Nation	248 ( 2.2)	265 ( 2.2)	251 ( 2.7)	261 ( 2.7)	246 ( 3.1)	265 ( 2.3)
	46 ( 7.4)	29 ( 6.5)	20 ( 2.5)	23 ( 3.9)	24 ( 6.6)	37 ( 8.3)
	246 ( 4.3) <sup>!</sup>	268 ( 6.1) <sup>!</sup>	*** ( ***)	263 ( 4.4) <sup>!</sup>	*** ( ***)	270 ( 4.0) <sup>!</sup>
<b>Other</b>						
State	50 ( 1.4)	27 ( 1.7)	27 ( 1.3)	17 ( 1.2)	25 ( 1.7)	35 ( 1.5)
Nation	248 ( 1.4)	271 ( 1.5)	253 ( 1.7)	265 ( 1.8)	245 ( 2.0)	273 ( 1.2)
	48 ( 1.9)	22 ( 2.0)	32 ( 1.7)	18 ( 1.1)	27 ( 1.8)	29 ( 2.1)
	254 ( 2.1)	272 ( 1.8)	283 ( 2.3)	263 ( 2.8)	253 ( 2.7)	275 ( 1.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Sometimes" category is not included. <sup>!</sup> Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A19 | **Students' Reports on the Use of a Calculator  
for Problem Solving or Tests**  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Working Problems in Class		Doing Problems at Home		Taking Quizzes or Tests	
	Almost Always	Never	Almost Always	Never	Almost Always	Never
<b>TOTAL</b>	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
State	50 ( 1.1)	25 ( 1.8)	27 ( 1.2)	17 ( 1.0)	25 ( 1.4)	33 ( 1.4)
Nation	247 ( 1.0)	269 ( 1.2)	252 ( 1.4)	262 ( 1.5)	244 ( 1.6)	271 ( 1.0)
	48 ( 1.5)	23 ( 1.9)	30 ( 1.3)	19 ( 0.9)	27 ( 1.4)	30 ( 2.0)
	254 ( 1.5)	272 ( 1.4)	261 ( 1.8)	263 ( 1.8)	259 ( 2.4)	274 ( 1.3)
<b>PARENTS' EDUCATION</b>						
<b>HS non-graduate</b>						
State	61 ( 2.6)	20 ( 2.6)	24 ( 2.6)	18 ( 2.5)	26 ( 3.3)	26 ( 2.5)
Nation	240 ( 2.0)	*** ( ***)	244 ( 3.1)	*** ( ***)	236 ( 2.8)	254 ( 2.5)
	54 ( 3.3)	19 ( 3.8)	26 ( 3.1)	22 ( 2.8)	32 ( 3.8)	24 ( 3.2)
	240 ( 2.3)	*** ( ***)	244 ( 3.8)	244 ( 4.2)	237 ( 2.3)	251 ( 4.6)
<b>HS graduate</b>						
State	52 ( 1.9)	21 ( 1.9)	27 ( 2.2)	17 ( 1.6)	27 ( 2.0)	27 ( 2.0)
Nation	243 ( 1.4)	262 ( 2.0)	246 ( 1.8)	255 ( 2.6)	240 ( 2.1)	264 ( 1.5)
	52 ( 2.5)	20 ( 2.4)	29 ( 1.9)	18 ( 1.5)	26 ( 1.8)	27 ( 2.2)
	249 ( 1.4)	265 ( 2.7)	250 ( 2.4)	256 ( 2.4)	246 ( 2.8)	265 ( 2.0)
<b>Some college</b>						
State	40 ( 2.2)	30 ( 3.1)	25 ( 2.0)	18 ( 2.3)	20 ( 2.3)	42 ( 2.9)
Nation	257 ( 2.2)	273 ( 2.0)	256 ( 2.9)	275 ( 3.0)	252 ( 2.5)	275 ( 1.8)
	46 ( 2.8)	26 ( 2.8)	28 ( 2.0)	20 ( 1.9)	26 ( 2.4)	35 ( 2.5)
	258 ( 2.1)	272 ( 2.5)	267 ( 3.0)	268 ( 3.2)	255 ( 3.6)	275 ( 2.0)
<b>College graduate</b>						
State	47 ( 1.8)	28 ( 2.1)	29 ( 1.5)	15 ( 1.4)	24 ( 1.6)	37 ( 2.1)
Nation	254 ( 1.5)	280 ( 1.9)	261 ( 2.4)	270 ( 3.0)	254 ( 2.5)	280 ( 1.7)
	45 ( 1.9)	25 ( 2.4)	33 ( 2.0)	16 ( 1.4)	26 ( 1.6)	33 ( 2.7)
	265 ( 1.7)	284 ( 1.8)	274 ( 2.2)	278 ( 2.8)	268 ( 2.6)	285 ( 2.0)
<b>GENDER</b>						
<b>Male</b>						
State	53 ( 1.5)	23 ( 1.7)	25 ( 1.4)	17 ( 1.1)	24 ( 1.6)	28 ( 1.8)
Nation	248 ( 1.4)	273 ( 1.8)	253 ( 2.1)	263 ( 2.0)	246 ( 2.1)	275 ( 1.6)
	50 ( 1.7)	20 ( 2.0)	29 ( 1.6)	19 ( 1.3)	27 ( 1.5)	26 ( 2.1)
	255 ( 1.9)	275 ( 2.2)	264 ( 2.8)	263 ( 2.5)	256 ( 3.0)	277 ( 1.9)
<b>Female</b>						
State	46 ( 1.6)	27 ( 2.0)	28 ( 1.4)	16 ( 1.4)	26 ( 1.7)	37 ( 1.7)
Nation	245 ( 1.3)	266 ( 1.5)	252 ( 1.6)	262 ( 1.8)	243 ( 2.0)	267 ( 1.3)
	46 ( 2.0)	26 ( 2.1)	32 ( 1.6)	18 ( 1.2)	27 ( 1.8)	33 ( 2.1)
	252 ( 1.7)	269 ( 1.8)	259 ( 1.7)	263 ( 2.1)	251 ( 2.4)	271 ( 1.5)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. The percentages may not total 100 percent because the "Sometimes" category is not included. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

# Arkansas

**TABLE A20 | Students' Knowledge of Using Calculators**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	High "Calculator-Use" Group	Other "Calculator-Use" Group
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>		
State	45 ( 1.1)	55 ( 1.1)
Nation	262 ( 1.2) 42 ( 1.3) 272 ( 1.6)	250 ( 1.2) 58 ( 1.3) 255 ( 1.5)
<b><u>RACE/ETHNICITY</u></b>		
<b>White</b>		
State	48 ( 1.3)	54 ( 1.3)
Nation	271 ( 1.3) 44 ( 1.4) 277 ( 1.7)	260 ( 1.2) 56 ( 1.4) 263 ( 1.7)
<b>Black</b>		
State	42 ( 2.1)	58 ( 2.1)
Nation	235 ( 2.0) 37 ( 3.4) 248 ( 3.8)	225 ( 1.8) 63 ( 3.4) 231 ( 3.0)
<b>Hispanic</b>		
State	29 ( 5.2) *** ( ***)	71 ( 5.2) *** ( ***)
Nation	36 ( 4.2) 254 ( 4.6)	64 ( 4.2) 238 ( 3.0)
<b><u>TYPE OF COMMUNITY</u></b>		
<b>Advantaged urban</b>		
State	40 ( 8.9) *** ( ***)	60 ( 8.9) 264 ( 8.4)!
Nation	50 ( 3.8) 288 ( 4.9)!	50 ( 3.8) 275 ( 4.4)!
<b>Disadvantaged urban</b>		
State	40 ( 5.4) *** ( ***)	60 ( 5.4) 232 ( 6.4)!
Nation	38 ( 4.2) 262 ( 5.6)!	62 ( 4.2) 244 ( 3.9)!
<b>Extreme rural</b>		
State	42 ( 2.3)	58 ( 2.3)
Nation	262 ( 2.5) 39 ( 5.6) 269 ( 4.4)!	250 ( 2.1) 61 ( 5.6) 248 ( 4.3)!
<b>Other</b>		
State	47 ( 1.4)	53 ( 1.4)
Nation	263 ( 1.2) 42 ( 1.4) 271 ( 1.9)	252 ( 1.6) 58 ( 1.4) 255 ( 2.0)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A20 | Students' Knowledge of Using Calculators  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	High "Calculator-Use" Group	Other "Calculator-Use" Group
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>		
State	45 ( 1.1)	55 ( 1.1)
Nation	262 ( 1.2)	250 ( 1.2)
	42 ( 1.3)	58 ( 1.3)
	272 ( 1.6)	255 ( 1.5)
<b>PARENTS' EDUCATION</b>		
<b>HS non-graduate</b>		
State	38 ( 3.3)	62 ( 3.3)
Nation	250 ( 3.2)	241 ( 2.9)
	34 ( 3.3)	66 ( 3.3)
	248 ( 4.4)	242 ( 2.4)
<b>HS graduate</b>		
State	43 ( 2.0)	57 ( 2.0)
Nation	254 ( 1.7)	245 ( 1.6)
	40 ( 2.2)	60 ( 2.2)
	263 ( 2.0)	249 ( 1.8)
<b>Some college</b>		
State	45 ( 2.0)	55 ( 2.0)
Nation	271 ( 2.3)	261 ( 2.2)
	48 ( 2.2)	52 ( 2.2)
	277 ( 2.6)	258 ( 2.5)
<b>College graduate</b>		
State	50 ( 2.1)	50 ( 2.1)
Nation	273 ( 1.4)	261 ( 2.0)
	46 ( 2.0)	54 ( 2.0)
	282 ( 2.1)	268 ( 1.9)
<b>GENDER</b>		
<b>Male</b>		
State	42 ( 1.4)	58 ( 1.4)
Nation	264 ( 1.6)	251 ( 1.7)
	39 ( 2.0)	61 ( 2.0)
	274 ( 2.0)	255 ( 2.3)
<b>Female</b>		
State	47 ( 1.6)	53 ( 1.6)
Nation	260 ( 1.6)	250 ( 1.5)
	45 ( 1.8)	55 ( 1.8)
	269 ( 1.7)	254 ( 1.3)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.



**TABLE A24 | Students' Reports on Types of Reading Materials in the Home**

 PERCENTAGE OF STUDENTS AND  
 AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Zero to Two Types	Three Types	Four Types
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	23 ( 0.7)	31 ( 1.0)	47 ( 1.2)
Nation	244 ( 1.3)	253 ( 1.4)	263 ( 1.2)
	21 ( 1.0)	30 ( 1.0)	48 ( 1.3)
	244 ( 2.0)	258 ( 1.7)	272 ( 1.1)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	20 ( 0.8)	30 ( 1.0)	51 ( 1.2)
Nation	255 ( 1.5)	262 ( 1.2)	270 ( 1.2)
	16 ( 1.1)	29 ( 1.3)	56 ( 1.5)
	251 ( 2.2)	268 ( 1.5)	276 ( 1.7)
<b>Black</b>			
State	30 ( 2.0)	33 ( 2.0)	37 ( 2.8)
Nation	224 ( 2.0)	231 ( 2.1)	235 ( 1.8)
	31 ( 1.9)	36 ( 2.2)	33 ( 2.4)
	232 ( 3.2)	233 ( 3.9)	245 ( 3.3)
<b>Hispanic</b>			
State	32 ( 4.6)	38 ( 5.2)	30 ( 5.3)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	44 ( 3.0)	30 ( 2.4)	26 ( 2.3)
	237 ( 3.4)	244 ( 4.3)	253 ( 2.4)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	17 ( 2.8)	21 ( 2.2)	62 ( 2.9)
Nation	*** ( ***)	*** ( ***)	280 ( 5.4)
	13 ( 3.8)	26 ( 2.1)	61 ( 4.9)
	*** ( ***)	*** ( ***)	287 ( 3.6)
<b>Disadvantaged urban</b>			
State	29 ( 3.4)	34 ( 3.6)	37 ( 3.3)
Nation	*** ( ***)	*** ( ***)	246 ( 5.0)
	32 ( 3.9)	31 ( 2.3)	37 ( 3.6)
	243 ( 2.9)	247 ( 3.7)	257 ( 4.9)
<b>Extreme rural</b>			
State	27 ( 1.8)	34 ( 1.9)	39 ( 2.5)
Nation	246 ( 2.0)	254 ( 3.1)	262 ( 1.9)
	17 ( 4.9)	33 ( 3.2)	50 ( 5.1)
	*** ( ***)	253 ( 4.3)	263 ( 5.6)
<b>Other</b>			
State	2 ( 0.9)	29 ( 1.1)	49 ( 1.3)
Nation	245 ( 1.9)	255 ( 1.5)	264 ( 1.4)
	22 ( 1.5)	30 ( 1.3)	48 ( 1.5)
	244 ( 2.6)	259 ( 2.2)	272 ( 1.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A24 | Students' Reports on Types of Reading Materials in the Home  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Zero to Two Types	Three Types	Four Types
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>			
State	23 ( 0.7)	31 ( 1.0)	47 ( 1.2)
Nation	244 ( 1.3)	253 ( 1.4)	263 ( 1.2)
	21 ( 1.0)	30 ( 1.0)	48 ( 1.3)
	244 ( 2.0)	258 ( 1.7)	272 ( 1.5)
<b><u>PARENTS' EDUCATION</u></b>			
<b>HS non-graduate</b>			
State	41 ( 2.8)	32 ( 2.8)	27 ( 2.5)
Nation	242 ( 2.8)	248 ( 2.5)	247 ( 3.7)
	47 ( 4.0)	28 ( 3.0)	25 ( 2.8)
	240 ( 3.4)	243 ( 3.3)	246 ( 3.3)
<b>HS graduate</b>			
State	26 ( 1.4)	32 ( 1.6)	42 ( 1.8)
Nation	242 ( 2.2)	249 ( 1.8)	254 ( 1.6)
	26 ( 2.2)	33 ( 1.9)	40 ( 1.7)
	246 ( 2.2)	253 ( 2.7)	260 ( 2.1)
<b>Some college</b>			
State	16 ( 1.6)	32 ( 1.8)	52 ( 2.0)
Nation	253 ( 3.3)	265 ( 1.8)	270 ( 1.9)
	17 ( 1.5)	32 ( 1.7)	51 ( 2.0)
	251 ( 4.0)	282 ( 2.6)	274 ( 1.9)
<b>College graduate</b>			
State	12 ( 1.1)	27 ( 1.8)	61 ( 2.0)
Nation	253 ( 3.0)	281 ( 2.4)	272 ( 1.8)
	10 ( 0.8)	28 ( 1.8)	62 ( 2.0)
	254 ( 2.8)	269 ( 2.5)	280 ( 1.8)
<b><u>GENDER</u></b>			
<b>Male</b>			
State	25 ( 1.2)	30 ( 1.2)	45 ( 1.8)
Nation	246 ( 1.9)	255 ( 1.8)	265 ( 1.8)
	21 ( 1.5)	31 ( 1.5)	48 ( 1.4)
	244 ( 2.3)	259 ( 2.1)	273 ( 2.0)
<b>Female</b>			
State	21 ( 1.0)	31 ( 1.3)	48 ( 1.5)
Nation	242 ( 1.7)	252 ( 1.8)	262 ( 1.4)
	22 ( 1.2)	29 ( 1.4)	49 ( 1.9)
	244 ( 2.2)	258 ( 1.9)	270 ( 1.7)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

Arkansas

TABLE A25 | Students' Reports on the Amount of Time Spent Watching Television Each Day

PERCENTAGE OF STUDENTS AND AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	One Hour or Less	Two Hours	Three Hours	Four to Five Hours	Six Hours or More
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b>TOTAL</b>					
State	8 ( 0.5)	18 ( 0.8)	22 ( 0.8)	33 ( 1.1)	20 ( 0.9)
Nation	12 ( 0.8)	21 ( 0.9)	22 ( 0.8)	28 ( 1.1)	18 ( 1.0)
	255 ( 2.5)	260 ( 1.9)	261 ( 1.8)	257 ( 0.9)	245 ( 1.5)
	269 ( 2.2)	268 ( 1.8)	265 ( 1.7)	260 ( 1.7)	245 ( 1.7)
<b>RACE/ETHNICITY</b>					
<b>White</b>					
State	9 ( 0.7)	17 ( 0.9)	24 ( 1.0)	34 ( 1.2)	16 ( 1.0)
Nation	13 ( 1.0)	23 ( 1.2)	24 ( 1.1)	27 ( 1.4)	12 ( 1.2)
	264 ( 2.3)	269 ( 1.7)	267 ( 1.8)	265 ( 1.1)	257 ( 1.4)
	276 ( 2.5)	275 ( 2.2)	272 ( 1.9)	267 ( 1.7)	253 ( 2.6)
<b>Black</b>					
State	6 ( 1.1)	13 ( 1.3)	14 ( 1.2)	33 ( 2.2)	33 ( 1.9)
Nation	6 ( 0.8)	13 ( 1.7)	17 ( 2.1)	32 ( 1.8)	32 ( 2.2)
	*** ( ***)	231 ( 3.2)	233 ( 3.4)	233 ( 1.8)	228 ( 1.8)
	*** ( ***)	239 ( 7.0)	239 ( 5.0)	239 ( 4.0)	233 ( 2.5)
<b>Hispanic</b>					
State	10 ( 3.2)	23 ( 4.0)	20 ( 4.4)	25 ( 4.4)	22 ( 3.7)
Nation	14 ( 2.4)	20 ( 2.5)	19 ( 2.1)	31 ( 3.1)	17 ( 1.7)
	*** ( ***)	245 ( 3.2)	242 ( 5.6)	247 ( 3.5)	236 ( 3.8)
	*** ( ***)				
<b>TYPE OF COMMUNITY</b>					
<b>Advantaged urban</b>					
State	10 ( 2.6)	18 ( 4.5)	31 ( 3.8)	26 ( 3.1)	16 ( 5.5)
Nation	18 ( 1.4)	25 ( 4.3)	21 ( 1.8)	30 ( 4.3)	6 ( 2.0)
	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)	*** ( ***)
<b>Disadvantaged urban</b>					
State	9 ( 1.6)	14 ( 3.7)	16 ( 3.2)	36 ( 2.8)	25 ( 2.8)
Nation	9 ( 1.2)	17 ( 3.1)	19 ( 2.1)	34 ( 2.4)	20 ( 3.2)
	*** ( ***)	250 ( 4.0)!	255 ( 5.0)!	251 ( 4.7)!	238 ( 4.5)!
	*** ( ***)	*** ( ***)	*** ( ***)	241 ( 5.3)!	*** ( ***)
<b>Extreme rural</b>					
State	7 ( 1.1)	12 ( 1.1)	23 ( 2.1)	36 ( 2.5)	22 ( 2.4)
Nation	14 ( 3.3)	19 ( 2.6)	23 ( 2.0)	26 ( 2.7)	19 ( 3.8)
	*** ( ***)	*** ( ***)	*** ( ***)	256 ( 1.3)	245 ( 3.1)!
	*** ( ***)	260 ( 5.3)	262 ( 2.5)	256 ( 3.6)!	*** ( ***)
<b>Other</b>					
State	8 ( 0.7)	17 ( 1.0)	22 ( 1.0)	33 ( 1.3)	19 ( 1.2)
Nation	12 ( 1.0)	21 ( 1.0)	23 ( 1.2)	27 ( 1.2)	17 ( 1.4)
	260 ( 2.9)	262 ( 2.2)	261 ( 2.0)	258 ( 1.3)	247 ( 1.9)
	268 ( 2.6)	269 ( 2.3)	265 ( 2.1)	259 ( 2.2)	246 ( 2.5)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A25 | Students' Reports on the Amount of Time Spent  
Watching Television Each Day  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	One Hour or Less	Two Hours	Three Hours	Four to Five Hours	Six Hours or More
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b>TOTAL</b>					
State	8 ( 0.5) 255 ( 2.5)	16 ( 0.8) 260 ( 1.9)	22 ( 0.8) 261 ( 1.6)	33 ( 1.1) 257 ( 0.9)	20 ( 0.9) 245 ( 1.5)
Nation	12 ( 0.8) 269 ( 2.2)	21 ( 0.9) 268 ( 1.8)	22 ( 0.8) 265 ( 1.7)	28 ( 1.1) 260 ( 1.7)	16 ( 1.0) 245 ( 1.7)
<b>PARENTS' EDUCATION</b>					
<b>HS non-graduate</b>					
State	10 ( 1.8) *** ( ***)	15 ( 2.0) *** ( ***)	21 ( 2.8) 247 ( 3.6)	31 ( 3.0) 244 ( 2.8)	22 ( 2.7) 240 ( 3.6)
Nation	12 ( 2.2) *** ( ***)	20 ( 3.1) *** ( ***)	21 ( 2.8) *** ( ***)	28 ( 2.9) 244 ( 3.2)	20 ( 2.4) *** ( ***)
<b>HS graduate</b>					
State	8 ( 0.9) 242 ( 4.0)	13 ( 1.3) 249 ( 3.0)	21 ( 1.4) 254 ( 1.9)	38 ( 1.9) 252 ( 1.5)	22 ( 1.3) 241 ( 2.0)
Nation	8 ( 1.0) 249 ( 4.7)	17 ( 1.4) 257 ( 2.8)	23 ( 2.0) 259 ( 3.2)	32 ( 2.3) 253 ( 2.5)	19 ( 1.6) 248 ( 3.0)
<b>Some college</b>					
State	8 ( 1.3) *** ( ***)	18 ( 1.8) 273 ( 3.4)	23 ( 1.9) 269 ( 3.0)	34 ( 2.0) 265 ( 2.1)	17 ( 1.9) 256 ( 4.2)
Nation	10 ( 1.4) *** ( ***)	25 ( 2.4) 275 ( 2.7)	23 ( 2.6) 269 ( 3.5)	28 ( 2.2) 267 ( 2.5)	14 ( 1.5) 242 ( 3.4)
<b>College graduate</b>					
State	9 ( 1.0) 274 ( 3.1)	17 ( 1.3) 274 ( 2.6)	24 ( 1.8) 269 ( 2.5)	32 ( 1.8) 267 ( 1.8)	18 ( 1.8) 251 ( 2.8)
Nation	17 ( 1.3) 282 ( 2.6)	22 ( 1.6) 280 ( 2.5)	23 ( 1.1) 277 ( 2.2)	25 ( 1.5) 270 ( 2.4)	12 ( 1.1) 255 ( 3.2)
<b>GENDER</b>					
<b>Male</b>					
State	8 ( 0.7) 254 ( 3.7)	16 ( 1.1) 260 ( 2.7)	22 ( 1.2) 261 ( 2.1)	34 ( 1.6) 259 ( 1.5)	21 ( 1.2) 248 ( 2.2)
Nation	11 ( 0.9) 269 ( 3.3)	22 ( 1.2) 267 ( 2.6)	22 ( 1.0) 267 ( 2.2)	28 ( 1.3) 262 ( 2.1)	17 ( 1.5) 248 ( 2.5)
<b>Female</b>					
State	9 ( 0.9) 256 ( 3.1)	16 ( 1.1) 261 ( 2.7)	23 ( 1.1) 260 ( 2.1)	33 ( 1.4) 255 ( 1.2)	19 ( 1.2) 242 ( 2.0)
Nation	14 ( 1.1) 269 ( 2.8)	20 ( 1.3) 269 ( 2.2)	23 ( 1.4) 264 ( 1.8)	28 ( 1.6) 258 ( 1.9)	15 ( 1.2) 241 ( 2.2)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

**TABLE A26 | Students' Reports on the Number of Days of School Missed**

 PERCENTAGE OF STUDENTS AND  
 AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	None	One or Two Days	Three Days or More
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	42 ( 1.1)	38 ( 1.0)	23 ( 1.0)
Nation	280 ( 1.3)	257 ( 1.2)	247 ( 1.6)
	45 ( 1.1)	32 ( 0.9)	23 ( 1.1)
	265 ( 1.8)	266 ( 1.5)	250 ( 1.9)
<b>RACE/ETHNICITY</b>			
<b>White</b>			
State	40 ( 1.2)	36 ( 1.1)	24 ( 1.1)
Nation	270 ( 1.1)	266 ( 1.5)	254 ( 1.5)
	43 ( 1.2)	34 ( 1.2)	23 ( 1.2)
	273 ( 1.8)	272 ( 1.7)	258 ( 2.1)
<b>Black</b>			
State	45 ( 2.9)	34 ( 2.7)	20 ( 2.0)
Nation	235 ( 1.4)	229 ( 1.8)	223 ( 2.5)
	56 ( 3.1)	21 ( 1.8)	23 ( 2.5)
	240 ( 3.2)	240 ( 4.1)	224 ( 3.5)
<b>Hispanic</b>			
State	46 ( 3.8)	37 ( 4.5)	17 ( 4.0)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	41 ( 3.3)	32 ( 2.2)	27 ( 2.6)
	245 ( 4.8)	250 ( 3.3)	235 ( 3.1)
<b>TYPE OF COMMUNITY</b>			
<b>Advantaged urban</b>			
State	41 ( 2.5)	27 ( 2.3)	32 ( 2.1)
Nation	*** ( ***)	*** ( ***)	*** ( ***)
	47 ( 2.3)	38 ( 2.6)	15 ( 3.7)
	284 ( 4.4)	279 ( 4.5)	*** ( ***)
<b>Disadvantaged urban</b>			
State	40 ( 4.2)	32 ( 1.9)	29 ( 3.8)
Nation	242 ( 7.1)	*** ( ***)	*** ( ***)
	42 ( 3.3)	26 ( 1.8)	32 ( 2.7)
	254 ( 3.7)	256 ( 4.2)	238 ( 6.3)
<b>Extreme rural</b>			
State	43 ( 1.8)	37 ( 2.0)	20 ( 1.8)
Nation	258 ( 2.8)	255 ( 2.7)	247 ( 2.9)
	43 ( 4.4)	32 ( 4.2)	25 ( 3.9)
	257 ( 4.1)	264 ( 5.8)	*** ( ***)
<b>Other</b>			
State	42 ( 1.4)	37 ( 1.2)	21 ( 1.0)
Nation	281 ( 1.5)	259 ( 1.6)	248 ( 1.9)
	45 ( 1.3)	32 ( 1.1)	23 ( 1.1)
	265 ( 2.2)	266 ( 1.9)	251 ( 2.4)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

TABLE A26 | Students' Reports on the Number of Days of School Missed  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	None	One or Two Days	Three Days or More
	Percentage and Proficiency	Percentage and Proficiency	Percentage and Proficiency
<b>TOTAL</b>			
State	42 ( 1.1) 260 ( 1.3)	36 ( 1.0) 257 ( 1.2)	23 ( 1.0) 247 ( 1.6)
Nation	45 ( 1.1) 265 ( 1.8)	32 ( 0.9) 268 ( 1.5)	23 ( 1.1) 250 ( 1.9)
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	34 ( 3.0) 251 ( 2.8)	34 ( 2.7) 245 ( 3.1)	32 ( 2.7) 238 ( 2.4)
Nation	36 ( 3.2) 245 ( 3.0)	26 ( 3.1) 249 ( 3.3)	38 ( 3.5) 237 ( 3.1)
<b>HS graduate</b>			
State	40 ( 1.8) 250 ( 1.8)	37 ( 2.1) 251 ( 1.5)	23 ( 1.6) 244 ( 2.1)
Nation	43 ( 2.1) 255 ( 2.0)	31 ( 1.9) 257 ( 2.6)	27 ( 1.9) 249 ( 2.4)
<b>Some college</b>			
State	41 ( 2.6) 270 ( 2.1)	37 ( 2.8) 266 ( 2.4)	22 ( 2.0) 257 ( 2.6)
Nation	40 ( 1.8) 270 ( 3.0)	37 ( 1.6) 271 ( 2.5)	23 ( 1.6) 253 ( 3.1)
<b>College graduate</b>			
State	48 ( 1.8) 270 ( 1.9)	34 ( 1.6) 268 ( 2.1)	18 ( 1.5) 256 ( 3.4)
Nation	51 ( 1.6) 275 ( 2.1)	33 ( 1.2) 277 ( 1.7)	16 ( 1.3) 265 ( 3.1)
<b>GENDER</b>			
<b>Male</b>			
State	44 ( 1.6) 261 ( 1.7)	34 ( 1.4) 259 ( 1.7)	22 ( 1.0) 248 ( 2.2)
Nation	47 ( 1.6) 266 ( 2.0)	31 ( 1.4) 267 ( 2.1)	22 ( 1.4) 250 ( 2.6)
<b>Female</b>			
State	40 ( 1.6) 259 ( 1.3)	37 ( 1.5) 256 ( 1.8)	23 ( 1.4) 246 ( 1.7)
Nation	43 ( 1.4) 264 ( 2.3)	32 ( 1.1) 266 ( 1.7)	25 ( 1.3) 250 ( 1.8)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample.

# Arkansas

**TABLE A27 | Students' Perceptions of Mathematics**

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Strongly Agree	Agree	Undecided, Disagree, Strongly Disagree
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b><u>TOTAL</u></b>			
State	28 ( 1.0) 263 ( 1.4)	48 ( 1.2) 257 ( 1.2)	24 ( 0.9) 247 ( 1.2)
Nation	27 ( 1.3) 271 ( 1.9)	49 ( 1.0) 262 ( 1.7)	24 ( 1.2) 251 ( 1.8)
<b><u>RACE/ETHNICITY</u></b>			
<b>White</b>			
State	26 ( 1.1) 274 ( 1.4)	48 ( 1.3) 268 ( 1.2)	26 ( 1.1) 253 ( 1.2)
Nation	26 ( 1.6) 279 ( 2.0)	48 ( 1.3) 272 ( 1.8)	26 ( 1.5) 257 ( 2.0)
<b>Black</b>			
State	32 ( 2.0) 237 ( 1.7)	48 ( 2.4) 230 ( 1.6)	19 ( 2.0) 222 ( 2.6)
Nation	32 ( 2.5) 247 ( 4.1)	52 ( 2.3) 233 ( 3.3)	16 ( 1.9) 227 ( 4.2)
<b>Hispanic</b>			
State	35 ( 5.9) *** ( ***)	43 ( 5.2) *** ( ***)	22 ( 3.9) *** ( ***)
Nation	24 ( 2.5) 257 ( 5.5)	48 ( 2.6) 244 ( 2.2)	28 ( 2.1) 236 ( 3.8)
<b><u>TYPE OF COMMUNITY</u></b>			
<b>Advantaged urban</b>			
State	31 ( 8.7) *** ( ***)	46 ( 5.2) 268 ( 6.8)!	23 ( 4.5) *** ( ***)
Nation	17 ( 3.2) *** ( ***)	55 ( 2.4) 280 ( 4.1)!	28 ( 4.2) *** ( ***)
<b>Disadvantaged urban</b>			
State	34 ( 1.7) *** ( ***)	42 ( 2.8) 238 ( 5.5)!	24 ( 3.7) *** ( ***)
Nation	26 ( 2.9) 260 ( 5.6)!	48 ( 2.9) 249 ( 4.6)!	26 ( 3.2) 240 ( 4.5)!
<b>Extreme rural</b>			
State	26 ( 1.8) 261 ( 2.3)	50 ( 1.9) 254 ( 2.3)	24 ( 2.1) 249 ( 2.7)
Nation	34 ( 2.8) 270 ( 3.9)!	49 ( 2.2) 252 ( 4.1)!	17 ( 1.4) *** ( ***)
<b>Other</b>			
State	27 ( 1.4) 264 ( 2.0)	49 ( 1.7) 259 ( 1.3)	24 ( 1.2) 247 ( 1.4)
Nation	27 ( 1.4) 271 ( 2.4)	48 ( 1.2) 263 ( 2.2)	25 ( 1.4) 250 ( 1.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. ! Interpret with caution -- the nature of the sample does not allow accurate determination of the variability of this estimated mean proficiency. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

1.3

TABLE A27 | Students' Perceptions of Mathematics  
(continued)

PERCENTAGE OF STUDENTS AND  
AVERAGE MATHEMATICS PROFICIENCY

1990 NAEP TRIAL STATE ASSESSMENT	Strongly Agree	Agree	Undecided, Disagree, Strongly Disagree
	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>	<b>Percentage and Proficiency</b>
<b>TOTAL</b>			
State	28 ( 1.0) 283 ( 1.4)	48 ( 1.2) 257 ( 1.2)	24 ( 0.9) 247 ( 1.2)
Nation	27 ( 1.3) 271 ( 1.9)	49 ( 1.0) 262 ( 1.7)	24 ( 1.2) 251 ( 1.8)
<b>PARENTS' EDUCATION</b>			
<b>HS non-graduate</b>			
State	24 ( 2.7) 251 ( 4.1)	46 ( 3.3) 244 ( 2.4)	30 ( 3.1) 241 ( 2.6)
Nation	20 ( 2.6) *** ( ***)	50 ( 3.3) 243 ( 2.6)	30 ( 3.6) 238 ( 4.3)
<b>HS graduate</b>			
State	24 ( 1.7) 255 ( 2.5)	50 ( 2.2) 250 ( 1.6)	26 ( 1.7) 242 ( 1.8)
Nation	27 ( 2.1) 262 ( 2.7)	47 ( 2.3) 255 ( 2.3)	26 ( 2.0) 245 ( 2.4)
<b>Some college</b>			
State	28 ( 2.3) 273 ( 2.5)	49 ( 2.4) 266 ( 2.3)	23 ( 2.3) 257 ( 2.9)
Nation	28 ( 2.5) 274 ( 3.1)	47 ( 2.4) 267 ( 1.9)	25 ( 1.8) 258 ( 3.2)
<b>College graduate</b>			
State	34 ( 1.8) 271 ( 2.3)	49 ( 2.1) 267 ( 1.4)	18 ( 1.2) 256 ( 2.8)
Nation	30 ( 2.3) 280 ( 2.4)	51 ( 1.6) 274 ( 2.2)	19 ( 1.8) 266 ( 2.5)
<b>GENDER</b>			
<b>Male</b>			
State	28 ( 1.5) 265 ( 2.0)	47 ( 1.6) 259 ( 1.5)	25 ( 1.1) 246 ( 1.6)
Nation	28 ( 1.5) 273 ( 2.3)	48 ( 1.2) 263 ( 2.0)	24 ( 1.4) 251 ( 2.4)
<b>Female</b>			
State	27 ( 1.2) 260 ( 1.8)	50 ( 1.6) 255 ( 1.2)	23 ( 1.3) 247 ( 1.8)
Nation	26 ( 1.7) 269 ( 2.1)	50 ( 1.7) 262 ( 1.8)	25 ( 1.9) 252 ( 1.9)

The standard errors of the estimated statistics appear in parentheses. It can be said with about 95 percent certainty that, for each population of interest, the value for the entire population is within  $\pm 2$  standard errors of the estimate for the sample. \*\*\* Sample size is insufficient to permit a reliable estimate (fewer than 62 students).

J. . .



## Acknowledgments

The design, development, analysis, and reporting of the first Trial State Assessment was truly a collaborative effort among staff from State Education Agencies, the National Center for Education Statistics (NCES), Educational Testing Service (ETS), Westat, and National Computer Systems (NCS). The program benefitted from the contributions of hundreds of individuals at the state and local levels -- Governors, Chief State School Officers, State and District Test Directors, State Coordinators, and district administrators -- who tirelessly provided their wisdom, experience, and hard work. Finally, and most importantly, NAEP is grateful to the students and school staff who participated in the Trial State Assessment.

Special recognition is due the Council of Chief State School Officers (CCSSO) for its considerable contributions to the program, especially its management of the National Assessment Planning Project. That project resulted in the mathematics framework and objectives for the assessment and recommendations about reporting the results of the program. In particular, we note the significant contributions of Ramsay Selden, Director of the State Education Assessment Center for the CCSSO and the members of the Steering, Mathematics Objectives, and Analysis and Reports Committees of the National Assessment Planning Project.

The Trial State Assessment was funded through NCES, in the Office of Educational Research and Improvement of the U.S. Department of Education. Emerson Elliott, NCES Acting Commissioner, provided consistent support and guidance. The staff -- particularly Gary Phillips, Eugene Owen, Stephen Gorman, Maureen Treacy, and Paul Garza -- worked closely and collegially with ETS, Westat, and NCS staff and played a crucial role in all aspects of the program.

The members of the National Assessment Governing Board (NAGB) and NAGB staff also deserve credit for their advice and guidance.

We owe a great deal to the Mathematics Item Development and Mathematics Scale Anchoring Panels. These people -- from school districts, colleges and universities, and State Education Agencies -- worked tirelessly to help ETS staff develop the assessment and a framework for interpreting the results.

Under the NAEP contract to ETS, Archie Lapointe served as the project director and Ina Mullis as the deputy director. Statistical and psychometric activities were led by John Mazzeo, with consultation from Eugene Johnson and Donald Rock. John Barone managed the data analysis activities; Jules Goodison, the operational aspects; Walter MacDonald and Chancey Jones, test development; David Hobson, the fiscal aspects; and Stephen Koffler, state services. Sampling and data collection activities were carried out by Westat under the supervision of Renee Slobasky, Keith Rust, Nancy Caldwell, and the late Morris Hansen. The printing, distribution, and processing of the materials were the responsibility of NCS, under the direction of John O'Neill and Lynn Zaback.

The large number of states and territories participating in the first Trial State Assessment introduced many unique challenges, including the need to develop 40 different reports, customized for each jurisdiction based on its characteristics and the results of its assessed students. To meet this challenge, a computerized report generation system was built, combining the speed and accuracy of computer-generated data with high resolution text and graphics normally found only in typesetting environments. Jennifer Nelson created the system and led the computer-based development of the report. John Mazzeo oversaw the analyses for this report. John Ferris, David Freund, Bruce Kaplan, Edward Kulick, and Phillip Leung collaborated to generate the data and perform analyses. They were assisted by Drew Bowker, Laura McCamley, and Craig Pizzuti. Debra Kline coordinated the efforts of the data analysis staff. Stephen Koffler wrote the text for the report. Kent Ashworth was responsible for coordinating the cover design and final printing of this report.

Special thanks are also due to many individuals for their invaluable assistance in reviewing the reports, especially the editors who improved the text and the analysts who checked the data.

