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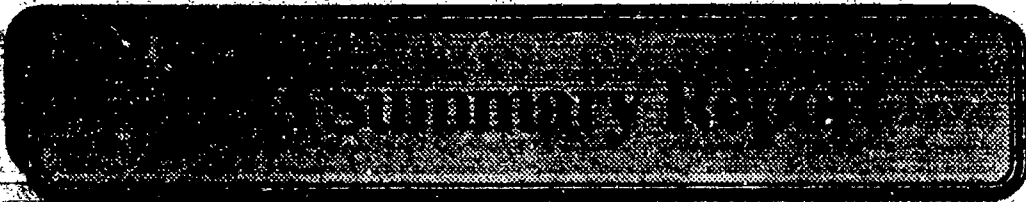
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## ABSTRACT

For the past seven years, Missouri has been administering the Missouri Mastery and Achievement Tests (MMAT) to fulfill the requirements of the Excellence in Education Act of 1985. The MMAT, as a criterion-referenced test, can measure student progress on specific key skills over time. This summary presents results of the spring 1993 administration of the MMAT for grades 3, 6, 8, and 10. Data for grades 3 and 6 are based on the total population (about 50,000 for each grade), and data for grades 8 and 10 are based on about 10% of test takers. Trend data from 1991 and 1992 are also presented. Scaled scores from 1993 show a general upward trend in student performance. Scores decreased from 1991 to 1993 only for grade-6 social studies, grade-10 English/language arts, and grade-10 social studies. Key skills mastered by the typical (median) student have also increased slightly or remained stable since 1991. The MMAT continues to provide the framework for fulfilling the goals of excellence in education. Three figures and one table present study data. (SLD)

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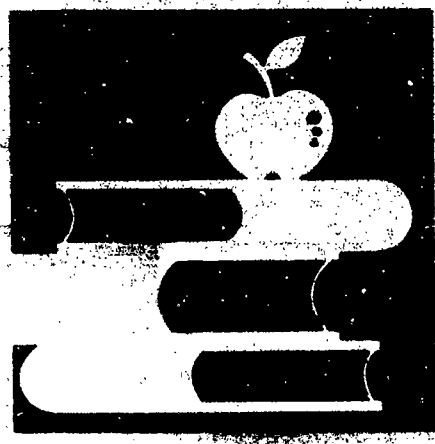


ED 375 178

# 1993 Results of the Missouri Mastery and Achievement Tests (MMAT)

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1993

Missouri Department of Elementary and Secondary Education  
Robert E. Bartman, Commissioner of Education

**1993  
SUMMARY REPORT  
OF**

**Missouri Mastery and Achievement Tests  
(MMAT) Results**

**1993  
Assessment Section  
Department of Elementary and Secondary Education**

## Table of Contents

|  | Page |
|--|------|
| Executive Summary . . . . .  | 1    |
| History and Description of the Missouri State<br>Testing Program . . . . . | 3    |
| Median Student Mastery . . . . .   | 5    |
| Median Student Mastery Data Summary . . . . .                              | 6    |
| Percent of Students Mastering Each Key Skill . . . . .                     | 7    |
| Scaled Score Averages . . . . .  | 17   |
| Score Distribution Data . . . . .  | 18   |

## Executive Summary of 1993 Results of the Missouri Mastery and Achievement Tests

For the past seven years, Missouri has been administering the Missouri Mastery and Achievement Tests (MMAT) to fulfill part of the requirements of Section 4 of the Excellence in Education Act of 1985. One of the most important aspects of the MMAT is its capacity, as a criterion-referenced test, to measure student progress on specific key skills over a period of time.

From 1987 to 1992, trend data were based on the performance of a representative sample consisting of about 10 percent of the students in each grade level. The *1993 Summary Report* presents results of the Spring 1993 administration of the MMAT for grades 3, 6, 8 and 10. Data for grades 3 and 6 are based on the total population taking the test (about 50,000 at each grade level). Data for grades 8 and 10 are based on the performance of a representative sample of about 10 percent of the students at each of those grade levels. Students in the State Sample at grades 8 and 10 took an alternate, equivalent form of the MMAT.

The *1993 Summary Report* also contains trend data for grades 3, 6, 8 and 10. In 1991, students in grades 7-10 took a revised version of the MMAT for the first time. Students in grades 2-6 took the revised MMAT for the first time in 1992. The extent of the revisions varied considerably depending upon the grade level and subject area. In some grade levels/subject areas, the key skills which the MMAT measures changed substantially, while in others, they remained virtually the same. The original test and the revised version were equated at the subject level; therefore, it is possible to make year to year comparisons of scaled scores and score distributions (quintiles), regardless of the test forms. This report contains scaled score and score distribution data for grades 3, 6, 8 and 10 for the past three years. It may be problematic, however, to make comparisons between the original MMAT and the revised version at the key skill mastery level in grade levels/subject areas in which the key skills have changed substantially. Thus, this report contains median student mastery data and key skill mastery data **only** for administrations of the revised MMAT (1992-1993 for grades 3 and 6; 1991-1993 for grades 8 and 10).

Scaled scores from the Spring 1993 administration of the MMAT for students in grades 3, 6, 8 and 10 show a general upward trend in student performance (see page 17 for complete data). Since 1991, scaled scores in the vast majority of grade levels/subject areas have increased. In fact, scores in one-third of the reported grade levels/subject areas increased by more than 11 points (an 11 point increase or decrease in scaled score points is educationally significant). Increases in mathematics and science scores in grades 3, 6 and 8 were particularly notable. From 1991 to 1993, scores in the science area increased 23 points in grade 3; 8 points in grade 6; and 16 points in grade 8. During the same time period, scores in the mathematics area increased 15 points in grade 3; 18 points in grade 6; and 12 points in grade 8. In three grade levels/subject areas—grade 3 math, grade 3 science and grade 6 math—scaled scores have reached their highest point since the inception of the MMAT in 1987. Scores decreased from 1991 to 1993 in only three grade levels/subject areas—grade 6 social studies, grade 10 English/language arts, and grade 10 social studies—and all decreased by two points or fewer.

Score distribution data from 1991 to 1993, in general, also indicate that student performance on the MMAT is improving and that instruction is impacting students at all levels of achievement (see page 18 for complete data). In the base year of testing (1987 for grades 3, 6, 8 and 10) the distribution of scaled scores was divided so that 20 percent of the scores fell into each quintile. The greatest improvements in 1993 occurred in grade 3 science and grade 6 math, where 74 percent and 71 percent of the students, respectively, fell within the top two quintiles. In other grade levels/subject areas (with the exception of grade 10 social studies), percents of students in the top two quintiles ranged from 46 to 67, representing moderate to substantial improvements over the original 40 percent in the top two quintiles. Student performance in grade 10 social studies has remained very similar to performance in the base year of testing, with 40 percent of the students falling within the top two quintiles.

The number of key skills mastered by the typical (median) student has also either increased slightly or remained stable since the first administration of the revised MMAT (1991 for grades 8 and 10 and 1992 for grades 3 and 6). Across subject areas, the median student in 1993 mastered one more key skill in grade 3 and two more key skills in grade 6 than the median student in 1992. Overall median student mastery in grades 8 and 10 remained stable from 1991 to 1993 (see page 6).

Spring 1993 MMAT results indicate, with few exceptions, that student performance is either improving or is remaining stable across grade levels and subject areas. The MMAT continues to provide a framework for fulfilling one of the major goals of the Excellence in Education Act—encouraging academic excellence for all of Missouri's public school students.

## History and Description of the Missouri State Testing Program

The Missouri Mastery and Achievement Tests (MMAT) comprise a battery of criterion-referenced tests specifically developed to satisfy the testing provision in the Excellence in Education Act of 1985. This law requires the Department of Elementary and Secondary Education to identify "key skills" or learner outcomes in the academic subjects of reading/language arts/English, mathematics, science, and social studies/civics; to test annually a representative sample of students throughout the State using a criterion-referenced test which measures the identified key skills; and to report the results of this testing to the General Assembly. Local school districts are required to measure student achievement on the key skills using criterion-referenced tests and to identify areas in need of instructional improvement. Criterion-referenced tests are especially well-suited to this purpose because they provide information about the educational strengths and needs of individual students and district curricula relative to a specific set of objectives.

The Department identified the key skills mandated by the Excellence in Education Act with the assistance of Missouri public school teachers, subject area specialists, school administrators and college professors. The resulting publication, *Core Competencies and Key Skills for Missouri Schools*, first published in September of 1986, listed identified key skills in terms of learner outcomes and provided information for incorporating them into local curricula.

In 1989, committees of educators met to begin review and revision of the original key skills. All principals in the State received letters requesting teachers' input regarding needed changes in key skills. Committees in each subject area used information provided by districts to guide the revision of the key skills. A revised version of the *Core Competencies and Key Skills for Missouri Schools* for grades 7 through 10 was published in 1990. The corresponding publication for grades 2 through 6 was published in 1991. These publications present the key skills for each subject area; content analyses which outline the committee's purpose for including each skill; the test content specifications which served as item-writing guidelines for MMAT-tested objectives; and sample test items or assessment procedures which educators can use to measure student progress toward attainment of each key skill. Although Missouri educators have identified both tested and non-tested key skills as important learner outcomes, districts should not consider them a total curriculum. The core competencies and key skills most effectively provide a framework around which a district can build a complete curriculum.

Upon completion of the key skill revisions, the Department and the Center for Educational Assessment at the University of Missouri-Columbia began work to revise the MMAT. The MMAT was designed in accordance with the American Psychological Association's Standards for Educational and Psychological Testing. Teachers from around the State were involved in writing items for the test. Content area specialists and other consultants then reviewed all items for congruence to key skills and potential bias. Finally, all items were field tested to determine statistical adequacy. Students in grades 7-10 took the revised MMAT for the first time in 1991. Revised tests for grades 2-6 were administered for the first time in 1992.



The revised MMAT, like the original test, includes four multiple-choice items to measure each key skill. To demonstrate mastery of a key skill, a student must correctly answer at least three of the four items. The MMAT for grades 3 through 10 includes four subtests. Each subtest contains between 56 and 104 items for a total of about 300 questions per grade level. The grade 2 test covers only the areas of reading/language arts and mathematics. The tests are designed to be administered over a four-day period, with approximately one to two hours a day devoted to testing.

The MMAT provides districts with data presented in a number of educationally relevant formats. **Key skill mastery data** provide specific, instructionally relevant information that can help teachers guide instruction for individual students or enable districts to evaluate the effectiveness of the curriculum and identify needed changes. **Scaled scores** allow districts to determine how their students compare with other students in the State and to monitor educational progress made over time. **Score distribution data** help educators determine whether instructional efforts are reaching all of the various populations of students taking the test.

From 1987 to 1992, the Center for Educational Assessment randomly selected and tested a representative State Sample including approximately 10 percent of the students in each grade. The information from this State Sample formed the basis for the annual report to the General Assembly. For the Spring 1993 administration of the test, the Department will report State level data for grades 3, 6, 8 and 10. State data for grades 3 and 6 will reflect the performance of all students taking the MMAT at those grade levels (about 50,000 per grade level). Data for grades 8 and 10 will be based on the performance of a representative sample which includes about 10 percent of the students at each of those grade levels. Students in the State Sample at grades 8 and 10 took an alternate, equivalent form of the MMAT. This report, the *1993 Summary Report*, contains data representing the Spring 1993 performance of students in grades 3, 6, 8 and 10 as well as longitudinal trend data for these grades.

This report presents trend data for 1991-1993 for scaled scores and score distributions for grades 3, 6, 8 and 10. Spring 1991 scores for grades 3 and 6 reflect performance on the original MMAT; however, the original and revised tests were equated at the subject level. Therefore, scaled scores and score distribution data are comparable across years, regardless of test forms. Because the key skills changed substantially in some grade levels and subject areas, it is somewhat more problematic to compare scores at the key skill level across test forms. Thus, this report contains key skill mastery data and median student mastery data only for the years in which the revised MMAT was administered (1992-1993 for grades 3 and 6; 1991-1993 for grades 8 and 10).

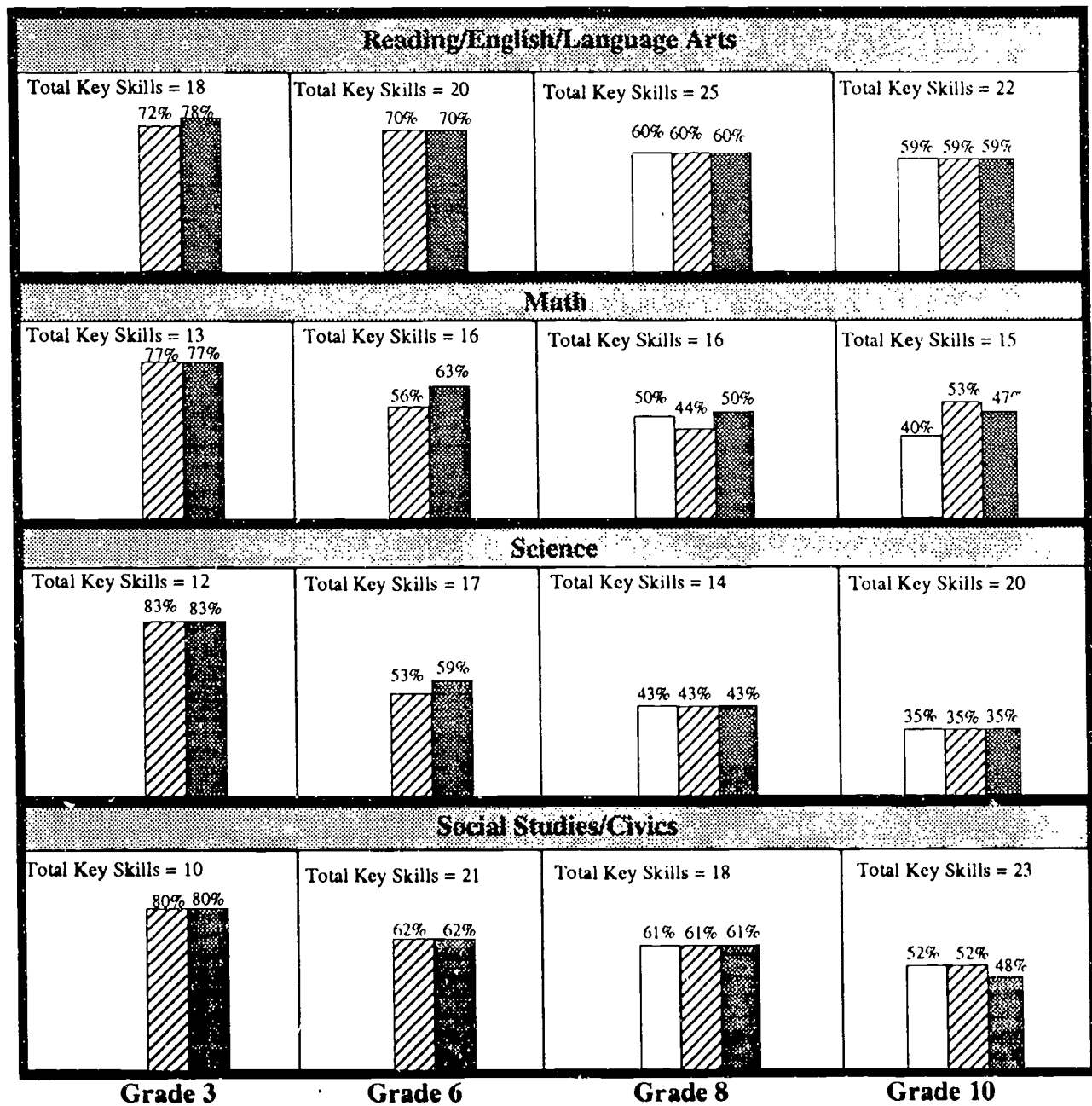


## Median Student Mastery

The following graph presents median student mastery in each subject area for grades 3, 6, 8 and 10. Trend data are presented for each year of administration of the revised MMAT (1992-1993 for grades 3 and 6; 1991-1993 for grades 8 and 10). The number at the top of each cell represents the total number of key skills tested in each grade level and subject area. Each bar of the graph represents the percent of key skills mastered by the median (typical) student in the State for a particular grade level and subject in a given year. As the graph indicates, median student performance has, in general, improved or remained stable since the first administration of the revised test.

**Figure A: Percent of Key Skills Mastered by the Typical or Median Student in the State**


1991  
 1992  
 1993

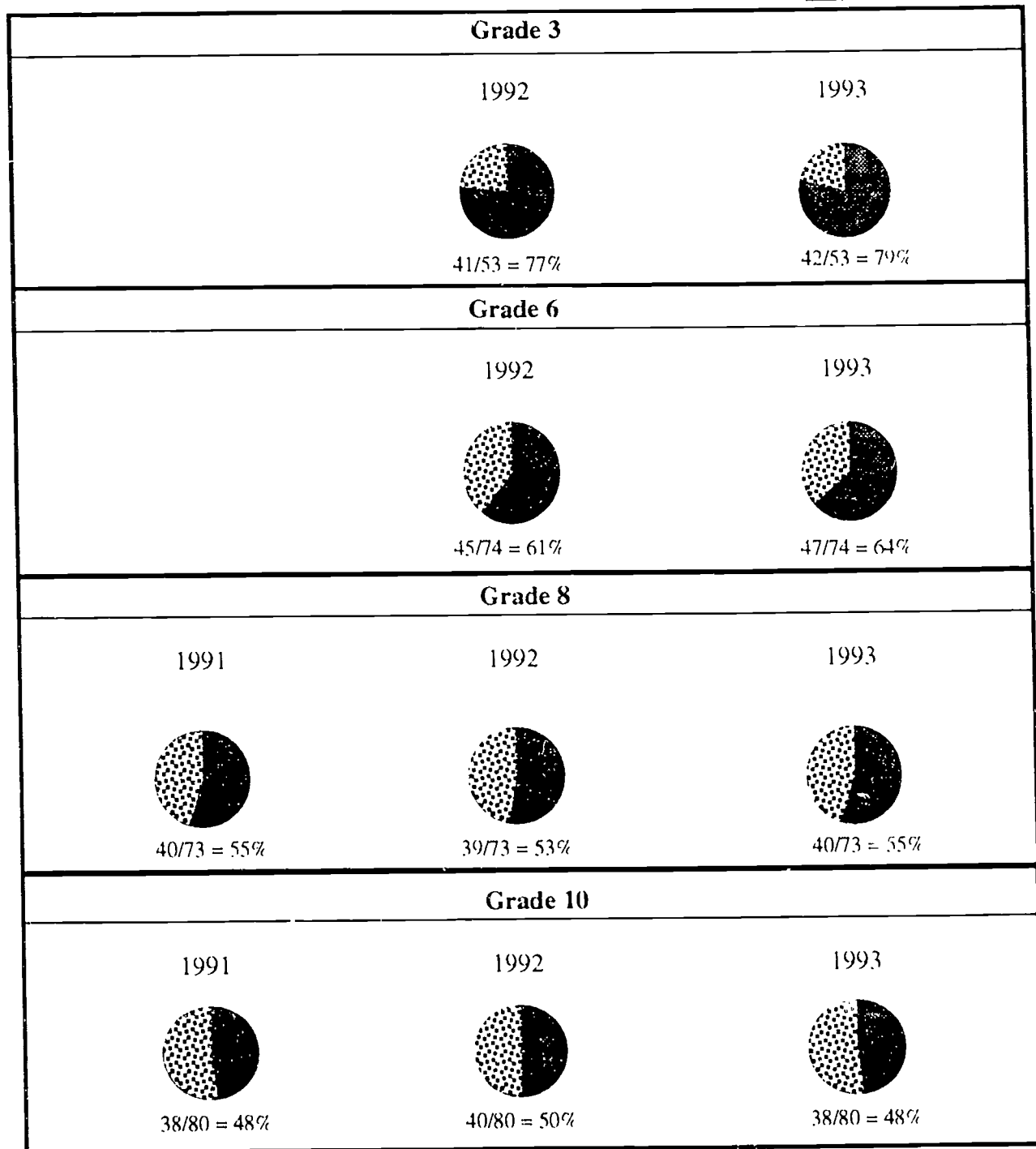


## Median Student Mastery Data Summary

The following graph presents a summary of median student mastery for grades 3, 6, 8 and 10. Data are presented for each year of administration of the revised MMAT (1992-1993 for grades 3 and 6; 1991-1993 for grades 8 and 10). Each graph shows the percent of the total key skills across subject areas mastered by the median (typical) student in a given grade level.

**Figure B: Median Student Mastery Across Subject Areas**

% Mastered by  
 Median Student



## Percent of Students Mastering Each Key Skill

The charts on pages 9-16 show the percent of students in the State mastering each tested objective for each year of administration of the revised MMAT in grades 3, 6, 8, and 10 (1992-1993 for grades 3 and 6; 1991-1993 for grade 8 and 10). Each MMAT objective is measured by four items. Students must answer at least three of the four correctly to demonstrate mastery of the key skill. A change of 5 or more percent between the years is educationally meaningful.

**Figure C: Percent of Students Mastering Key Skills  
GRADE 3  
READING/LANGUAGE ARTS**

| Key Skill                       | Percent of Students Demonstrating Mastery |             |
|---------------------------------|---|-------------|
|                                 | <u>1992</u>                               | <u>1993</u> |
| B-1 Contextual Word Meaning     | 59%                                       | 60%         |
| B-2 Prefixes/Suffixes           | 68  | 69          |
| B-3 Synonyms/Antonyms           | 65  | 64          |
| B-4 New Word Meanings           | 68  | 68          |
| C-1 Story Elements              | 83  | 82          |
| C-2 Fact/Fantasy                | 70  | 70          |
| C-3 Cause/Effect                | 74  | 74          |
| C-4 Main Idea                   | 58  | 60          |
| C-5 Conclusions/Generalizations | 78  | 77          |
| C-7 Outcome Prediction          | 75  | 75          |
| C-8 Story Title                 | 51  | 51          |
| C-10 Summarization              | 53  | 55          |
| D-5 Directions                  | 79  | 79          |
| G-3 Effective Writing           | 66  | 66          |
| G-6 Sentence Combining          | 69  | 70          |
| G-9 Capitalization              | 68  | 69          |
| G-10 Punctuation                | 50  | 52          |
| G-11 Grammatical Usage          | 72  | 71          |

**MATHEMATICS**

| Key Skill                | Percent of Students Demonstrating Mastery |             |
|--------------------------|---|-------------|
|                          | <u>1992</u>                               | <u>1993</u> |
| A-2 Number Comparison    | 74%                                       | 76%         |
| A-3 Place Value          | 61  | 63          |
| A-6 Fractional Parts     | 73  | 75          |
| B-4 Addition/Subtraction | 80  | 79          |
| B-5 Multiplication       | 71  | 72          |
| B-7 Open Sentences       | 66  | 66          |
| D-3 Time                 | 71  | 72          |
| D-5 Measurement          | 78  | 78          |
| E-2 Shapes               | 77  | 78          |
| F-2 Displays of Data     | 68  | 69          |
| F-3 Grids                | 62  | 62          |
| H-2 Money Problems       | 61  | 63          |
| H-4 Problems             | 61  | 63          |

## GRADE 3 SCIENCE

| Key Skill                      | Percent of Students<br>Demonstrating Mastery |             |
|--------------------------------|--|-------------|
|                                | <u>1992</u>                                  | <u>1993</u> |
| B-3 Organisms in Ecosystems    | 83%  | 83%         |
| C-1 Seed Germination & Growth  | 80   | 80          |
| C-2 Seedling Growth            | 60   | 61          |
| C-3 Animal/Plant Development   | 87   | 87          |
| E-3 Temperature Measurement    | 56   | 57          |
| G-2 Effects of Heating/Cooling | 87   | 87          |
| H-2 Effects of Pushing/Pulling | 84   | 83          |
| H-4 Hazardous Situations       | 84   | 83          |
| I-1 Objects in the Sky         | 82   | 81          |
| I-2 Light Producers/Reflectors | 61   | 60          |
| I-4 Temperature/Precipitation  | 71   | 73          |
| J-1 Shadow Lengths             | 56   | 56          |

## SOCIAL STUDIES/CIVICS

| Key Skill                       | Percent of Students<br>Demonstrating Mastery |             |
|---------------------------------|--|-------------|
|                                 | <u>1992</u>                                  | <u>1993</u> |
| A-4 Map-reading Skills          | 80%  | 81%         |
| A-5 Features of Maps            | 71   | 73          |
| B-2 Effects of Regional Changes | 56   | 54          |
| F-1 Past/Present Comparisons    | 79   | 78          |
| G-2 Democratic Decision Making  | 74   | 76          |
| H-2 Major Offices of Government | 46   | 48          |
| J-1 Responsible Behavior        | 87   | 86          |
| K-1 Respect for Others          | 83   | 82          |
| M-2 Economic Choices            | 55   | 60          |
| V-1 Interpret Sources           | 77   | 77          |

## GRADE 6 READING/LANGUAGE ARTS

| Key Skill                       | Percent of Students<br>Demonstrating Mastery |             |
|---------------------------------|--|-------------|
|                                 | <u>1992</u>                                  | <u>1993</u> |
| B-1 Contextual Word Meaning     | 69%  | 70%         |
| B-3 Synonyms/Antonyms           | 35   | 37          |
| C-1 Story Elements              | 60   | 60          |
| C-2 Fact/Opinion                | 81   | 83          |
| C-3 Cause/Effect                | 85   | 85          |
| C-4 Main Idea                   | 73   | 76          |
| C-5 Conclusions/Generalizations | 78   | 79          |
| C-7 Outcome Prediction          | 72   | 74          |
| C-8 Author's Purpose            | 69   | 72          |
| C-10 Summarization              | 54   | 56          |
| C-12 Figurative Language        | 75   | 76          |
| C-13 Point of View              | 51   | 52          |
| D-1 Learning Resources          | 67   | 71          |
| D-5 Directions                  | 88   | 89          |
| G-3 Effective Writing           | 59   | 65          |
| G-7 Draft Revision              | 51   | 53          |
| G-8 Spelling                    | 44   | 45          |
| G-9 Capitalization              | 51   | 53          |
| G-10 Punctuation                | 55   | 56          |
| G-11 Grammatical Usage          | 53   | 56          |

## MATHEMATICS

| Key Skill                       | Percent of Students<br>Demonstrating Mastery |             |
|---------------------------------|--|-------------|
|                                 | <u>1992</u>                                  | <u>1993</u> |
| A-2 Fraction/Decimal Comparison | 41%  | 49%         |
| A-4 Numerical Sequences         | 56   | 63          |
| A-6 Graphing on Number Lines    | 37   | 42          |
| B-6 Arithmetic                  | 45   | 50          |
| B-7 Number Sentences            | 77   | 77          |
| B-8 Fraction Multiplication     | 67   | 69          |
| B-9 Order of Operations         | 48   | 54          |
| D-1 Measurement                 | 68   | 74          |
| D-6 Area/Perimeter              | 46   | 51          |
| D-9 Measurement Conversion      | 35   | 40          |
| E-4 Properties of Shapes        | 58   | 67          |
| F-1 Data Collection             | 72   | 76          |
| F-2 Displays of Data            | 68   | 71          |
| H-1 Money Problems              | 69   | 71          |
| H-4 Multi-step Problems         | 53   | 56          |
| H-5 Nonstandard Problems        | 39   | 41          |

## GRADE 6 SCIENCE

| Key Skill                     | Percent of Students<br>Demonstrating Mastery |      |
|-------------------------------|--|------|
|                               | 1992   | 1993 |
| B-1 Requirements for Life     | 68%  | 71%  |
| B-2 Parts of Plants           | 34   | 36   |
| B-3 Photosynthesis            | 40   | 42   |
| C-2 Plant/Animal Growth Rates | 81   | 84   |
| C-3 Endangered Species        | 57   | 63   |
| E-4 Acids/Bases               | 44   | 50   |
| E-5 Metric Measurement        | 50   | 55   |
| G-1 Chemical/Physical Changes | 66   | 63   |
| H-1 Simple/Compound Machines  | 51   | 49   |
| H-3 Friction                  | 52   | 53   |
| H-5 Electromagnets            | 69   | 73   |
| H-6 Electricity               | 77   | 79   |
| H-7 Electric Circuits         | 48   | 51   |
| H-11 Potential/Kinetic Energy | 39   | 46   |
| I-1 Minerals                  | 69   | 72   |
| K-2 Soil Erosion              | 23   | 24   |
| K-3 Fossils                   | 37   | 41   |

## SOCIAL STUDIES/CIVICS

| Key Skill                       | Percent of Students<br>Demonstrating Mastery |      |
|---------------------------------|--|------|
|                                 | 1992   | 1993 |
| A-4 Map-reading Skills          | 57%  | 59%  |
| A-5 Features of Maps            | 58   | 60   |
| A-6 Maps: United States         | 61   | 64   |
| A-7 Maps: World                 | 52   | 56   |
| B-2 Effects of Regional Changes | 53   | 55   |
| E-1 Time Line Interpretations   | 54   | 56   |
| E-3 Fact/Value Judgment         | 56   | 60   |
| F-4 Cause/Effect Relationships  | 55   | 56   |
| G-1 Democratic Practices/Values | 49   | 52   |
| G-2 Democratic Decision Making  | 77   | 78   |
| H-1 Government Activities       | 49   | 52   |
| I-2 Rights/Responsibilities     | 64   | 65   |
| M-2 Economic Choices            | 52   | 56   |
| N-1 Production Terms            | 42   | 45   |
| P-2 Supply/Demand Predictions   | 79   | 81   |
| Q-2 Government & Economy        | 47   | 51   |
| R-6 Regional Specialization     | 56   | 55   |
| S-4 Social/Cultural Roles       | 59   | 61   |
| T-1 Meeting Human Needs         | 65   | 67   |
| V-1 Interpret Sources           | 45   | 48   |
| V-2 Library Resources           | 67   | 69   |



**GRADE 8**  
**ENGLISH/LANGUAGE ARTS**

| Key Skill                     | Percent of Students<br>Demonstrating Mastery |             |             |
|-------------------------------|--|-------------|-------------|
|                               | <u>1991</u>                                  | <u>1992</u> | <u>1993</u> |
| B-1 Contextual Word Meaning   | 68%  | 67%         | 70%         |
| C-1 Story Elements            | 58   | 57          | 56          |
| C-2 Fact/Opinion              | 68   | 69          | 70          |
| C-3 Cause/Effect              | 69   | 71          | 68          |
| C-4 Main Idea                 | 49   | 41          | 47          |
| C-5 Inferences/Conclusions    | 60   | 47          | 59          |
| C-7 Propaganda Techniques     | 42   | 49          | 49          |
| C-8 Author's Purpose          | 54   | 51          | 50          |
| C-9 Plot/Setting Relationship | 55   | 61          | 55          |
| C-10 Summarization            | 55   | 65          | 56          |
| C-12 Figurative Language      | 60   | 65          | 63          |
| D-1 Reference Sources         | 50   | 66          | 56          |
| D-5 Directions                | 78   | 73          | 77          |
| D-6 Compare Sources           | 76   | 70          | 76          |
| E-1 Schedules/Timetables      | 72   | 73          | 71          |
| E-2 Instructions/Labeling     | 63   | 65          | 63          |
| G-2 Main Idea/Details         | 33   | 27          | 36          |
| G-3 Story Details             | 66   | 61          | 65          |
| G-4 Organizational Elements   | 45   | 40          | 44          |
| G-5 Persuasive Rhetoric       | 56   | 56          | 53          |
| G-6 Sentence Combining        | 46   | 46          | 47          |
| G-8 Spelling                  | 56   | 49          | 58          |
| G-9 Capitalization            | 51   | 53          | 53          |
| G-10 Punctuation              | 44   | 48          | 44          |
| G-11 Grammatical Usage        | 56   | 64          | 55          |

**MATHEMATICS**

| Key Skill                      | Percent of Students<br>Demonstrating Mastery |             |             |
|--------------------------------|--|-------------|-------------|
|                                | <u>1991</u>                                  | <u>1992</u> | <u>1993</u> |
| A-1 Interpreting Numbers       | 51%  | 61%         | 59%         |
| A-2 Number Comparison          | 42   | 47          | 46          |
| A-7 Number Theory              | 34   | 40          | 43          |
| B-7 Solving Linear Equations   | 43   | 51          | 50          |
| B-9 Algebraic Expressions      | 61   | 63          | 66          |
| C-5 Estimation Problems        | 55   | 49          | 59          |
| D-6 Perimeter/Area             | 42   | 40          | 45          |
| D-10 Circle Circumference/Area | 38   | 30          | 41          |
| E-1 Lines/Angles               | 63   | 56          | 65          |
| E-2 Polygon Classification     | 32   | 27          | 34          |
| E-3 Similar/Congruent Figures  | 54   | 50          | 55          |
| F-4 Probability                | 55   | 47          | 57          |
| G-4 Sequential Instructions    | 65   | 60          | 67          |
| H-1 Consumer Money Problems    | 41   | 33          | 43          |
| H-3 Area/Perimeter Problems    | 49   | 50          | 51          |
| H-4 Proportion Problems        | 56   | 54          | 55          |

## GRADE 8 SCIENCE

| Key Skill                      | Percent of Students<br>Demonstrating Mastery |             |             |
|--------------------------------|--|-------------|-------------|
|                                | <u>1991</u>                                  | <u>1992</u> | <u>1993</u> |
| A-2 Vertebrate Classification  | 63%  | 68%         | 63%         |
| B-1 Cell Parts                 | 36   | 42          | 43          |
| D-1 Human Body Systems         | 60   | 60          | 62          |
| D-4 Pollution Effects          | 60   | 60          | 62          |
| D-5 Variables in an Experiment | 19   | 36          | 24          |
| E-1 Kinetic/Potential Energy   | 34   | 46          | 39          |
| E-5 Heat Transfer              | 35   | 55          | 43          |
| E-6 Atoms/Elements/Compounds   | 40   | 46          | 45          |
| F-1 Wave Characteristics       | 20   | 25          | 29          |
| H-1 Energy in Systems          | 48   | 38          | 53          |
| H-5 Periodic Table             | 68   | 72          | 72          |
| I-3 Missouri Fossils           | 24   | 33          | 31          |
| L-2 Weather Prediction         | 44   | 43          | 49          |
| L-6 Climatic Zones             | 40   | 45          | 44          |

## SOCIAL STUDIES/CIVICS

| Key Skill                        | Percent of Students<br>Demonstrating Mastery |             |             |
|----------------------------------|--|-------------|-------------|
|                                  | <u>1991</u>                                  | <u>1992</u> | <u>1993</u> |
| A-4 Map-reading Skills           | 73%  | 76%         | 72%         |
| A-6 Maps: United States          | 67   | 69          | 69          |
| A-7 Maps: World                  | 70   | 70          | 69          |
| B-2 Effects of Regional Changes  | 47   | 49          | 48          |
| E-5 Historical Resources/Biases  | 46   | 51          | 48          |
| F-4 Early American History       | 43   | 43          | 45          |
| F-5 U.S. History to Civil War    | 35   | 40          | 34          |
| G-1 Democratic Practices/Values  | 60   | 51          | 62          |
| G-2 Democratic Decision Making   | 63   | 66          | 64          |
| H-2 Government Offices           | 46   | 45          | 44          |
| H-4 Legislative Procedures       | 45   | 51          | 44          |
| I-2 Rights/Responsibilities      | 55   | 63          | 55          |
| J-3 Citizen Influence            | 63   | 68          | 64          |
| K-2 Political Issue Analysis     | 45   | 57          | 44          |
| M-3 Economic Decision Making     | 65   | 65          | 65          |
| N-1 Results of Production Change | 50   | 56          | 48          |
| P-4 Changes in Supply/Demand     | 60   | 67          | 60          |
| V-3 Research Methods             | 71   | 68          | 71          |

**GRADE 10  
ENGLISH/LANGUAGE ARTS**

| Key Skill                    | Percent of Students<br>Demonstrating Mastery |             |             |
|------------------------------|--|-------------|-------------|
|                              | <u>1991</u>                                  | <u>1992</u> | <u>1993</u> |
| B-1 Contextual Word Meaning  | 67%  | 60%         | 68%         |
| B-2 Prefixes/Suffixes        | 51   | 54          | 51          |
| C-1 Story Theme              | 64   | 61          | 64          |
| C-2 Examples/Illustrations   | 46   | 54          | 43          |
| C-3 Cause/Effect             | 66   | 59          | 64          |
| C-4 Main Idea                | 61   | 67          | 59          |
| C-5 Inferences/Conclusions   | 49   | 38          | 46          |
| C-7 Plot Elements            | 66   | 59          | 66          |
| C-8 Author's Purpose         | 54   | 58          | 53          |
| C-9 Literary Forms           | 58   | 60          | 56          |
| C-10 Figurative Language     | 47   | 51          | 46          |
| D-1 Reference Sources        | 61   | 68          | 62          |
| D-4 Organize Information     | 62   | 64          | 64          |
| D-5 Directions               | 74   | 78          | 73          |
| D-6 Compare Sources          | 60   | 61          | 61          |
| E-1 Business Correspondence  | 47   | 60          | 44          |
| E-2 Occupational Information | 68   | 66          | 68          |
| G-2 Paragraph Construction   | 56   | 53          | 55          |
| G-3 Sentence Revision        | 59   | 61          | 56          |
| G-5 Spelling/Usage/Structure | 50   | 45          | 48          |
| G-7 Punctuation              | 49   | 49          | 49          |
| G-9 Writing Techniques       | 45   | 38          | 43          |

**MATHEMATICS**

| Key Skill                     | Percent of Students<br>Demonstrating Mastery |             |             |
|-------------------------------|--|-------------|-------------|
|                               | <u>1991</u>                                  | <u>1992</u> | <u>1993</u> |
| A-5 Simplify Expressions      | 61%  | 60%         | 61%         |
| B-7 Solve Linear Equations    | 41   | 45          | 45          |
| B-10 Solve Formulas           | 30   | 40          | 30          |
| C-1 Estimation                | 36   | 50          | 40          |
| C-5 Estimation Problems       | 48   | 47          | 50          |
| D-5 Pythagorean Theorem       | 46   | 57          | 49          |
| E-1 Lines/Angles              | 49   | 54          | 48          |
| E-3 Linear Equation Graphs    | 25   | 34          | 27          |
| E-6 Similar/Congruent Figures | 40   | 43          | 40          |
| F-2 Probability               | 44   | 61          | 46          |
| F-3 Inference Limitations     | 34   | 42          | 35          |
| G-1 Logical Conclusions       | 64   | 44          | 64          |
| G-2 Conclusion Validity       | 57   | 67          | 57          |
| H-2 Banking Problems          | 63   | 72          | 62          |
| H-4 Net Pay Computation       | 38   | 49          | 36          |

## GRADE 10 SCIENCE

| Key Skill                           | Percent of Students<br>Demonstrating Mastery |      |      |
|-------------------------------------|--|------|------|
|                                     | 1991   | 1992 | 1993 |
| A-2 Mitosis/Meiosis                 | 31%  | 28%  | 30%  |
| A-3 Classification: Kingdoms        | 30   | 30   | 31   |
| A-4 Classification: Phyla           | 46   | 57   | 49   |
| B-1 Functions of Cell Parts         | 26   | 34   | 29   |
| C-4 Natural Selection               | 28   | 37   | 27   |
| D-2 Marine/Terrestrial Environments | 29   | 30   | 31   |
| D-3 Overpopulation Problems         | 43   | 44   | 42   |
| D-4 Elemental Cycles & Food Webs    | 53   | 41   | 53   |
| D-7 Sexually Transmitted Disease    | 69   | 74   | 75   |
| E-3 Scientific Notation             | 12   | 11   | 14   |
| F-2 Solution/Suspension/Colloid     | 33   | 26   | 33   |
| F-7 Nuclear Fission/Fusion          | 17   | 16   | 16   |
| G-1 Kinetic-molecular Theory        | 35   | 40   | 36   |
| G-2 Energy Transformations          | 46   | 47   | 46   |
| H-1 Newton's Laws of Motion         | 27   | 48   | 28   |
| I-2 Earth Region Classification     | 44   | 36   | 44   |
| K-1 Time Line/Earth History         | 61   | 53   | 61   |
| L-1 Experimental Variables          | 15   | 21   | 17   |
| L-3 Energy Needs                    | 45   | 42   | 43   |
| L-4 Toxic/Nuclear Waste             | 66   | 56   | 64   |

## SOCIAL STUDIES/CIVICS

| Key Skill                        | Percent of Students<br>Demonstrating Mastery |      |      |
|----------------------------------|--|------|------|
|                                  | 1991   | 1992 | 1993 |
| A-4 Map-reading Skills           | 61%  | 61%  | 60%  |
| A-6 Maps: United States          | 52   | 60   | 54   |
| A-7 Maps: World                  | 60   | 68   | 60   |
| B-2 Effects of Regional Changes  | 50   | 44   | 48   |
| E-5 Historical Resources/Biases  | 42   | 42   | 41   |
| F-3 Historical Personages        | 35   | 49   | 31   |
| F-4 History Events: America      | 47   | 47   | 47   |
| F-7 History Events: Modern World | 29   | 30   | 29   |
| F-8 Contributions of Cultures    | 32   | 39   | 34   |
| F-12 Historical Sequences: U.S.  | 53   | 51   | 50   |
| F-13 Historical Sequences: World | 32   | 31   | 30   |
| G-5 U.S. Political Documents     | 35   | 37   | 36   |
| G-6 Comparison of Governments    | 51   | 49   | 48   |
| H-2 Government Offices           | 53   | 62   | 53   |
| H-3 Federal/State Governments    | 68   | 68   | 66   |
| J-3 Citizen Influence            | 62   | 67   | 62   |
| K-2 Political Issue Analysis     | 49   | 37   | 47   |
| L-1 Propaganda Analysis          | 52   | 55   | 52   |
| N-5 Influences on GNP            | 54   | 61   | 51   |
| O-5 Economic Institutions        | 63   | 62   | 61   |
| Q-3 Market & Command Economics   | 47   | 45   | 43   |
| Q-7 GNP & Living Conditions      | 51   | 52   | 51   |
| S-6 Prejudice/Discrimination     | 73   | 75   | 70   |

## Scaled Score Averages

The following chart provides the scaled score averages for each subject area in grades 3, 6, 8 and 10 for the 1991, 1992 and 1993 test administrations. These averages may be compared within grade level and subject area as a broad measure of academic progress over time. The first year the test was administered (1987 for grades 3, 6, 8, and 10), a baseline was established and the average for each grade level and subject area was set at 300. Although the 1991 scaled scores for grades 3 and 6 were obtained from the administration of the original MMAT, scaled scores between the original and the revised test are comparable. A change of about 11 points over time is considered educationally meaningful.

**Figure D: Scaled Score Averages**

| Grade | Year  | Reading | Math | Science | Social Studies | Average |
|-------|-------|---------|------|---------|----------------|---------|
| 3     | 1991  | 321     | 326  | 344     | 336            | 332     |
|       | *1992 | 323     | 339  | 364     | 336            | 341     |
|       | 1993  | 325     | 341  | 367     | 342            | 344     |
| 6     | 1991  | 296     | 347  | 352     | 330            | 331     |
|       | *1992 | 308     | 349  | 347     | 322            | 332     |
|       | 1993  | 313     | 365  | 360     | 329            | 342     |
| 8     | *1991 | 318     | 331  | 339     | 315            | 326     |
|       | 1992  | 323     | 335  | 365     | 324            | 337     |
|       | 1993  | 318     | 343  | 355     | 316            | 333     |
| 10    | *1991 | 313     | 326  | 327     | 302            | 317     |
|       | 1992  | 313     | 338  | 348     | 307            | 327     |
|       | 1993  | 311     | 329  | 329     | 300            | 317     |

\* Indicates first year of revised MMAT administration

## Score Distribution Data

The following charts show the score distributions for students in grades 3, 6, 8 and 10 who took the MMAT in 1991, 1992 and 1993. In the base year of testing (1987), 20 percent of the students in these grade levels fell into each quintile. Each cell of the blocks which follow contains the percent of students which fell within that quintile in the following years.

**Figure F: Score Distribution**

**\*Grade 3**

|      | Reading |    |    | Math |    |    | Science |    |    | Social Studies |    |    |
|------|---------|----|----|------|----|----|---------|----|----|----------------|----|----|
|      | 91      | 92 | 93 | 91   | 92 | 93 | 91      | 92 | 93 | 91             | 92 | 93 |
| High | 31      | 32 | 34 | 35   | 42 | 44 | 44      | 54 | 56 | 39             | 40 | 43 |
|      | 19      | 22 | 21 | 21   | 20 | 21 | 22      | 20 | 18 | 21             | 20 | 18 |
|      | 19      | 18 | 17 | 16   | 15 | 14 | 13      | 10 | 10 | 16             | 14 | 13 |
|      | 16      | 15 | 14 | 13   | 12 | 11 | 10      | 08 | 08 | 12             | 12 | 11 |
| Low  | 15      | 13 | 14 | 15   | 11 | 11 | 11      | 08 | 08 | 12             | 14 | 14 |

**\*Grade 6**

|      | Reading |    |    | Math |    |    | Science |    |    | Social Studies |    |    |
|------|---------|----|----|------|----|----|---------|----|----|----------------|----|----|
|      | 91      | 92 | 93 | 91   | 92 | 93 | 91      | 92 | 93 | 91             | 92 | 93 |
| High | 19      | 24 | 27 | 44   | 44 | 52 | 47      | 46 | 51 | 38             | 34 | 38 |
|      | 18      | 20 | 20 | 20   | 19 | 19 | 18      | 17 | 16 | 20             | 19 | 19 |
|      | 20      | 19 | 19 | 15   | 14 | 12 | 13      | 13 | 12 | 14             | 15 | 14 |
|      | 18      | 19 | 17 | 11   | 11 | 08 | 11      | 10 | 10 | 14             | 14 | 13 |
| Low  | 24      | 18 | 17 | 11   | 11 | 09 | 11      | 14 | 12 | 14             | 18 | 16 |

**\*\*Grade 8**

|      | Reading |    |    | Math |    |    | Science |    |    | Social Studies |    |    |
|------|---------|----|----|------|----|----|---------|----|----|----------------|----|----|
|      | 91      | 92 | 93 | 91   | 92 | 93 | 91      | 92 | 93 | 91             | 92 | 93 |
| High | 29      | 31 | 29 | 36   | 39 | 42 | 40      | 52 | 47 | 29             | 34 | 30 |
|      | 20      | 21 | 21 | 18   | 19 | 18 | 18      | 16 | 16 | 18             | 20 | 18 |
|      | 20      | 17 | 18 | 16   | 13 | 14 | 14      | 11 | 13 | 18             | 15 | 16 |
|      | 17      | 16 | 18 | 15   | 13 | 12 | 12      | 10 | 10 | 15             | 13 | 15 |
| Low  | 14      | 14 | 14 | 15   | 16 | 13 | 15      | 12 | 15 | 20             | 18 | 21 |

**\*\*Grade 10**

|      | Reading |    |    | Math |    |    | Science |    |    | Social Studies |    |    |
|------|---------|----|----|------|----|----|---------|----|----|----------------|----|----|
|      | 91      | 92 | 93 | 91   | 92 | 93 | 91      | 92 | 93 | 91             | 92 | 93 |
| High | 28      | 27 | 28 | 34   | 40 | 35 | 35      | 47 | 37 | 22             | 24 | 21 |
|      | 19      | 19 | 18 | 20   | 19 | 21 | 20      | 18 | 20 | 19             | 19 | 19 |
|      | 16      | 17 | 17 | 16   | 15 | 15 | 16      | 13 | 15 | 18             | 19 | 17 |
|      | 18      | 18 | 18 | 15   | 12 | 13 | 13      | 10 | 12 | 19             | 18 | 19 |
| Low  | 19      | 18 | 20 | 15   | 14 | 16 | 15      | 12 | 15 | 22             | 19 | 23 |

\* Revised MMAT used in 1992

\*\* Revised MMAT first used in 1991



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