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## ABSTRACT

The Missouri Mastery and Achievement Tests (MMAT) were developed as a result of the Excellence in Education Act of 1985, which required the state department of education to identify core competencies and key skills in reading/language arts, mathematics, science, and social studies/civics and to test a sample of students annually. State-level data on these tests is currently reported for grades 3, 6, 8, and 10. Approximately 50,000 students for each grade take these tests in grades 3 and 6, and about 5,000 students for each grade (approximately 10% of Missouri students) take the MMAT for grades 8 and 10. Spring MMAT results indicate that student achievement has leveled off in recent years, with students showing little or no improvement across most grade levels or subject areas since the implementation of the revised tests in 1991 and 1992. In relation to the initial testing in 1987, scores are up, suggesting that the tests have had positive impact on achievement. The 1996 MMAT results are somewhat encouraging in that they reflect improvement over 1987, but they reflect little recent change. (Contains 20 tables.) (SLD)

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ED 406 411

# *Missouri Mastery and Achievement Tests*

## *Summary Report 1996*

Missouri Department of Elementary and Secondary Education

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Missouri Department of Elementary and Secondary Education  
Robert E. Bartman, Commissioner of Education  
James Friedebach, Director of Assessment

**For more information regarding results contained in this report contact  
the Assessment Resource Center at 1-800-366-8232, Columbia, Missouri.**

# *History of the Missouri Mastery and Achievement Tests (MMAT)*

The MMAT was developed as a result of the Excellence in Education Act of 1985. This law requires the Department of Elementary and Secondary Education to identify "core competencies and key skills" in reading/language arts/English, mathematics, science, and social studies/civics; to test annually a sample of students throughout Missouri; and to report results to the General Assembly. Local school districts are required to measure student achievement on the key skills and to identify areas in need of instructional improvement.

The *Core Competencies and Key Skills for Missouri Schools* documents, revised in 1992 for grades 2-6 and 1991 for grades 7-10, identify key skills as required by the Excellence in Education Act. These documents were developed with the assistance of Missouri educators, and provide a framework around which districts can build a complete curriculum.

The MMAT was designed in accordance with the American Psychological Association's Standards for Educational and Psychological Testing. Missouri teachers assisted in writing test items.

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, 6, 8, and 10 includes four subtests (reading/language arts/English, Mathematics, science and social studies/civics). Each subtest contains between 56 and 104 items for a total of about 300 questions per grade level. Test administration requires approximately 2 hours per subtest.

The MMAT is available for district use for grades 2-10. State level data is currently reported for grades 3, 6, 8, and 10. Many Missouri students in grades 3 and 6 take the MMAT (approximately 50,000 for each grade). A representative sample in grades 8 and 10, which includes an estimated 10 percent of Missouri students, take the MMAT (approximately 5,000 for each grade).

## **MMAT Data:**

**Scale Scores** allow districts to determine how their students compare with other Missouri students and to monitor educational progress over time.

**Score Distribution Data** help educators determine whether instructional efforts are reaching all of the various populations of students taking the test.

**Key Skill Mastery Data** provides information to help teachers guide instruction for individual students and/or enables districts to evaluate the effectiveness of curriculum and identify needed changes.

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# Summary

The 1996 Summary Report presents trend data for the spring of 1995 and 1996. Data from the first year the revised Missouri Mastery and Achievement Tests (MMAT) were administered is also presented. The report includes data for grades 3, 6, 8, and 10.

Spring 1996 MMAT results indicate student achievement has leveled off in recent years, with students showing little or no improvement across most grade levels or subject areas since the implementation of the revised tests in 1992 (grades 3 & 6) and 1991 (grades 8 & 10). In relation to the base, or initial year of testing in 1987, scores are up, indicating instruction has impacted students at most levels of achievement in a positive way. The 1996 Summary Report has trend data for scaled score averages, score distribution and key skills mastered.

**Scaled Score Averages** - In grades 3, 6, 8, and 10 Missouri students demonstrated, on the average, an upward trend in achievement. Grade 10 shows no meaningful improvement in English and social studies since establishment of the 1987 baseline. (Reference Figure A, Page 5)

**Score Distribution Data** - Student scores have leveled off over time and remain flat for 1996. With the exception of grade 10 in English/language arts and social studies, scores are up in relation to the base or initial year of testing (1987). However, there has been no significant change in the lowest two quintiles since the 1992 and 1991 revision years. (Reference Figure B, Page 6)

**Key Skills Mastered** - The average students' performance in general has remained stable. Grade 10 has regained percentage points to match 1994 levels in the areas of math and science, after a 7% and 5% drop respectively in 1995. (Reference Figure C-E, Pages 7-16)

The 1996 MMAT results are somewhat encouraging, in that student scores have improved over the established 1987 baseline. But on the whole, most data shows student scores stable or flat in recent years. 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.

*Missouri Department of Elementary and Secondary Education,  
Assessment Section*

## Scaled Score Averages

- Scaled score averages monitor educational progress over time.
- Each subject is shown for 1995 and 1996 for grades 3, 6, 8, and 10. Each subject is also shown for the first year the revised MMAT was administered (1992 for grades 3 and 6, and 1991 for grades 8 and 10).
- In 1987 a baseline was established and the average for each grade and subject was set at 300.
- **A change of about 11 points over time is considered educationally meaningful.**

*Figure A: Scaled Score Averages*

Grade	Year	Reading/ English/ Lang. Arts	Math	Science	Social Studies	Average
<b>3</b>	1992	323	339	364	336	341
	1995	325	345	372	347	347
	1996	<b>325</b>	<b>346</b>	<b>374</b>	<b>348</b>	<b>348</b>
<b>6</b>	1992	308	349	347	322	332
	1995	315	370	365	335	346
	1996	<b>314</b>	<b>372</b>	<b>369</b>	<b>335</b>	<b>348</b>
<b>8</b>	1991	318	331	339	315	326
	1995	319	349	353	323	336
	1996	<b>317</b>	<b>355</b>	<b>357</b>	<b>321</b>	<b>338</b>
<b>10</b>	1991	313	326	327	302	317
	1995	306	328	322	297	313
	1996	<b>308</b>	<b>339</b>	<b>333</b>	<b>300</b>	<b>320</b>

**Summary:**

Students, on the average, demonstrated a slight upward trend in performance in Grades 3, 6, 8, and 10 for 1996. Student scores have risen since the 1987 baseline was established but achievement has leveled off in recent years. Grade 10 has shown no meaningful improvement in English and social studies since the baseline year.

## Score Distribution Data

- Score distribution data can be used to monitor the specific effects of instruction over time. Each subject area is shown for grades 3, 6, 8, and 10 for years 1995 and 1996. Each subject is also shown for the first year the revised MMAT was administered (1992 for grades 3 and 6, and 1991 for grades 8 and 10).
- In 1987 the scaled scores were rank-ordered. The ranked scores were divided into five equal parts. Twenty-percent of the students fell into each part or cell, thus establishment of a baseline.
- Overtime, the percentage of students in the bottom two cells should decrease, and the percentage of students in the top two cells should increase. The percentage of students in the bottom two cells should be close to zero.

*Figure B: Score Distribution Quintiles*

Grade		Reading/English /Lang. Arts			Math			Science			Social Studies		
		'92	'95	'96	'92	'95	'96	'92	'95	'96	'92	'95	'96
<b>3</b>	High	32	34	<b>34</b>	42	45	<b>46</b>	54	58	<b>59</b>	40	46	<b>47</b>
		22	22	<b>21</b>	20	20	<b>20</b>	20	18	<b>17</b>	20	18	<b>17</b>
		18	17	<b>17</b>	15	14	<b>13</b>	10	9	<b>9</b>	14	12	<b>12</b>
	Low	15	14	<b>14</b>	12	10	<b>10</b>	8	7	<b>7</b>	12	10	<b>10</b>
		13	14	<b>14</b>	11	10	<b>11</b>	8	8	<b>8</b>	14	13	<b>14</b>
<b>6</b>	High	24	28	<b>27</b>	44	54	<b>55</b>	46	53	<b>55</b>	34	41	<b>41</b>
		20	20	<b>21</b>	19	19	<b>18</b>	17	16	<b>15</b>	19	19	<b>19</b>
		19	19	<b>19</b>	14	11	<b>11</b>	13	11	<b>11</b>	15	13	<b>13</b>
	Low	19	17	<b>17</b>	11	8	<b>8</b>	10	9	<b>8</b>	14	13	<b>13</b>
		18	16	<b>16</b>	11	8	<b>8</b>	14	11	<b>11</b>	18	14	<b>14</b>
Grade		'91	'95	'96	'91	'95	'96	'91	'95	'96	'91	'95	'96
<b>8</b>	High	29	30	<b>30</b>	36	46	<b>49</b>	40	47	<b>47</b>	29	34	<b>33</b>
		20	21	<b>20</b>	18	19	<b>18</b>	18	17	<b>16</b>	18	20	<b>19</b>
		20	18	<b>17</b>	16	13	<b>13</b>	14	13	<b>12</b>	18	15	<b>15</b>
	Low	17	16	<b>18</b>	15	10	<b>11</b>	12	11	<b>11</b>	15	14	<b>15</b>
		14	15	<b>15</b>	15	12	<b>10</b>	15	13	<b>14</b>	20	18	<b>18</b>
<b>10</b>	High	28	26	<b>28</b>	34	36	<b>41</b>	35	35	<b>40</b>	22	21	<b>23</b>
		19	17	<b>18</b>	20	19	<b>19</b>	20	19	<b>18</b>	19	19	<b>19</b>
		16	16	<b>15</b>	16	15	<b>14</b>	16	14	<b>14</b>	18	17	<b>17</b>
	Low	18	17	<b>17</b>	15	13	<b>12</b>	13	12	<b>12</b>	19	18	<b>18</b>
		19	24	<b>23</b>	15	18	<b>15</b>	15	19	<b>16</b>	22	25	<b>24</b>

**Summary:** Student scores have leveled off over time and remain flat for 1996. With the exception of grade 10 in English/language arts and social studies, scores are up in relation to the base or initial year of testing (1987). However, there has been no significant change in the lowest two quintiles since the 1992 and 1991 revision years.



## Median Student Mastery

- The chart shows the percent of key skills mastered by the **average or median** student in Missouri in each subject area for grades 3, 6, 8, and 10.
- The number at the top of each grade and subject represents the total number of skills tested for that subject area and grade level.
- Each number represents the percent of key skills mastered by the average student in Missouri for the noted year.

*Figure C: Percent of Key Skills Mastered by the Average Student By Year*

Grade	Reading/English/ Lang. Arts	Math			Science			Social Studies		
	'92 '95 '96	'92 '95 '96	'92 '95 '96	'92 '95 '96	'92 '95 '96	'92 '95 '96	'92 '95 '96	'92 '95 '96	'92 '95 '96	
<b>3</b>	18 Total Key Skills Tested  72% 78% <b>78%</b>	13 Total Key Skills Tested  77% 77% <b>77%</b>	12 Total Key Skills Tested  83% 83% <b>83%</b>	10 Total Key Skills Tested  80% 80% <b>80%</b>						
<b>6</b>	20 Total Key Skills Tested  70% 70% <b>70%</b>	16 Total Key Skills Tested  56% 63% <b>63%</b>	17 Total Key Skills Tested  53% 59% <b>59%</b>	21 Total Key Skills Tested  62% 67% <b>67%</b>						
Grade	'91 '95 '96	'91 '95 '96	'91 '95 '96	'91 '95 '96						
<b>8</b>	25 Total Key Skills Tested  60% 60% <b>60%</b>	16 Total Key Skills Tested  50% 56% <b>56%</b>	14 Total Key Skills Tested  43% 43% <b>43%</b>	18 Total Key Skills tested  61% 61% <b>61%</b>						
<b>10</b>	22 Total Key Skills Tested  59% 59% <b>59%</b>	15 Total Key Skills Tested  40% 40% <b>47%</b>	20 Total Key Skills Tested  35% 35% <b>40%</b>	23 Total Key Skills Tested  52% 48% <b>48%</b>						

**Summary:**

The chart indicates the average student achievement, in general, has remained stable. Grade 10 has regained percentage points to match 1994 levels in the areas of math and science, after a 7% and 5% drop respectively in 1995.

## Median Student Mastery In All Subject Areas

- The chart presents a summary of all subject areas for grades 3, 6, 8, and 10.
- Data is presented for 1995 and 1996. Data is also shown for the first year the revised MMAT was administered (1992 for grades 3 and 6, and 1991 for grades 8 and 10).
- The chart shows total key skills for all subject areas mastered by the median student in the noted grade level.

*Figure D: Median Student Mastery All Subject Areas*

<b>Grade</b>	<b>1992 (Grades 3 &amp; 6) 1991 (Grades 8 &amp; 10)</b>	<b>1995</b>	<b>1996</b>
<b>3</b>	41 key skills mastered out of a total of 53  $41/53=77\%$	42 key skills mastered out of a total of 53  $42/53=79\%$	<b>42 key skills mastered out of a total of 53</b>  <b><math>42/53=79\%</math></b>
<b>6</b>	45 key skills mastered out of a total of 74  $45/74=61\%$	48 key skills mastered out of a total of 74  $48/74=65\%$	<b>48 key skills mastered out of a total of 74</b>  <b><math>48/74=65\%</math></b>
<b>8</b>	40 key skills mastered out of a total of 73  $41/73=55\%$	41 key skills mastered out of a total of 73  $41/73=56\%$	<b>41 key skills mastered out of a total of 73</b>  <b><math>41/73=56\%</math></b>
<b>10</b>	38 key skills mastered out of a total of 80  $38/80=48\%$	37 key skills mastered out of a total of 80  $37/80=46\%$	<b>39 key skills mastered out of a total of 80</b>  <b><math>39/80=49\%</math></b>

**Summary:**

The chart indicates the average student performance, in general, has remained stable. Grade 10 has regained percentage points after a drop in 1995.

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## Key Skill Mastery Data

- The information on pages 9-16 shows the percent of students in Missouri mastering each tested objective for the years 1995 and 1996, in grades 3, 6, 8, and 10. Data is also shown for the first year the revised MMAT was administered (1992 for grades 3 and 6, and 1991 for grades 8 and 10).
- The key skills are presented in *Core Competencies and Key Skills for Missouri Schools*, published by the Missouri Department of Elementary and Secondary Education. The key skills are listed by the code number used in respective publication and a brief descriptor.
- Each tested objective is measured by four items. The student must answer at least three of the four correctly to demonstrate mastery of the key skill.
- A change of 5 or more percentage points between years is educationally meaningful.
- See Figures C & D for percentage of key skills mastered by median students and total skills mastered by grade.

*Figure E: Key Skill Mastery Data*

### Grade 3

#### Reading/Language Arts

Key Skill	Percent of Students Demonstrating Mastery		
	1992	1995	1996
B-1 Contextual Word Meaning	59	61	60
B-2 Prefixes/Suffixes	68	70	70
B-3 Synonyms/Antonyms	65	64	64
B-4 New Word Meanings	68	66	66
C-1 Story Elements	83	83	83
C-2 Fact/Fantasy	70	71	70
C-3 Cause/Effect	74	74	74
C-4 Main Idea	58	59	58
C-5 Conclusions/Generalizations	78	77	76
C-7 Outcome Prediction	75	75	75
C-8 Story Title	51	52	53
C-10 Summarization	53	55	55
D-5 Directions	79	80	80
G-3 Effective Writing	66	67	67
G-6 Sentence Combining	69	71	71
G-9 Capitalization	68	70	69
G-10 Punctuation	50	53	53
G-11 Grammatical Usage	72	71	70

**Grade 3**  
**Mathematics**

**Key Skill**

**Percent of Students Demonstrating Mastery**

	<u>1992</u>	<u>1995</u>	<u>1996</u>
A-2 Number Comparison	74	78	78
A-3 Place Value	61	66	65
A-6 Fractional Parts	73	75	75
B-4 Addition/Subtraction	80	79	79
B-5 Multiplication	71	72	72
B-7 Open Sentences	66	67	67
D-3 Time	71	73	73
D-5 Measurement	78	80	79
E-2 Shapes	77	80	81
F-2 Displays of Data	68	70	69
F-3 Grids	62	63	64
H-2 Money Problems	61	63	63
H-4 Problems	61	65	65

**Grade 3**  
**Science**

B-3 Organisms in Ecosystems	83	84	84
C-1 Seed Germination & Growth	80	82	82
C-2 Seedling Growth	60	63	63
C-3 Animal/Plant Development	87	88	88
E-3 Temperature Measurement	56	58	58
G-2 Effects of Heating/Cooling	87	87	87
H-2 Effects of Pushing/Pulling	84	84	84
H-4 Hazardous Situations	84	83	83
I-1 Objects in the Sky	82	82	82
I-2 Light Producers/Reflectors	61	62	62
I-4 Temperature/Precipitation	71	75	75
J-1 Shadow Lengths	56	59	60

**Grade 3**  
**Social Studies/Civics**

A-4 Map-reading Skills	80	81	80
A-5 Features of Maps	71	74	74
B-2 Effects of Regional Changes	56	57	58
F-1 Past/Present Comparisons	79	78	79
G-2 Democratic Decision Making	74	77	76
H-2 Major Offices of Government	46	49	51
J-1 Responsible Behavior	87	87	87
K-1 Respect for Others	83	83	83
M-2 Economic Choices	55	65	65
V-1 Interpret Sources	77	77	76

**Grade 6**  
**Reading/Language Arts**

Key Skill	Percent of Students Demonstrating Mastery		
	1992	1995	1996
B-1 Contextual Word Meaning	69	70	70
B-3 Synonyms/Antonyms	35	38	37
C-1 Story Elements	60	60	61
C-2 Fact/Opinion	81	84	83
C-3 Cause/Effect	85	85	85
C-4 Main Idea	73	77	77
C-5 Conclusions/Generalizations	78	79	79
C-7 Outcome Prediction	72	74	74
C-8 Author's Purpose	69	73	72
C-10 Summarization	54	57	57
C-12 Figurative Language	75	77	77
C-13 Point of View	51	54	54
D-1 Learning Resources	67	71	69
D-5 Directions	88	89	88
G-3 Effective Writing	59	66	68
G-7 Draft Revision	51	55	55
G-8 Spelling	44	45	46
G-9 Capitalization	51	53	54
G-10 Punctuation	55	57	57
G-11 Grammatical Usage	53	57	58

**Grade 6**  
**Mathematics**

A-2 Fraction/Decimal Comparison	41	50	51
A-4 Numerical Sequences	56	66	67
A-6 Graphing on Number Lines	37	46	46
B-6 Arithmetic	45	50	51
B-7 Number Sentences	77	77	77
B-8 Fraction Multiplication	67	67	66
B-9 Order of Operations	48	56	58
D-1 Measurement	68	75	75
D-6 Area/Perimeter	46	51	53
D-9 Convert Units of Measure	35	42	42
E-4 Properties of Shapes	58	69	69
F-1 Data Collection	72	78	79
F-2 Displays of Data	68	72	73
H-1 Money Problems	69	72	72
H-4 Multistep Problems	53	57	57
H-5 Nonstandard Problems	39	42	43

**Grade 6**  
**Science**  
**Key Skill**

**Percent of Students Demonstrating Mastery**

		<u>1992</u>	<u>1995</u>	<u>1996</u>
B-1	Requirements for Life	68	70	71
B-2	Parts of Plants	34	37	40
B-3	Photosynthesis	40	44	46
C-2	Plant/Animal Growth Rates	81	84	85
C-3	Endangered Species	57	65	65
E-4	Acids/Bases	44	50	51
E-5	Metric Measurement	50	58	58
G-1	Chemical/Physical Changes	66	64	65
H-1	Simple/Compound Machines	51	50	51
H-3	Friction	52	55	57
H-5	Electromagnets	69	74	75
H-6	Electricity	77	82	82
H-7	Electric Circuits	48	53	55
H-11	Potential/Kinetic Energy	39	47	49
I-1	Minerals	69	73	74
K-2	Soil Erosion	23	25	25
K-3	Fossils	37	43	44

**Grade 6**  
**Social Studies/Civics**

A-4	Map-reading Skills	57	61	61
A-5	Features of Maps	58	61	61
A-6	Maps: United States	61	67	67
A-7	Maps: World	52	60	61
B-2	Effects of Regional Changes	53	58	56
E-1	Time Line Interpretations	54	59	60
E-3	Fact/Value Judgment	56	64	66
F-4	Cause/Effect Relationships	55	57	57
G-1	Democratic Practices/Values	49	53	54
G-3	Democratic Decision Making	77	81	81
H-1	Government Activities	49	54	54
I-2	Rights/Responsibilities	64	67	68
M-2	Economic Choices	52	62	63
N-1	Production Terms	42	48	48
P-2	Supply/Demand Predictions	79	82	82
Q-2	Government & Economy	47	52	53
R-6	Regional Specialization	56	51	49
S-4	Social/Cultural Roles	59	62	63
T-1	Meeting Human Needs	65	69	68
V-1	Interpret Sources	45	50	50
V-2	Library Resources	67	70	71

**Grade 8**  
**English/Language Arts**  
**Key Skill**

		<b>Percent of Students Demonstrating Mastery</b>		
		<b>1991</b>	<b>1995</b>	<b>1996</b>
B-1	Contextual Word Meaning	68	68	68
C-1	Story Elements	58	56	55
C-2	Fact/Opinion	68	68	67
C-3	Cause/Effect	69	69	67
C-4	Main Idea	49	48	46
C-5	Inferences/Conclusions	60	59	58
C-7	Propaganda Techniques	42	48	45
C-8	Author's Purpose	54	53	51
C-9	Pilot/Setting Relationship	55	55	53
C-10	Summarization	55	56	56
C-12	Figurative Language	60	65	62
D-1	Reference Sources	50	58	55
D-5	Directions	78	77	76
D-6	Compare Sources	76	76	75
E-1	Schedules/Timetables	72	72	70
E-2	Instructions/Labeling	63	62	61
G-2	Main Idea/Details	33	35	35
G-3	Story Details	66	66	65
G-4	Organizational Elements	45	45	43
G-5	Persuasive Rhetoric	56	54	54
G-6	Sentence Combining	46	48	47
G-8	Spelling	56	57	58
G-9	Capitalization	51	52	52
G-10	Punctuation	44	46	47
G-11	Grammatical Usage	56	57	57

**Grade 8**  
**Mathematics**

A-1	Interpreting Numbers	51	63	67
A-2	Number Comparison	42	51	51
A-7	Number Theory	34	47	48
B-7	Solving Linear Equations	43	58	61
B-9	Algebraic Expressions	61	70	73
C-5	Estimation Problems	55	61	60
D-6	Perimeter/Area	42	46	51
D-10	Circle Circumference/Area	38	36	43
E-1	Lines/Angles	63	66	68
E-2	Polygon Classification	32	33	34
E-3	Similar/Congruent Figures	54	58	61
F-4	Probability	55	58	58
G-4	Sequential Instructions	65	68	72
H-1	Consumer Money Problems	41	42	43
H-3	Area/Perimeter Problems	49	54	55
H-4	Proportion Problems	56	59	57

**Grade 8**  
**Science**  
**Key Skill**

**Percent of Students Demonstrating Mastery**

		<u>1991</u>	<u>1995</u>	<u>1996</u>
A-2	Vertebrate Classification	63	67	63
B-1	Cell Parts	36	39	37
D-1	Human Body Systems	60	61	63
D-4	Pollution Effects	60	61	61
D-5	Variables in an Experiment	19	23	27
E-1	Kinetic/Potential Energy	34	43	43
E-5	Heat Transfer	35	46	47
E-6	Atoms/Elements/Compounds	40	46	45
F-1	Wave Characteristics	20	22	27
H-1	Energy in Systems	48	55	56
H-5	Periodic Table	68	71	70
I-3	Missouri Fossils	24	33	34
L-2	Weather Prediction	44	47	48
L-6	Climatic Zones	40	43	44

**Grade 8**  
**Social Studies/Civics**

A-4	Map-reading Skills	73	76	74
A-6	Maps: United States	67	73	72
A-7	Maps: World	70	73	72
B-2	Effects of Regional Changes	47	50	49
E-5	Historical Resources/Biases	46	53	52
F-4	Early American History	43	48	47
F-5	U.S. History to Civil War	35	37	37
G-1	Democratic Practices/Values	60	63	63
G-2	Democratic Decision Making	63	69	67
H-2	Government Offices	46	47	46
H-4	Legislative Procedures	45	48	46
I-2	Rights/Responsibilities	55	58	58
J-3	Citizen Influence	63	66	65
K-2	Political Issue Analysis	45	47	49
M-3	Economic Decision Making	65	67	66
N-1	Results of Production Change	50	53	49
P-4	Changes in Supply/Demand	60	63	61
V-3	Research Methods	71	76	75



## Grade 10

### English/Language Arts

#### Key Skill

#### Percent of Students Demonstrating Mastery

	<u>1991</u>	<u>1995</u>	<u>1996</u>
B-1 Contextual Word Meaning	67	62	63
B-2 Prefixes/Suffixes	51	48	50
C-1 Story Theme	64	60	61
C-2 Examples/Illustrations	46	43	45
C-3 Cause/Effect	66	60	62
C-4 Main Idea	61	55	56
C-5 Inferences/Conclusions	49	48	49
C-7 Pilot Elements	66	64	65
C-8 Author's Purpose	54	51	51
C-9 Literary Forms	58	55	56
C-10 Figurative Language	47	45	47
D-1 Reference Sources	61	60	60
D-4 Organize Information	62	62	64
D-5 Directions	74	72	71
D-6 Compare Sources	60	57	57
E-1 Business Correspondence	47	45	44
E-2 Occupational Information	68	65	66
G-2 Paragraph Construction	56	55	54
G-3 Sentence Revision	59	56	56
G-5 Spelling/Usage/Structure	50	46	47
G-7 Punctuation	49	47	50
G-9 Writing Techniques	45	40	44

## Grade 10

### Mathematics

A-5 Simplify Expressions	61	59	62
B-7 Solve Linear Equations	41	47	51
B-10 Solve Formulas	30	31	34
C-1 Estimation	36	41	45
C-5 Estimation Problems	48	47	52
D-5 Pythagorean Theorem	46	49	53
E-1 Lines/Angles	49	45	52
E-3 Linear Equation Graphs	25	29	30
E-6 Similar/Congruent Figures	40	41	46
F-2 Probability	44	45	48
F-3 Inference Limitations	34	33	36
G-1 Logical Conclusions	64	60	66
G-2 Conclusion Validity	57	54	58
H-2 Banking Problems	63	59	64
H-4 Net Pay Computation	38	36	38

## Grade 10

### Science

#### Key Skill

#### Percent of Students Demonstrating Mastery

		1991	1995	1996
A-2	Mitosis/Meiosis	31	30	35
A-3	Classification: Kingdoms	30	28	32
A-4	Classification: Phyla	46	50	46
B-1	Functions of Cell Parts	26	32	34
C-4	Natural Selection	28	25	32
D-2	Marine/Terrestrial Environments	29	30	36
D-3	Overpopulation Problems	43	39	42
D-4	Elemental Cycles & Food Webs	53	49	52
D-7	Sexually Transmitted Disease	69	71	72
E-3	Scientific Notation	12	13	14
F-2	Solution/Suspension/Colloid	33	31	33
F-7	Nuclear Fission/Fusion	17	14	17
G-1	Kinetic-Molecular Theory	35	34	34
G-2	Energy Transformation	46	43	47
H-1	Newton's Law of Motion	27	26	30
I-2	Earth Region Classification	44	44	50
K-1	Time Line/Earth History	61	59	63
L-1	Experimental Variables	15	18	22
L-3	Energy Needs	45	39	42
L-4	Toxic/Nuclear Waste	66	60	63

## Grade 10

### Social Studies/Civics

A-4	Map-reading Skills	61	59	61
A-6	Maps: United States	52	56	60
A-7	Maps: World	60	61	65
B-2	Effects of Regional Changes	50	46	47
E-5	Historical Resources/Biases	42	41	42
F-3	Historical Personages	35	32	33
F-4	History Events: America	47	46	45
F-7	History Events: Modern World	29	30	29
F-8	Contributions of Cultures	32	34	37
F-12	Historical Sequences: U.S.	53	49	47
F-13	Historical Sequences: World	32	28	33
G-5	U.S. Political Documents	35	31	35
G-6	Comparisons of Governments	51	49	48
H-2	Government Offices	53	52	52
H-3	Federal/State Governments	68	64	68
J-3	Citizen Influence	62	61	60
K-2	Political Issue Analysis	49	47	48
L-1	Propaganda Analysis	52	53	54
N-5	Influences on GNP	54	50	51
O-5	Economic Institutions	63	58	58
Q-3	Market & Command Economics	47	42	44
Q-7	GNP & Living Conditions	51	50	50
S-6	Prejudice/Discrimination	73	69	71

- End of 1996 MMAT Summary Report -



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