National Center for Education Statistics

The Nation's Report Card

Mathematics 2000

THE NATION'S REPORT CARD naep

U.S. Department of Education
Office of Educational Research and Improvement

NCES 2001-517

What is The Nation's Report Card?

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

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

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

The National Assessment Governing Board

National Center for Education Statistics

The Nation's Report Card
Mathematics 2000

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Executive Summary

The National Assessment of Educational Progress (NAEP) is the nation's only ongoing representative sample survey of student achievement in core subject areas. In 2000, NAEP conducted a national mathematics assessment of fourth-, eighth-, and twelfth-grade students. State-level results were also collected at the fourth and eighth grades within participating states and jurisdictions.

Authorized by Congress and administered by the National Center for Education Statistics (NCES) in the U.S. Department of Education, NAEP regularly reports to the public on the educational progress of students in grades 4, 8, and 12. This report presents the results of the NAEP 2000 mathematics assessment for the nation and the states. Results in 2000 are compared to results of previous NAEP mathematics assessments. Students' performance on the assessment is described in terms of average scores on a 0–500 scale and in terms of the percentages of students attaining three achievement levels: *Basic*, *Proficient*, and *Advanced*. The achievement levels are performance standards adopted by the National Assessment Governing Board (NAGB) as part of its statutory responsibilities. The achievement levels are collective judgments of what students should know and be able to do. The Governing Board is an independent, bipartisan group created by Congress in 1988 to set policy for the National Assessment of Educational Progress.

As provided by law, the Acting Commissioner of Education Statistics, upon review of a congressionally mandated evaluation of NAEP, determined that the achievement levels are to be considered developmental and should be interpreted and used with caution. However, both the Acting Commissioner and the Board believe these performance standards are useful for understanding trends in student achievement. They have been widely used by national and state officials, including the National Education Goals Panel, as a common yardstick of academic performance.

In addition to providing average scores and achievement level performance at the national level and state level, this report provides results for subgroups of students defined by various background and contextual characteristics. This report also contains results for a second sample at both the national and state levels—one in which testing accommodations were provided to students with special needs (students with disabilities or students with limited English proficiency).

The results presented in this report are based on representative samples of students for the nation and for participating states. In the national sample, approximately 14,000 fourth-graders from 742 schools, 16,000 eighth-graders from 744 schools, and 13,000 twelfth-graders from 558 schools were assessed. In the state assessments, approximately 100,000 students at each of grades 4 and 8 were assessed.

A summary of major findings from the 2000 NAEP mathematics assessment is presented on the following pages. Differences between results across years or between groups of students are discussed only if they have been determined to be statistically significant.

Major Findings for the Nation, Regions, and States

For the Nation:

- Fourth-, eighth-, and twelfth-grade students had higher average scores in 2000 than in 1990, the first assessment year in which the current mathematics framework was used. Fourth- and eighth-graders showed steady progress across the decade. Twelfth-graders made gains from 1990 to 1996, but their average score declined between 1996 and 2000.
- In 2000, the percentage of students performing at or above *Proficient*—identified by NAGB as the level that all students should reach—was 26 percent at grade 4, 27 percent at grade 8, and 17 percent at grade 12. At each grade, the percentage of students performing at or above this level was higher in 2000 than in 1990. There were gains over the decade at the *Basic* and *Advanced* levels as well. However, from 1996 to 2000, the percentage of twelfth-graders reaching the *Basic* level declined.
- Score increases are evident across the performance distribution—higher-, middle-, and lower-performing students have made gains since 1990 at each grade. At grade 12, however, the decline in the average score between 1996 and 2000 was reflected mostly in the scores of students in the middle- and lower-performance ranges: scores declined only at the 50th, 25th, and 10th percentiles.

For the Regions:

- Average scores in the Southeast, Central, and West were higher in 2000 than in 1990 for students in all three grades. Average scores in the Northeast were higher in 2000 than in 1990 for fourth- and eighth-graders, but the apparent difference for twelfth-graders was not statistically significant.
- In 2000, average scores for fourth-graders were higher in the Northeast and Central regions than in the Southeast. For eighth- and twelfth-graders, scores in the Northeast, Central, and West were higher than in the Southeast.

For the States and Other Jurisdictions:

- In the NAEP 2000 state-by-state assessment, 40 states and 6 other jurisdictions at grade 4, and 39 states and 5 other jurisdictions at grade 8 met the participation guidelines for reporting results. Only public schools participated in the state-by-state assessment.

At grade 4:

- In 2000, no state scored higher than these nine: Connecticut, Indiana, Iowa, Kansas, Massachusetts, Minnesota, North Carolina, Texas, and Vermont. The states with the highest percentages of students at or above *Proficient* were Connecticut, Indiana, Kansas, Massachusetts, Michigan, Minnesota, and Vermont. Their percentages at or above *Proficient* ranged from 29 percent to 34 percent.
- Of the 36 states and jurisdictions that participated in both 2000 and the first state assessment at grade 4 in 1992, 26 had higher average scores in 2000 than in 1992.

At grade 8:

- In 2000, no state scored higher than these three: Kansas, Minnesota, and Montana. The two states with the highest percentages of students at or above *Proficient* were Minnesota (40 percent) and Montana (37 percent).
- Of the 31 states and jurisdictions that participated in both 2000 and the first state assessment at grade 8 in 1990, 27 had higher average scores in 2000 than in 1990.

National Results for Student Subgroups

In addition to overall results for the nation and jurisdictions, NAEP reports on the performance of various subgroups of students. Observed differences between student subgroups in NAEP mathematics performance most likely reflect a range of socioeconomic and educational factors not addressed in this report or by NAEP.

Gender

- In 2000, there was no significant difference between the average scores of male and female fourth-graders, but the average score of males was higher than that of females for both eighth- and twelfth-graders.
- At all three grades, both male and female students had higher average scores in 2000 than in 1990.
- The difference, or "gap," between the average scores of male and female students at every grade was relatively small and has shown little change in its size over the four assessments beginning in 1990.

Race/Ethnicity

- In 2000, at all three grades, the average scores of white students were higher than those of black, Hispanic, and American Indian students.
- In 2000, at grade 12, the average score of Asian/Pacific Islander students was higher than the scores of white, black, and Hispanic students.
- White, black, and Hispanic students at grades 4 and 8 had higher average scores in 2000 than in 1990. At grade 12, only white students had a higher average score in 2000 than in 1990. The score gaps between white and black students, and between white and Hispanic students, were large at every grade. There was no evidence in the 2000 assessment of any narrowing of the racial/ethnic group score gaps since 1990.

Parents' Level of Education

- Generally, students in grades 8 and 12 with higher scores reported higher levels of parental education in 2000. This result is consistent with past NAEP assessments.
- At grade 8, students at each level of parental education had higher scores in 2000 than in 1990. At grade 12, however, only students who reported their parents' highest level of education as "graduated from college" had higher scores in 2000 than in 1990.

Type of School

- At all three grades in 2000, students attending nonpublic schools outperformed their peers attending public schools.
- Over the period from 1990 to 2000, public, nonpublic, and Catholic schools had increased average scores for fourth-graders. For eighth-graders, the scores of public, nonpublic, Catholic, and other nonpublic school students also increased over the 10 year period. Similarly, for twelfth-graders, average scores for all the school types were higher in 2000 than in 1990.

Type of Location

- In 2000, fourth-, eighth-, and twelfth-graders in central city schools had lower average scores than their counterparts in urban fringe/large town schools. Fourth- and eighth-graders in central city schools had lower average scores than their counterparts in rural/small town schools. Fourth-graders in urban fringe/large town schools had higher scores than their counterparts in rural/small town schools.

Free/Reduced-Price Lunch Program

- At all three grades in 2000, students eligible for the Free/Reduced-Price Lunch Program administered by the U.S. Department of Agriculture (USDA) had lower average scores than those who were not eligible. Free/reduced-price lunches are intended for children at or near the poverty line: eligibility is determined by the USDA's Income Eligibility guidelines. (http://www.fns.usda.gov/cnd/IEGs&NAPs/IEGs.htm).

Becoming a More Inclusive NAEP

A second set of results from the NAEP 2000 mathematics assessment includes the performance of special-needs students who were provided with testing accommodations. A similar set of results is available from 1996 at the national level only, allowing for comparisons between 1996 and 2000 national results based on administration procedures that permitted accommodations.

For the Nation:

- At grades 4 and 8, the small differences between the "accommodations-permitted" and "accommodations-not-permitted" national average scores were not statistically significant in either 1996 or 2000. At grade 12, there was no significant difference between the two sets of results in the 2000 assessment, but in the 1996 assessment the average score was higher when accommodations were not permitted.
- Between 1996 and 2000, average scores increased at grades 4 and 8 in both sets of results. At grade 12, the average score declined in both sets of results during the same time period; however, the apparent decline in "accommodations-permitted" results was not statistically significant.

For the States and Other Jurisdictions:

- At grade 4, there were no statistically significant differences observed between the "accommodations-not-permitted" results and the "accommodations-permitted" results for any participating state or jurisdiction in 2000.
- At grade 8, the seven states that had average scores that were higher in the "accommodations-not-permitted" results than in the "accommodations-permitted" results were Maryland, Massachusetts, Missouri, Nevada, New York, North Carolina, and West Virginia.

School Contexts for Learning

NAEP collects information about the contexts for student learning by administering questionnaires to assessed students, their teachers, and their school administrators. Using the student as the unit of analysis, NAEP examines the relationship between selected contextual variables drawn from these questionnaires and students' average scores on the mathematics assessment. Readers are cautioned that the relationship between a contextual variable (for example, teacher self-reported preparation levels, or classroom instructional activities) and student mathematics performance is not necessarily causal (see page 130 for more on this topic).

Teacher Preparation **(grades 4 and 8 only)**

- In 2000, eighth-graders whose teachers majored in either mathematics or mathematics education had higher average scores than did students whose teachers did not major in these subjects.
- Most fourth- and eighth-grade students in 2000 were taught by teachers who considered themselves to be well prepared to teach the mathematics content areas assessed by NAEP. There were no significant differences in the average scores of fourth-graders based on teachers' self-reported level of preparation in

NAEP content areas. However, eighth-graders whose teachers reported being very well prepared in these content areas had higher average scores than did students whose teachers reported they were less well prepared.

- Eighth-graders in 2000 who were taught by mathematics teachers with 11 or more years of experience had higher average scores than those taught by teachers with 2 years or less of experience.

Technology

- Eighth-graders whose teachers reported that they permitted unrestricted use of calculators had higher average scores in 2000 than did the students whose teachers restricted calculator use.
- In 2000, eighth-graders whose teachers reported that they permitted calculator use on class tests had higher average NAEP scores than students whose teachers did not permit calculator use on tests. (NAEP permits calculators on certain sections of the assessment.)
- In grades 4, 8, and 12, there was an increase between 1996 and 2000 in the percentage of students in schools that reported computers were available at all times in classrooms.

Instructional Time and Homework

- In 2000, the average scores of eighth-graders, but not fourth-graders, generally increased as the amount of homework that teachers reported assigning increased.
- In 2000, 82 percent of eighth-grade students attended schools that reported offering algebra to eighth-graders for high school course placement or credit.

Classroom Practices and Home Contexts for Learning

Teachers' Classroom Practices

- In 2000, the majority of students at all three grade levels reported that they did mathematics textbook problems in school every day. Eighth- and twelfth-graders who reported doing textbook problems in school every day had higher average scores than did students who reported doing textbook problems less frequently.

Calculator Usage

- At both grades 4 and 8, the percentage of students who reported using calculators every day for classwork and for homework declined between 1996 and 2000. For twelfth-graders, however, there was no change over the same time span in the frequency of use of calculators for classwork or homework.
- While frequent usage of calculators reported by fourth-graders in 2000 was associated with lower average mathematics scores than less frequent usage, for eighth- and twelfth-graders just the opposite was true—more frequent calculator usage was associated with higher scores.
- In 2000, more frequent usage of calculators on both homework and quizzes as reported by students was again associated with lower average scores for fourth-graders, but with higher scores for eighth- and twelfth-graders.
- There was an increase between 1996 and 2000 in the percentage of twelfth-graders who reported using graphing calculators for schoolwork. In 2000, eighth- and twelfth-graders who used graphing calculators in class had higher average NAEP scores than did nonusers.

Courses Taken by Twelfth-Grade Students

- Twelfth-graders' responses to the NAEP questionnaire in 2000 indicated that 94 percent had taken first-year algebra, 88 percent had taken geometry, 18 percent had taken statistics, and 18 percent had taken calculus.
- Analysis of course-taking patterns revealed a positive association between higher levels of mathematics courses taken and progressively higher NAEP mathematics scores.

Time Spent on Homework

- In 2000, eighth-graders who reported spending a moderate amount of time on mathematics homework had higher average scores than did those who spent either no time on homework or more than 1 hour. Twelfth-graders who spent some time doing mathematics homework had higher average scores than either the 29 percent who were not taking math or the 12 percent who spent no time on homework.

Hours Worked at a Part-Time Job

- More than two-thirds of twelfth-graders reported spending time working at a part-time job in 2000. Those who worked 15 or fewer hours had higher average scores than did those who worked 21 or more hours.

Television Viewing Habits

- Fourth-graders reported watching less television in 2000 than in earlier assessment years. In 2000, the scores of fourth-, eighth-, and twelfth-graders who reported heavy television watching were lower than for students who watched little or a moderate amount of television.

Attitudes Toward Mathematics

- Fourth-, eighth-, and twelfth-graders in 2000 who reportedly agreed that they liked math and that math was useful for solving problems had higher average scores than those who disagreed.
- Students at all three grades in 2000 who disagreed with the statements that math was mostly memorizing facts and that there was only one way to solve a mathematics problem scored higher, on average, than those who agreed.
- Fewer eighth- and twelfth-graders reported liking mathematics in 2000 than in the early 1990s.

The full set of results is available in an interactive database on the NAEP web site,

http://nces.ed.gov/nationsreportcard

Released test questions from previous assessments and question-level performance data are also available on the web site.

1 NAEP 2000 Mathematics Assessment

Introduction

The ability to know and use mathematics is a necessity of daily life. Whether America's young people learn quantitative sciences such as physics or economics or engage in such daily activities as making change or following a recipe, they must rely on the language of numbers to succeed.

In order to provide students with the mathematics skills they need to live and learn in the modern world, America's schools typically teach mathematics every year through junior high school (eighth grade), and require students to take at least one or two years of mathematics to graduate from high school. Beginning in the junior high years and continuing through high school, students can choose from a variety of mathematics course offerings, from practical or business math through algebra, geometry, and calculus.

Young people need to understand and be able to apply mathematical skills and concepts to function in today's technological world. Their need to demonstrate mathematical literacy underlies the importance of monitoring their mathematics achievement. This report summarizes student achievement in the NAEP 2000 mathematics assessment for grades 4, 8, and 12 and compares the results for the nation and states with previous NAEP assessments beginning in 1990.

Chapter Focus

What is the NAEP mathematics assessment?

How does the NAEP mathematics assessment measure and report student progress?

Chapter Contents

Overview of the 2000 National Assessment of Educational Progress

In 1969, the National Assessment of Educational Progress (NAEP) was authorized by Congress to collect, analyze, and report reliable and valuable information about what American students know and can do in core subject areas. Since that time, in what has come to be referred to as the long-term trend assessment, NAEP has assessed public and nonpublic school students who are 9, 13, and 17 years old. (See page 184 in appendix A for more detail on NAEP's Long-Term Trend Assessment). Since 1990, the more recently developed assessments, referred to as the main NAEP, have assessed public and nonpublic school students in grades 4, 8, and 12. In 2000, student performance in mathematics and science was assessed at all three grades, and student performance in reading was assessed at grade 4 only.

All NAEP assessments are based on content frameworks developed through a national consensus process. The NAEP 2000 mathematics assessment was the fourth administration of an assessment based on the *NAEP Mathematics Framework*, which was originally developed for the 1990 assessment and refined for the 1996 and 2000 assessments.[1] In 1990, 1992, and 1996, the NAEP mathematics assessment was administered to national samples of fourth-, eighth-, and twelfth-graders.

The mathematics assessment was also administered to samples of fourth-graders participating in the state-by-state assessment in 1992, 1996, and 2000 and eighth-graders participating in the state assessment in 1990, 1992, 1996, and 2000. The legislation authorizing NAEP did not include state-by-state testing in grade 12.[2]

This report describes the results of the 2000 NAEP mathematics assessment at grades 4, 8, and 12 and compares results in 2000 to those in 1990, 1992, and 1996. The comparisons focus on 2000 results in relation to earlier results. Comparisons of 1996 to 1992 and of 1992 to 1990 were made in previous report cards and therefore are not highlighted in tables or figures in this report.[3] Comparisons across assessment years are possible because the assessments were developed under the same basic framework and share a common set of mathematics questions. In addition, the populations of students were sampled and assessed using comparable procedures.

The Mathematics Assessment Framework

The NAEP Mathematics Framework has provided the operational specifications for developing NAEP mathematics assessments since 1990. In 1996 the framework was refined so that the 1996 and 2000 assessments could better reflect recent curricular emphases in mathematics, while maintaining the connection to the 1990 and 1992 assessments in order to measure trends in student performance.

1 National Assessment Governing Board. *Mathematics framework for the 1996 and 2000 National Assessment of Educational Progress*. Washington, DC: Author.

2 Public Law 100–297. (1988). National Assessment of Educational Progress Improvement Act (20 USC 1211).

3 Reese, C.M., Miller, K.E., Mazzeo, J., & Dossey, J.A. (1997). *NAEP 1996 mathematics report card for the nation and the states*. Washington, DC: National Center for Education Statistics.

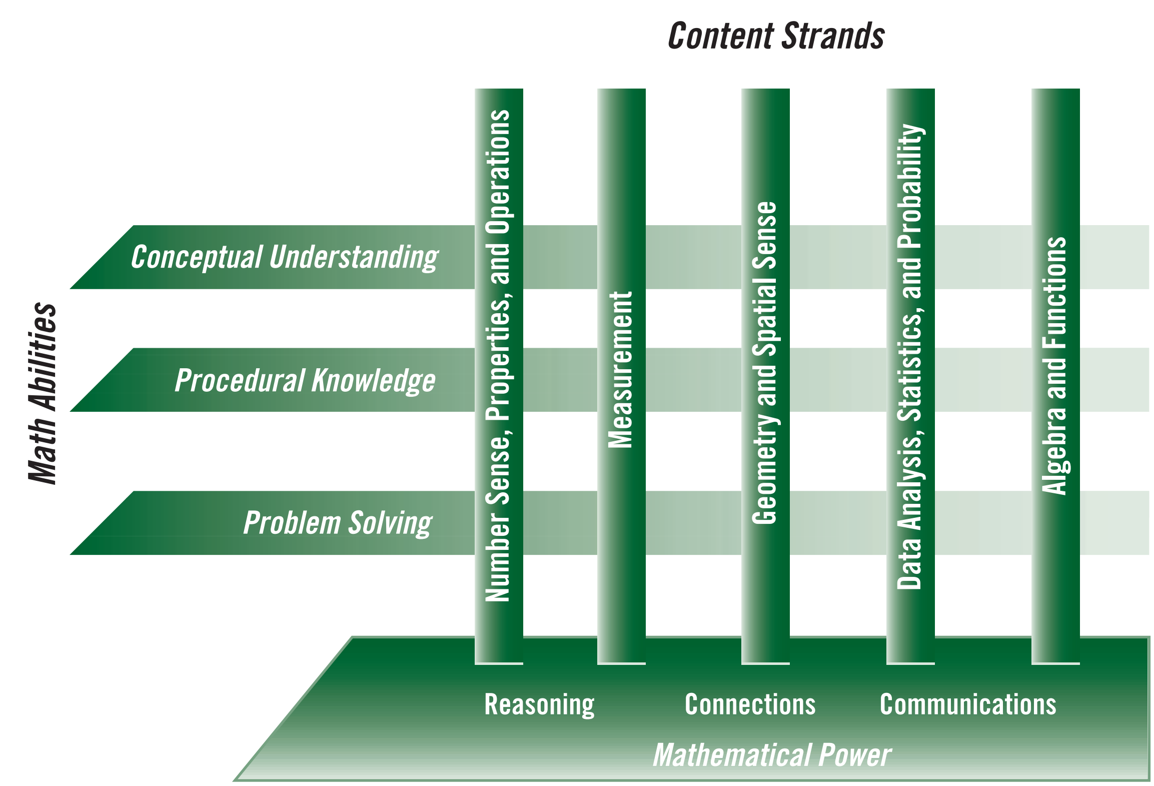
Mullis, I.V.S., Dossey, J., Owen, E.H., & Phillips, G.W. (1993). *NAEP 1992 mathematics report card for the nation and the states*. Washington, DC: National Center for Education Statistics.

Mullis, I.V.S. et al. (1991). *The state of mathematics achievement: NAEP's 1990 assessment of the nation and the trial assessment of the states*. Washington, DC: United States Department of Education, Office of Educational Research and Improvement.

The framework calls for questions based on five mathematics content strands: number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions. Questions were also categorized according to two domains: mathematical abilities and mathematical power. Mathematical abilities describes the types of knowledge or processes required for a student to successfully respond to a question. Mathematical abilities may reflect conceptual understanding, procedural knowledge, or a combination of both in problem solving. The second domain, mathematical power, reflects the processes stressed as major goals of the mathematics curriculum. These include the student's ability to reason, to communicate, and to make connections between concepts and skills either across the mathematics content strands, or from mathematics to other curricular areas. Figure 1.1 summarizes the structure of the 2000 assessment.

A breakdown of the percentage of questions in each content strand prescribed by the framework for the 1990, 1992, 1996, and 2000 assessments is provided in table A.1 (page 187). The framework also incorporates the use of calculators (four-function at grade 4 and scientific at grades 8 and 12), rulers (at all grades), protractors (at grades 8 and 12), and manipulatives such as spinners and geometric shapes. The use of these ancillary materials and the use of calculators were incorporated into some parts of the assessment, but not all. Calculator use was permitted on approximately one-third of the test questions.

Figure 1.1: Structure of the 2000 Assessment



SOURCE: National Assessment Governing Board. *Mathematics Framework for the 1996 and 2000 National Assessment of Educational Progress.*

The Mathematics Assessment Instruments

As the only federally authorized ongoing assessment of student mathematics achievement on a national scale, the NAEP assessment must reflect the framework and expert perspectives and opinions about mathematics and its measurement. To that end, the assessment development process involves stages of review by teachers and teacher educators, state officials, and measurement experts. All components of the assessment are evaluated for curricular relevance, developmental appropriateness, and fairness concerns. Final approval of NAEP test questions is given by the National Assessment Governing Board. A list of the mathematics development committee members for the 2000 assessment is provided in appendix E.

The 2000 mathematics assessment booklets at grades 4, 8, and 12 each contained three, separately timed, 15-minute sections of mathematics questions. Typically, a section, or block as it is sometimes called, will contain about 12-15 questions, but there is considerable variation depending on the balance between multiple-choice and constructed-response questions. The total numbers of test questions used in grades 4, 8, and 12 were 145, 160, and 163, respectively. Each student answered only a small portion of the total number of questions. Each assessment booklet also included a set of background questions that asked students to give information about themselves and their home and school practices, such as time spent on homework, calculator use, and time spent watching television. The assessment time for each grade was 45 minutes plus the 10–15 minutes needed to complete the background questions.

The mathematics blocks included both multiple-choice and constructed-response questions designed to assess the framework objectives. More than 50 percent of student assessment time was devoted to constructed-response questions. Two types of constructed-response questions were used:

- short-constructed response questions that required students to provide answers to computation problems or to describe solutions in one or two sentences, and
- extended constructed-response questions that required students to give longer responses.

Additional information about the design of the 2000 mathematics assessment is presented in appendix A (pages 188–189).

Description of School and Student Samples

The NAEP 2000 mathematics assessment was conducted nationally at grades 4, 8, and 12 and state-by-state at grades 4 and 8. The national assessment included representative samples of both public and nonpublic schools. The state-by-state assessments included only public schools. In the national sample approximately 14,000 fourth-graders, 16,000 eighth-graders, and 13,000 twelfth-graders were assessed. In the state assessments, approximately 100,000 students at each of grades 4 and 8 were assessed. The number of schools in the reporting sample were 742 at grade four, 744 at grade 8, and 558 at grade 12. Additional information about school and student samples is given in appendix A (pages 189–194).

Jurisdictions including 41 states, the District of Columbia, American Samoa, Guam, the Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS), the overseas Department of Defense Dependents Schools (DoDDS), and the Virgin Islands participated in the 2000 state-by-state assessment. To ensure comparability across jurisdictions, NCES has established guidelines for school and student participation rates. Appendix A highlights these guidelines (pages 195–198), and jurisdictions failing to meet them are noted in tables and figures presenting state-by-state results.

Figure 1.2 lists the jurisdictions that participated in the 2000 mathematics assessment and notes those jurisdictions failing to meet one or more NCES-established participation rate guidelines for public schools. Results are not reported for jurisdictions failing to meet the initial school participation rate of 70 percent.

Figure 1.2 Participating jurisdictions in the NAEP 2000 state assessment program in mathematics

Grade 4	Alabama	Kentucky	New Mexico	Vermont[2]
	Arizona	Louisiana	New York[2]	Virginia
	Arkansas	Maine[2]	North Carolina	West Virginia
	California[2]	Maryland	North Dakota	Wisconsin[1]
	Connecticut	Massachusetts	Ohio[2]	Wyoming
	Georgia	Michigan[2]	Oklahoma	American Samoa
	Hawaii	Minnesota[2]	Oregon[2]	District of Columbia
	Idaho[2]	Mississippi	Rhode Island	DDESS
	Illinois[2]	Missouri	South Carolina	DoDDS
	Indiana[2]	Montana[2]	Tennessee	Guam
	Iowa[2]	Nebraska	Texas	Virgin Islands
	Kansas[2]	Nevada	Utah	
Grade 8	Alabama	Louisiana	New York[2]	Virginia
	Arizona[2]	Maine[2]	North Carolina	West Virginia
	Arkansas	Maryland	North Dakota	Wisconsin[1]
	California[2]	Massachusetts	Ohio	Wyoming
	Connecticut	Michigan[2]	Oklahoma	American Samoa
	Georgia	Minnesota[2]	Oregon[2]	District of Columbia
	Hawaii	Mississippi	Rhode Island	DDESS
	Idaho[2]	Missouri	South Carolina	DoDDS
	Illinois[2]	Montana[2]	Tennessee	Guam
	Indiana[2]	Nebraska	Texas	Virgin Islands[1]
	Kansas[2]	Nevada	Utah	
	Kentucky	New Mexico	Vermont[2]	

[1] Failed to meet the initial school participation rate of 70 percent; results not reported.
[2] Failed to meet one or more participation rate guidelines; results reported with appropriate notation.
For more details on participation rate guidelines, see appendix A.
DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools
DoDDS: Department of Defense Dependents School (Overseas)
SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Two Sets of NAEP Results:
Accommodations Not Permitted and Accommodations Permitted

Although NAEP assessments are designed to include special-needs students—those with disabilities and those with limited English proficiency (LEP)—to the fullest degree possible, there have always been some special-needs students who were excluded because they could not participate meaningfully in the assessment. Schools that participate in NAEP have been permitted to exclude some students who may have Individualized Education Programs (IEPs) or are receiving services under Section 504 of the Rehabilitation Act of 1973.[4] Similarly, schools have been permitted to exclude students they identify as being limited English proficient. Schools are encouraged to make exclusion decisions in accordance with explicit criteria provided by the NAEP program.

In order to move its assessments toward more inclusive samples, NAEP began to explore the use of accommodations or alternate testing situations with special-needs students in the 1996 mathematics and science assessments. This shift toward greater inclusiveness allowed NAEP to more closely approximate state and district testing policies that have increasingly offered testing accommodations to special-needs students. In 1996, the national NAEP sample was split so that some of the schools sampled were permitted to provide accommodations to special-needs students and the others were not. This sample design made it possible to study the effects on NAEP results of including special-needs students in the assessments under alternate testing conditions. A series of technical research papers has been published with the results of these comparisons.[5] Based on the outcomes of these technical analyses, the 1998 results of those NAEP assessments that used new test frameworks (writing and civics), and hence also began new trend lines, were reported for the first time with the inclusion of data from accommodated special-needs students.

The results presented in the 1996 mathematics report card included the performance of students with disabilities (SD) and those with limited English proficiency (LEP) who were assessed without accommodations. The results did not include the performance of students for whom accommodations were permitted because of the need to preserve comparability with the results from 1990 and 1992. Students in those earlier assessments had not had accommodations available to them. However, in both the 1996 and 2000 mathematics assessments, the NAEP program used the split-sample design, so that trends in students' mathematics achievement could be reported across all the assessment years and, at the same time, the program could continue to examine the effects of including students tested with accommodations.

4 Section 504 of the Rehabilitation Act of 1973 is a civil rights law designed to prohibit discrimination on the basis of disability in programs and activities, including education, that received federal financial assistance.

5 Olson, J.F. and Goldstein, A. A. (1997). *The inclusion of students with disabilities and limited English proficient students in large-scale assessments: A summary of recent progress.* (NCES Publication No. 97–482). Washington, DC: National Center for Education Statistics.

Mazzeo, J., Carlson, J.E., Voelkl, K.E., & Lutkus, A. D. (1999). *Increasing the participation of special needs students in NAEP: A report on 1996 research activities.* (NCES Publication No. 2000–473). Washington, DC: National Center for Education Statistics.

This report displays two different sets of NAEP results based on the split-sample design:

- those that reflect the performance of regular and special-needs students when accommodations were not permitted, and
- those that reflect the performance of regular and special-needs students—those who required and were given accommodations (such as extended time, small group administration, Spanish-English bilingual booklets, etc.) and those who could be tested without accommodations—when accommodations were permitted.

It should be noted that accommodated students make up a small proportion of the total weighted number of students assessed (see table A.8 in appendix A, page 204, for details). Making accommodations available may change the overall assessment results in subtle ways. For example, some special-needs students who may have been tested without accommodations in previous assessment years may now receive accommodations and, possibly, attain higher scores. Further, special-needs students who may have been excluded in previous years may now be included, but produce relatively low scores. The findings on results when accommodated special-needs students are included in the NAEP assessment are presented in chapter 4 of this report.

Reporting the Assessment Results

The results of student performance on the NAEP mathematics assessment are presented in this report in two ways: as average scores on the NAEP mathematics scale and as the percentages of students attaining NAEP mathematics achievement levels. The average scale scores represent how students performed on the assessment. The achievement levels represent how that performance measured up against set expectations for achievement. Thus, the average scale scores represent what students know and can do, while the achievement level results indicate the degree to which student performance meets expectations of what they should know and be able to do.

The national results for 1990, 1992, 1996, and 2000 are presented on the grade 4, 8, and 12 NAEP mathematics scale. A scale ranging from 0 to 500 was created to report performance for each content strand. The scales summarize student performance across all three types of questions in the assessment (multiple-choice, short constructed-response, and extended constructed-response).

Each mathematics scale was initially based on the distribution of student performance across all three grades in the national assessment (grades 4, 8, and 12). The scales had an average of 250 and a standard deviation of 50. In addition, a composite scale was created as an overall measure of students' mathematics performance. This composite scale is a weighted average of the separate scales for the content strands. The weight for each content strand corresponds to the relative importance of each strand in the NAEP 2000 mathematics framework. A full description of NAEP scales and scaling procedures can be found in the forthcoming *NAEP 2000 Technical Report.*

Achievement level results are presented in terms of mathematics achievement levels as authorized by the NAEP legislation and adopted by the National Assessment Governing Board.[6] For each grade tested, NAGB has adopted three achievement levels: *Basic*, *Proficient*, and *Advanced*. For reporting purposes, the achievement level cut scores are placed on the mathematics scale, resulting in four ranges: below *Basic*, *Basic*, *Proficient*, and *Advanced*.

The Setting of Achievement Levels

The 1988 NAEP legislation that created the National Assessment Governing Board directed the Board to identify "appropriate achievement goals…for each subject area" that NAEP measures.[7] The 1994 NAEP reauthorization reaffirmed many of the Board's statutory responsibilities, including "developing appropriate student performance standards for each age and grade in each subject area to be tested under the National Assessment."[8] In order to follow this directive and achieve the mandate of the 1988 statute to "improve the form and use of NAEP results," the Board undertook the development of student performance standards called "achievement levels." Since 1990, the Board has adopted achievement levels in mathematics, reading, U.S. history, world geography, science, writing, and civics.

The Board defined three levels for each grade: *Basic*, *Proficient*, and *Advanced*. The *Basic* level denotes partial mastery of the knowledge and skills that are fundamental for proficient work at a given grade. The *Proficient* level represents solid academic performance. Students reaching this level demonstrate competency over challenging subject matter. The *Advanced* level signifies superior performance at a given grade. For each grade, the levels are cumulative; that is, abilities achieved at the *Proficient* level presume mastery of abilities associated with the *Basic* level, and attainment of the *Advanced* level presumes mastery of both the *Basic* and *Proficient* levels. Figure 1.3 presents the policy definitions of the achievement levels that apply across all grades and subject areas. Adopting three levels of achievement for each grade signals the importance of looking at more than one standard of performance. The Board believes, however, that all students should reach the *Proficient* level; the *Basic* level is not the desired goal, but rather represents partial mastery that is a step toward *Proficient*.

6 Public Law 100–297. (1988). National Assessment of Educational Progress Improvement Act (20 USC 1211). Washington, DC.

Public Law 102–382. (1994). Improving America's Schools Act (20 USC 9010). Washington, DC.

7 Public Law 100-297. (1988). National Assessment of Educational Progress Improvement Act (20 USC 1211). Washington, DC.

8 Public Law 102-382. (1994). Improving America's Schools Act (20 USC 9010). Washington, DC.

Figure 1.3 Achievement Levels	Policy definitions of the three achievement levels
Basic	This level denotes partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade.
Proficient	This level represents solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter.
Advanced	This level signifies superior performance.

SOURCE: National Assessment Governing Board.

The achievement levels in this report were adopted by the Board based on a standard-setting process designed and conducted under a contract with ACT, Inc. To develop these levels, ACT convened a cross section of educators and interested citizens from across the nation and asked them to judge what students should know and be able to do relative to a body of content reflected in the NAEP framework for mathematics. This achievement level setting process was reviewed by a variety of individuals including policymakers, representatives of professional organizations, teachers, parents, and other members of the general public. Prior to adopting these levels of student achievement, NAGB engaged a large number of persons to comment on the recommended levels and to review the results.

The results of the achievement level setting process, after NAGB approval, became a set of achievement level descriptions and a set of achievement level cut points on the 0-500 NAEP mathematics scale. The cut points are the scores that define the boundaries between below *Basic*, *Basic*, *Proficient*, and *Advanced* performance at grades 4, 8, and 12. The Board established these mathematics achievement levels in 1992 based upon the mathematics content framework.

Achievement Level Descriptions for Each Grade

Specific definitions of the *Basic*, *Proficient*, and *Advanced* mathematics achievement levels for grades 4, 8, and 12 are presented in figures 1.4 through 1.6. As noted previously, the achievement levels are cumulative. Therefore, students performing at the *Proficient* level also display the competencies associated with the *Basic* level, and students at the *Advanced* level also demonstrate the skills and knowledge associated with both the *Basic* and the *Proficient* levels. For each achievement level listed in figures 1.4 through 1.6, the scale score that corresponds to the beginning of that level is shown in parentheses. For example, in figure 1.4 the scale score of 249 corresponds to the beginning of the grade 4 *Proficient* level of achievement.

Figure 1.4	NAEP mathematics achievement levels: Grade 4
Basic (214)	**Fourth-grade students performing at the *Basic* level should show some evidence of understanding the mathematical concepts and procedures in the five NAEP content strands.** Fourth-graders performing at the *Basic* level should be able to estimate and use basic facts to perform simple computations with whole numbers; show some understanding of fractions and decimals; and solve some simple real-world problems in all NAEP content strands. Students at this level should be able to use — though not always accurately — four-function calculators, rulers, and geometric shapes. Their written responses are often minimal and presented without supporting information.
Proficient (249)	**Fourth-grade students performing at the *Proficient* level should consistently apply integrated procedural knowledge and conceptual understanding to problem solving in the five NAEP content strands.** Fourth-graders performing at the *Proficient* level should be able to use whole numbers to estimate, compute, and determine whether results are reasonable. They should have a conceptual understanding of fractions and decimals; be able to solve real-world problems in all NAEP content strands; and use four-function calculators, rulers, and geometric shapes appropriately. Students performing at the *Proficient* level should employ problem-solving strategies such as identifying and using appropriate information. Their written solutions should be organized and presented both with supporting information and explanations of how they were achieved.
Advanced (282)	**Fourth-grade students performing at the *Advanced* level should apply integrated procedural knowledge and conceptual understanding to complex and nonroutine real-world problem solving in the five NAEP content strands.** Fourth-graders performing at the *Advanced* level should be able to solve complex and nonroutine real-world problems in all NAEP content strands. They should display mastery in the use of four-function calculators, rulers, and geometric shapes. These students are expected to draw logical conclusions and justify answers and solution processes by explaining why, as well as how, they were achieved. They should go beyond the obvious in their interpretations and be able to communicate their thoughts clearly and concisely.

SOURCE: National Assessment Governing Board.
NOTE: The scores in parentheses indicate the cutpoint on the scale at which the achievement level range begins.

Figure 1.5 NAEP mathematics achievement levels: Grade 8

Basic **(262)**	**Eighth-grade students performing at the *Basic* level should exhibit evidence of conceptual and procedural understanding in the five NAEP content strands. This level of performance signifies an understanding of arithmetic operations — including estimation — on whole numbers, decimals, fractions, and percents.** Eighth-graders performing at the *Basic* level should complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. They should be able to solve problems in all NAEP content strands through the appropriate selection and use of strategies and technological tools — including calculators, computers, and geometric shapes. Students at this level also should be able to use fundamental algebraic and informal geometric concepts in problem solving. As they approach the *Proficient* level, students at the *Basic* level should be able to determine which of the available data are necessary and sufficient for correct solutions and use them in problem solving. However, these eighth-graders show limited skill in communicating mathematically.
Proficient **(299)**	**Eighth-grade students performing at the *Proficient* level should apply mathematical concepts and procedures consistently to complex problems in the five NAEP content strands.** Eighth-graders performing at the *Proficient* level should be able to conjecture, defend their ideas, and give supporting examples. They should understand the connections among fractions, percents, decimals, and other mathematical topics such as algebra and functions. Students at this level are expected to have a thorough understanding of *Basic* level arithmetic operations — an understanding sufficient for problem solving in practical situations. Quantity and spatial relationships in problem solving and reasoning should be familiar to them, and they should be able to convey underlying reasoning skills beyond the level of arithmetic. They should be able to compare and contrast mathematical ideas and generate their own examples. These students should make inferences from data and graphs; apply properties of informal geometry; and accurately use the tools of technology. Students at this level should understand the process of gathering and organizing data and be able to calculate, evaluate, and communicate results within the domain of statistics and probability.
Advanced **(333)**	**Eighth-grade students performing at the *Advanced* level should be able to reach beyond the recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles in the five NAEP content strands.** Eighth-graders performing at the *Advanced* level should be able to probe examples and counterexamples in order to shape generalizations from which they can develop models. Eighth-graders performing at the *Advanced* level should use number sense and geometric awareness to consider the reasonableness of an answer. They are expected to use abstract thinking to create unique problem-solving techniques and explain the reasoning processes underlying their conclusions.

SOURCE: National Assessment Governing Board.
NOTE: The scores in parentheses indicate the cutpoint on the scale at which the achievement level range begins.

Figure 1.6 NAEP mathematics achievement levels: Grade 12

***Basic* (288)**

Twelfth-grade students performing at the *Basic* level should demonstrate procedural and conceptual knowledge in solving problems in the five NAEP content strands.

Twelfth-grade students performing at the *Basic* level should be able to use estimation to verify solutions and determine the reasonableness of results as applied to real-world problems. They are expected to use algebraic and geometric reasoning strategies to solve problems. Twelfth-graders performing at the *Basic* level should recognize relationships presented in verbal, algebraic, tabular, and graphical forms; and demonstrate knowledge of geometric relationships and corresponding measurement skills.

They should be able to apply statistical reasoning in the organization and display of data and in reading tables and graphs. They also should be able to generalize from patterns and examples in the algebra, geometry, and statistics strands. At this level, they should use correct mathematical language and symbols to communicate mathematical relationships and reasoning processes; and use calculators appropriately to solve problems.

***Proficient* (336)**

Twelfth-grade students performing at the *Proficient* level should consistently integrate mathematical concepts and procedures into the solutions of more complex problems in the five NAEP content strands.

Twelfth-graders performing at the *Proficient* level should demonstrate an understanding of algebraic, statistical, and geometric and spatial reasoning. They should be able to perform algebraic operations involving polynomials; justify geometric relationships; and judge and defend the reasonableness of answers as applied to real-world situations. These students should be able to analyze and interpret data in tabular and graphical form; understand and use elements of the function concept in symbolic, graphical, and tabular form; and make conjectures, defend ideas, and give supporting examples.

***Advanced* (367)**

Twelfth-grade students performing at the *Advanced* level should consistently demonstrate the integration of procedural and conceptual knowledge and the synthesis of ideas in the five NAEP content strands.

Twelfth-grade students performing at the *Advanced* level should understand the function concept and be able to compare and apply the numeric, algebraic, and graphical properties of functions. They should apply their knowledge of algebra, geometry, and statistics to solve problems in more *Advanced* areas of continuous and discrete mathematics. They should be able to formulate generalizations and create models through probing examples and counterexamples. They should be able to communicate their mathematical reasoning through the clear, concise, and correct use of mathematical symbolism and logical thinking.

SOURCE: National Assessment Governing Board.
NOTE: The scores in parentheses indicate the cutpoint on the scale at which the achievement level range begins.

The Developmental Status of Achievement Levels

The 1994 NAEP reauthorization law requires that the achievement levels be used on a developmental basis until the Commissioner of Education Statistics determines that the achievement levels are "reasonable, valid, and informative to the public."[9] Until that determination is made, the law requires the Commissioner and the Board to state clearly the developmental status of the achievement levels in all NAEP reports.

In 1993, the first of several congressionally mandated evaluations of the achievement level setting process concluded that the procedures used to set the achievement levels were flawed and that the percentage of students at or above any particular achievement level cutpoint may be underestimated.[10] Others have critiqued these evaluations, asserting that the weight of the empirical evidence does not support such conclusions.[11]

In response to the evaluations and critiques, NAGB conducted an additional study of the 1992 reading achievement levels before deciding to use those reading achievement levels for reporting 1994 NAEP results.[12] When reviewing the findings of this study, the National Academy of Education (NAE) Panel expressed concern about what it saw as a "confirmatory bias" in the study and about the inability of this study to "address the panel's perception that the levels had been set too high."[13] In 1997, the NAE Panel summarized its concerns with interpreting NAEP results based on the achievement levels as follows:

> *First, the potential instability of the levels may interfere with the accurate portrayal of trends. Second, the perception that few American students are attaining the higher standards we have set for them may deflect attention to the wrong aspects of education reform. The public has indicated its interest in benchmarking against international standards, yet it is noteworthy that when American students performed very well on a 1991 international reading assessment, these results were discounted because they were contradicted by poor performance against the possibly flawed NAEP reading achievement levels in the following year.*[14]

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9 The Improving America's Schools Act of 1994 (20 USC 9010) requires that the Commissioner base his determination on a congressionally mandated evaluation by one or more nationally recognized evaluation organizations, such as the National Academy of Education or the National Academy of Science.

10 United States General Accounting Office. (1993). *Education achievement standards: NAGB's approach yields misleading interpretations,* U.S. General Accounting Office Report to Congressional Requestors. Washington, DC: Author.

National Academy of Education. (1993). *Setting performance standards for achievement: A report of the National Academy of Education Panel on the evaluations of the NAEP Trial State Assessment: An evaluation of the 1992 achievement levels.* Stanford, CA: Author.

11 Cizek, G. (1993). *Reactions to National Academy of Education report.* Washington, DC: National Assessment Governing Board.

Kane, M. (1993). *Comments on the NAE evaluation of the NAGB achievement levels.* Washington, DC: National Assessment Governing Board.

12 American College Testing. (1995). *NAEP reading revisited: An evaluation of the 1992 achievement level descriptions.* Washington, DC: National Assessment Governing Board.

13 National Academy of Education. (1996). Reading achievement levels. In *Quality and utility: The 1994 Trial State Assessment in reading. The fourth report of the National Academy of Education Panel on the evaluation of the NAEP Trial State Assessment.* Stanford, CA: Author.

14 National Academy of Education. (1997). *Assessment in transition: Monitoring the nation's educational progress* (p. 99). Mountain View, CA: Author.

The NAE Panel report recommended "that the current achievement levels be abandoned by the end of the century and replaced by new standards...." The National Center for Education Statistics and the National Assessment Governing Board have sought and continue to seek new and better ways to set performance standards on NAEP.[15] For example, NCES and NAGB jointly sponsored a national conference on standard setting in large-scale assessments, which explored many issues related to standard setting.[16] Although new directions were presented and discussed, a proven alternative to the current process has not yet been identified. The Acting Commissioner of Education Statistics and the Board continue to call on the research community to assist in finding ways to improve standard setting for reporting NAEP results.

The most recent congressionally mandated evaluation conducted by the National Academy of Sciences (NAS) relied on prior studies of achievement levels, rather than carrying out new evaluations, on the grounds that the process has not changed substantially since the initial problems were identified. Instead, the NAS Panel studied the development of the 1996 science achievement levels. The NAS Panel basically concurred with earlier congressionally mandated studies. The Panel concluded that "NAEP's current achievement level setting procedures remain fundamentally flawed. The judgment tasks are difficult and confusing; raters' judgments of different item types are internally inconsistent; appropriate validity evidence for the cut scores is lacking; and the process has produced unreasonable results."[17]

The NAS Panel accepted the continuing use of achievement levels in reporting NAEP results on a developmental basis, until such time as better procedures can be developed. Specifically, the NAS Panel concluded that "....tracking changes in the percentages of students performing at or above those cut scores (or, in fact, any selected cut scores) can be of use in describing changes in student performance over time."[18]

The National Assessment Governing Board urges all who are concerned about student performance levels to recognize that the use of these achievement levels is a developing process and is subject to various interpretations. The Board and the Acting

15 Reckase, Mark, D. (2000). *The evolution of the NAEP achievement levels setting process: A summary of the research and development efforts conducted by ACT.* Iowa City, IA: ACT, Inc.

16 National Assessment Governing Board and National Center for Education Statistics. (1995). *Proceedings of the joint conference on standard setting for large-scale assessments of the National Assessment Governing Board (NAGB) and the National Center for Education Statistics* (NCES). Washington, DC: Government Printing Office.

17 Pellegrino, J.W., Jones, L.R., & Mitchell, K.J. (Eds.). (1998). *Grading the nation's report card: evaluating NAEP and transforming the assessment of educational progress.* Committee on the Evaluation of National Assessments of Educational Progress, Board on Testing and Assessment, Commission on Behavioral and Social Sciences and Education, National Research Council. (p.182). Washington, DC: National Academy Press.

18 Ibid., page 176.

Commissioner believe that the achievement levels are useful for reporting trends in the educational achievement of students in the United States.[19] In fact, achievement level results have been used in reports by the President of the United States, the Secretary of Education, state governors, legislators, and members of Congress. The National Education Goals Panel and government leaders in the nation and in more than 40 states use these results in their annual reports.

However, based on the congressionally mandated evaluations so far, the Acting Commissioner agrees with the National Academy's recommendation that caution needs to be exercised in the use of the current achievement levels. Therefore, the Acting Commissioner concludes that these achievement levels should continue to be considered developmental and should continue to be interpreted and used with caution.

Sample Assessment Questions

No questions from the NAEP mathematics assessment administered in 2000 will be released at this time so that they may be used again in a future assessment. However, nine sample questions from the 1996 assessment, three at each grade level, are presented in appendix D. They represent the types of questions used in 2000 (i.e., multiple-choice, short constructed-response, and extended constructed-response), but do not illustrate the breadth of the content assessed. A large collection of questions from the 1996 assessment and from earlier assessments in 1990 and 1992 is available on the NAEP web site at http://nces.ed.gov/nationsreportcard.

Maps of Selected Item Descriptions

The mathematics performance of fourth-, eighth-, and twelfth-graders can be illustrated by maps that position item descriptions along the NAEP mathematics scale where items are likely to be answered successfully by students.[20] The descriptions used on these maps focus on the mathematics skill or knowledge needed to answer the question. For multiple-choice questions, the description indicates the skill or knowledge demonstrated by selection of the correct option; for constructed-response questions, the description takes into account the skill or knowledge specified by the different levels of scoring criteria for that question.

Figures 1.7 through 1.9 are item maps for grades 4, 8, and 12, respectively. Approximately 25 questions from each grade have been selected and placed on each item map. For each question indicated on the map, students who scored above the scale point had a higher probability of successfully answering the question, and students who scored below the scale point had a lower probability of successfully answering the question. The map location for each question identifies where that

[19] Forsyth, Robert A. (2000). A description of the standard-setting procedures used by three standardized test publishers. In *Student performance standards on the National Assessment of Educational Progress: Affirmations and improvements*. Washington, DC: National Assessment Governing Board.

Nellhaus, Jeffrey M. (2000). States with NAEP-like performance standards. In *Student performance standards on the National Assessment of Educational Progress: Affirmations and improvements*. Washington, DC: National Assessment Governing Board.

[20] Details on the procedures used to develop item maps are provided in appendix A, 214–215.

question was answered successfully by at least 65 percent of the students for constructed-response questions, 74 percent of the students for four-option multiple-choice questions, and 72 percent of the students for five-option multiple-choice questions.

As an example of how to interpret the item maps, consider the question in figure 1.7 that maps at score point 282. As the description indicates, fourth-graders were required to "Find the area of an irregular figure on a 4 by 7 grid" in order to answer this question successfully. As this was a four-option multiple-choice question, students who scored at or above 282 (its map value) on the NAEP scale had at least a 74 percent probability of answering the question correctly. Students who scored below 282 had less than a 74 percent probability of doing so. This does not mean that all students scoring 282 or above always answered the question correctly, or that students scoring below 282 always answered the question incorrectly. Rather, the item map indicates higher or lower probability of answering the question successfully depending on students' overall mathematics ability as measured by the NAEP scale.

As another example of how to interpret the item maps, consider the question in figure 1.8 that maps at score point 330 and requires eighth-graders to "Write a word problem to fit a given situation involving division." Students' responses to this constructed-response question were rated according to a three-level scoring guide that distinguished between "Unsatisfactory," "Partial," and "Satisfactory" responses. As with all constructed-response questions portrayed on the item maps, the description of this item takes into account the requirements for a response to be rated at a certain level according to the scoring criteria for that question. With this question, the description is based on the level of performance required for a score of "Satisfactory." Its map location indicates that students who scored 330 or above had at least a 65 percent probability of demonstrating the skill required to answer the question satisfactorily. Students who scored below 330 had less than a 65 percent probability of doing so.

In interpreting the item map information, it is important to note that questions administered at grade 4 tend to map to the lower range of the cross-grade scale, reflecting the typical performance of fourth-graders. Questions administered at grade 12 tend to map to the higher range of the scale. Questions administered at grade 8 tend to map more to the middle of the scale. The three mathematics achievement levels for a specific grade are also indicated on the item map for that grade. Although the same 0-to-500 mathematics scale is used at each grade, the achievement levels are grade specific and each achievement level begins at a different score point at each grade.

NAEP Mathematics Scale

Figure 1.7

Grade 4 Item Map

Map of selected item descriptions on the National Assessment of Educational Progress mathematics scale for grade 4

This map describes the skill or ability associated with answering individual mathematics questions. The map identifies the score point at which students had a high probability of successfully answering the question.*

500		
340		
330		**332** Extend a pattern in a table and explain the answer
320		**322** *Solve a story problem involving fractions*
310		**313** *Solve a problem involving the start time and stop time to cook a turkey*
300		**301** *Recognize the best unit to measure the length of an object*
290		**292** List and explain possible ways to select a flavor of ice cream and a serving container
280	***Advanced*** **282**	**282** *Find the area of an irregular figure on a 4 by 7 grid*
270		**272** *Find the product of several numbers when one of them is zero*
260		**264** Apply the concept of symmetry to visualize the result of folding a marked strip of paper **261** *Solve a story problem that involves recognizing that the solution must be a multiple of six* **257** *Identify the procedure needed to find the weight of boxes that each weigh the same amount*
250	***Proficient*** **249**	**253** *Solve a ratio problem involving pints* **251** Draw bars on a graph to represent a situation **247** *Use a ruler to find the total length of three line segments*
240		**246** Given three equivalent fractions, provide two more fractions that are equivalent to the three **245** Solve a problem involving even and odd numbers **241** *Given points on a number line, find their sum*
230		**230** Given certain coins, show how a given amount of money can be made
220		**221** Write an addition problem in terms of multiplication
210	***Basic*** **214**	**213** Complete a bar graph
200		**208** *Identify which of four objects is heaviest*
190		**194** Shade a region to represent a given fraction
180		**189** *Round money as specified* **188** Solve a simple subtraction problem
0		

NOTE: Regular type denotes a constructed-response question. Italic type denotes a multiple-choice question.

* Each grade 4 mathematics question in the 2000 assessment was mapped onto the NAEP 0–500 mathematics scale. The position of the question on the scale represents the scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, a 74 percent probability of correctly answering a four-option multiple-choice question, or a 72 percent probability of correctly answering a five-option question. Only selected questions are presented. Scale score ranges for mathematics achievement levels are referenced on the map.

SOURCE: National Center for Education Statistics. National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

NAEP Mathematics Scale

Figure 1.8

Grade 8 Item Map

Map of selected item descriptions on the National Assessment of Educational Progress mathematics scale for grade 8

This map describes the skill or ability associated with answering individual mathematics questions. The map identifies the score point at which students had a high probability of successfully answering the question.*

500

400

390
- **393** Draw a right triangle on a grid that has the same angle measures as a given right triangle, but has a specified larger area

380
- **383** Solve a problem involving postage

370

360
- **363** List all possible pairs of numbered chips that can be drawn from a box

350
- **347** Given two methods of price reductions, indicate which method results in the cheaper price
- **344** *Determine which term in a pattern of fractions will have a specified decimal value*

340
- **340** *Determine a central angle in a circle, given the fraction of the circumference the angle subtends*

***Advanced* 333**

330
- **331** *Given the formula, convert a temperature from Fahrenheit to Celsius*
- **330** Write a word problem to fit a given situation involving division
- **328** *Use proportional reasoning to find the distance between two towns*

320
- **317** Find the area of a figure
- **314** *Determine which equation is true for each of three given pairs of x and y values*

310

***Proficient* 299**

300
- **305** Draw a line of symmetry for each of two figures
- **301** Graph an inequality, given certain specifications
- **298** *Find the coordinates of one vertex of a square, given the coordinates of the other vertices*

290
- **291** Determine which of two surveys is better and explain why
- **287** *Solve a basic percent problem*

280
- **281** *Determine how much change a person will get back from a purchase*

270
- **274** Determine the length of an object pictured above a ruler, but not aligned at the beginning of the scale

***Basic* 262**

260
- **264** *Apply property of a cube*
- **259** *Solve a problem using data given in a pie chart*

250
- **254** *Solve a story problem involving division*

240
- **240** Display data on a bar graph
- **235** Visualize a geometric figure

230
- **230** Determine the value of a number located on a number line

0

NOTE: Regular type denotes a constructed-response question. Italic type denotes a multiple-choice question.

* Each grade 8 mathematics question in the 2000 assessment was mapped onto the NAEP 0–500 mathematics scale. The position of the question on the scale represents the scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, a 74 percent probability of correctly answering a four-option multiple-choice question, or a 72 percent probability of correctly answering a five-option question. Only selected questions are presented. Scale score ranges for mathematics achievement levels are referenced on the map.

SOURCE: National Center for Education Statistics. National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

NAEP Mathematics Scale

Figure 1.9

Grade 12 Item Map

Map of selected item descriptions on the National Assessment of Educational Progress mathematics scale for grade 12

This map describes the skill or ability associated with answering individual mathematics questions. The map identifies the score point at which students had a high probability of successfully answering the question.*

500

410

400
404 Interpret slope and intercept

390
388 Given the graphs of two functions, describe the transformations required to obtain the second from the first

380
386 Given a table of interest rates, determine which bank account would have the most money after 2 years

372 *Determine the x coordinate of a point on the graph of a trig function*

Advanced 370
370 *Determine which of five triangles is not a 30º - 60º - 90º triangle*
370 *Solve a quadratic inequality*

367

366 Analyze and explain a situation involving percent
363 *Use proportional reasoning to find the distance between two towns*

360

350
349 Solve a system of equations for x and y
346 Given a frequency distribution of scores, determine the average score

Proficient 340
342 *Given a formula involving several variables, solve for one variable in terms of the others*

336

336 *Find the perimeter of a figure*
333 *Choose solution set for a cubic equation*

330
330 *Recognize a property of prime numbers*
329 Determine the first three terms in a sequence
326 *Visualize where a point will touch when a rectangle is folded along a dotted line*

320

314 Provide a counterexample to a statement about a number sequence expressed algebraically
312 *Identify a statement about a given parallelogram that is not necessarily true*

310

300
297 *Identify which figure could not be folded to make a cube*

Basic 290
293 *Apply the concept of perimeter*

288

286 *Determine the cost of renting a car given the per day and mileage charges*

280
282 Place a dot on a number line to locate a given fraction
277 *Find missing length in a figure*

270
269 *Interpret pie chart data*

260
262 *Solve story problem involving division*

0

NOTE: Regular type denotes a constructed-response question. Italic type denotes a multiple-choice question.

* Each grade 12 mathematics question in the 2000 assessment was mapped onto the NAEP 0–500 mathematics scale. The position of the question on the scale represents the scale score attained by students who had a 65 percent probability of successfully answering a constructed-response question, a 74 percent probability of correctly answering a four-option multiple-choice question, or a 72 percent probability of correctly answering a five-option question. Only selected questions are presented. Scale score ranges for mathematics achievement levels are referenced on the map.

SOURCE: National Center for Education Statistics. National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Interpreting NAEP Results

The average scores and percentages presented in this report are estimates because they are based on representative samples of students rather than on the entire population of students. Moreover, the collection of questions used at each grade level is but a sample of the many questions that could have been asked that measure the NAEP framework. As such, the results are subject to a measure of uncertainty, reflected in the standard error of the estimates. The standard errors for the estimated scale scores and percentages in this report are provided in appendix B.

The differences between scale scores and between percentages discussed in the following chapters take into account the standard errors associated with the estimates. Comparisons are based on statistical tests that consider both the magnitude of the difference between the group average scores or percentages and the standard errors of those statistics. Throughout this report, differences between scores or between percentages are pointed out only when they are significant from a statistical perspective. All differences reported are significant at the .05 level with appropriate adjustments for multiple comparisons. The term significant is not intended to imply a judgment about the absolute magnitude of the educational relevance of the differences. It is intended to identify statistically dependable population differences to help inform dialogue among policymakers, educators, and the public.

Readers are cautioned against interpreting NAEP results in a causal sense. Inferences related to subgroup performance or to the effectiveness of public and nonpublic schools, for example, should take into consideration the many socioeconomic and educational factors that may also impact on mathematics performance.

Overview of the Remaining Report

The results in chapters 2 and 3 of this report are based on the set of data with no accommodations offered. Findings are presented for the nation, for regions, for participating jurisdictions, and for the major reporting subgroups included in all NAEP report cards. Trends from the 1990, 1992, and 1996 assessments are noted where the data permit comparisons. State-by-state results are included for the states and jurisdictions that participated in the mathematics assessment at grades 4 and 8.

Chapter 4 presents an overview of the second set of results—those that include students who were provided accommodations during the test administration. By including these results in the nation's mathematics report card, the NAEP program continues a phased transition toward a more inclusive reporting sample. Future assessment results will be based solely on a student and school sample in which accommodations are permitted.

Chapter 5 examines contexts for learning mathematics in terms of school/teacher policies and their relationship to student learning as measured by NAEP scale scores. Special emphasis is given to teacher preparation and to the use of technology in mathematics instruction. Chapter 6 examines contexts for learning mathematics in terms of classroom practices and student variables. This chapter includes information about course-taking patterns in grades eight and twelve, calculator usage, students' reports of their use of time outside of school, and their attitudes toward mathematics.

This report also contains appendices that support or augment the results presented. Appendix A contains an overview of the NAEP mathematics framework and specifications, information on the national and state samples, and a more detailed description of the major reporting subgroups featured in chapters 2 and 3. Appendix B contains the full data with standard errors for all tables and figures in this report. Appendix C presents selected contextual variables from non-NAEP sources that likely have bearing on student performance. Appendix D provides a set of sample NAEP test questions that were administered in the 1996 assessment. Appendix E contains a list of the NAEP mathematics committee members.

Detailed information about the measurement methodology and data analysis techniques will be available in the forthcoming *NAEP 2000 Technical Report*.

2 Overall Results for the Nation and the States

Overview

This chapter presents the 2000 mathematics scale score and achievement level results for the nation at grades 4, 8, and 12 and for the participating states and jurisdictions at grades 4 and 8. The 2000 national results are compared to results from the three previous mathematics assessments—1990, 1992, and 1996. The state assessments in mathematics were first administered in 1990 at grade 8 and in 1992 at grade 4. The 2000 results for participating states and jurisdictions are compared to those from the three previous assessments at grade 8 (1990, 1992, and 1996) and the two previous assessments at grade 4 (1992 and 1996). The results reported in this chapter are based on testing conditions comparable to those in previous NAEP assessments. Accommodations for special-needs students were not offered, but special-needs students who could participate in the assessment without accommodations were included. Results that were obtained when accommodations were offered for special-needs students are presented in chapter 4.

The performance of students across the nation and within states is summarized by an average score on the NAEP mathematics scale, which ranges from 0 to 500. Performance is also described in terms of the percentages of students who attained each of the three mathematics achievement levels: *Basic, Proficient*, and *Advanced*. The overall national results are presented first, followed by results for individual states and, finally, cross-state comparisons.

Chapter Focus

Are the nation's and states' fourth-, eighth-, and twelfth-graders making progress in mathematics?

Chapter Contents

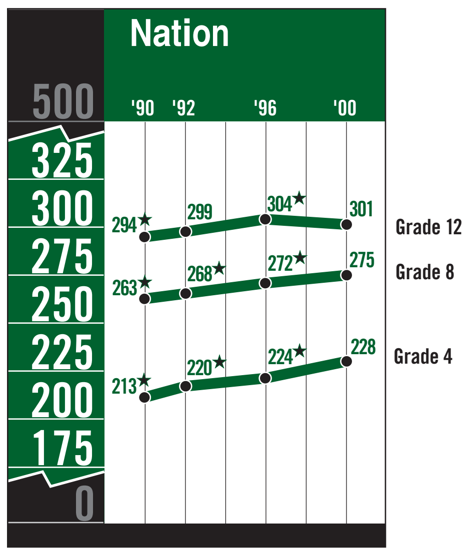
National Scale Score Results

Figure 2.1 displays the national average mathematics scale scores for fourth-, eighth-, and twelfth-graders in 1990, 1992, 1996, and 2000. At grades 4 and 8, the trend in student performance is one of continued improvement across the decade. The average scores for these students increased each year, and in 2000 they were higher than those for fourth- and eighth-graders in 1990, 1992, or 1996. The trend pattern was different at grade 12. The average score of twelfth-graders increased between 1990 and 1996, but then declined between 1996 and 2000. Despite this recent downturn in performance, the twelfth-grade average score in 2000 was higher than that in 1990.

Figure 2.1

National Scale Score Results

National average mathematics scale scores, grades 4, 8, and 12: 1990–2000



★ Significantly different from 2000.
SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessments.

Achievement Level Results for the Nation

The achievement levels that have been set by the National Assessment Governing Board (NAGB) as authorized by the NAEP legislation establish a set of standards for what students are expected to know and do at each grade level.[1] The setting of achievement levels was based on the collective judgments of experts about what students should be expected to know and be able to do in terms of the NAEP mathematics framework. Viewing students' performance from this perspective provides some insight into the adequacy of students' knowledge and skills and the extent to which they achieved expected levels of performance.

In 1992, NAGB reviewed and adopted the recommended achievement levels,

[1] The Improving America's Schools Act of 1994 (20 USC 9010) requires that the National Assessment Governing Board develop "appropriate student performance levels" for reporting NAEP results.

which were derived from the judgments of a broadly representative panel that included teachers, education specialists, and members of the general public. For each grade assessed, NAGB has adopted three achievement levels: *Basic, Proficient,* and *Advanced*. For reporting purposes, the achievement level cut scores are placed on the NAEP mathematics scale resulting in four ranges: below *Basic, Basic, Proficient,* and *Advanced*. Figures 1.4-1.6 in chapter 1 present specific descriptions of mathematics achievement for the *Basic*, *Proficient*, and *Advanced* levels at each of the three grades.

The NAEP legislation requires that achievement levels be "used on a developmental basis until the Commissioner of Education Statistics determines…that such levels are reasonable, valid and informative to the public." A discussion of the developmental status of achievement levels may be found in chapter 1.

Figure 2.2 displays the achievement level results for the nation for each grade. Results are presented in two ways: 1) the percentage of students within each achievement level interval, and 2) the percentage of students at or above the *Basic* and at or above the *Proficient* achievement levels. In reading figure 2.2, it is necessary to keep in mind that the percentages at or above specific achievement levels are cumulative. Therefore, included among the percentage of students at or above the *Basic* level are also those who have achieved the *Proficient* and *Advanced* levels of performance, and included among students at or above the *Proficient* level are also those who have attained the *Advanced* level of performance.

In the 2000 mathematics assessment, 26 percent of fourth-graders, 27 percent of eighth-graders, and 17 percent of twelfth-graders performed at or above the *Proficient* level—identified by NAGB as the level at which all students should perform. Students' attainment of the achievement levels across years generally reflects the trends in scale score results described in the previous section: A pattern of steady growth is evident at grades 4 and 8, while the results at grade 12 are somewhat mixed.

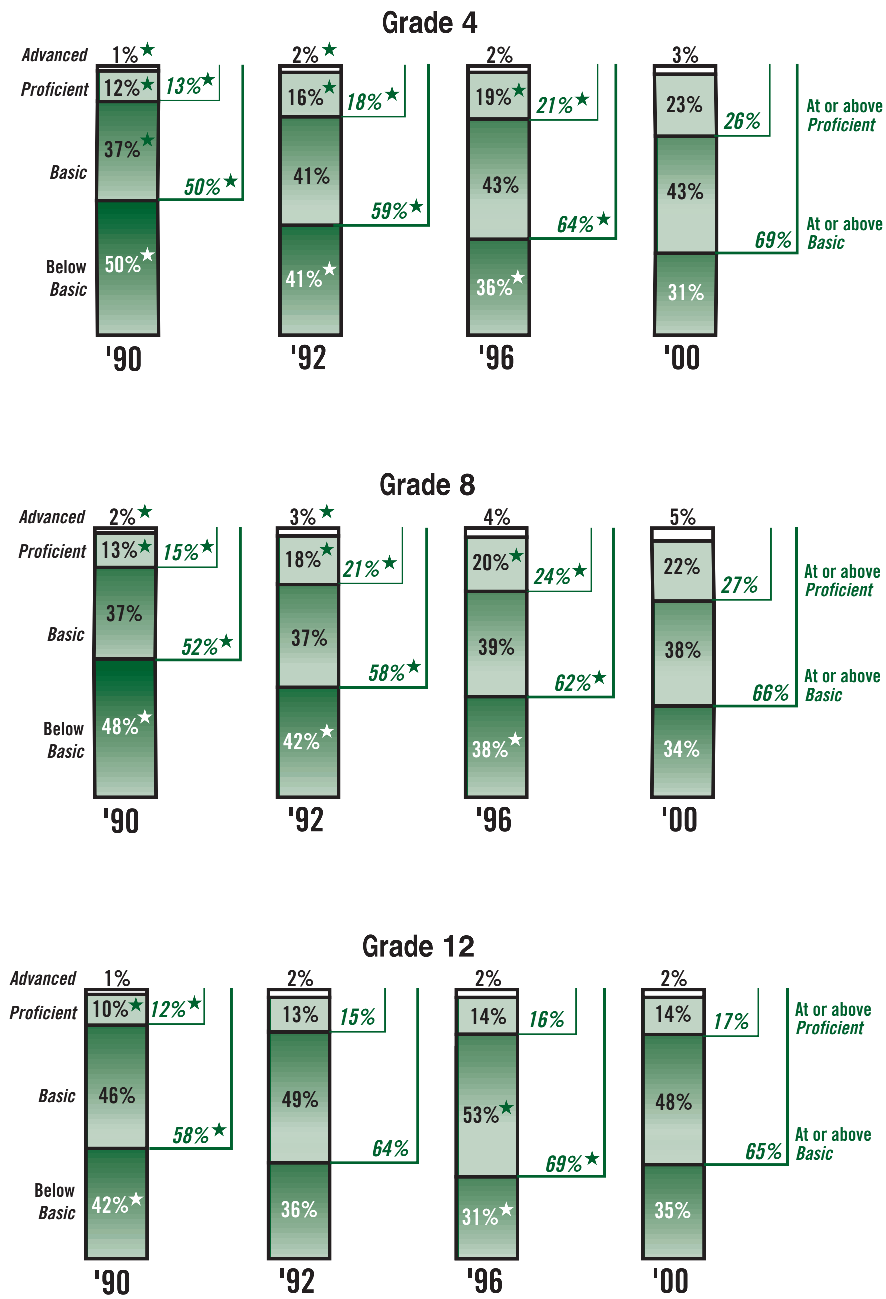
At grades 4 and 8, the percentage of students performing at or above *Basic* increased each assessment year, with the highest percentage at or above this level in 2000. The percentage of fourth- and eighth-graders at or above *Proficient* has also increased across the decade, reaching its highest level in both grades in 2000. Gains between 1990 and 2000 in the percentages of fourth- and eighth-grade students reaching the *Advanced* level are also evident, although they remain small—from 1 to 3 percent at grade 4 and from 2 to 5 percent at grade 8.

At grade 12, the percentage of students performing at or above *Basic* increased between 1990 and 1996, but declined between 1996 and 2000. The percentage of twelfth-graders attaining this level of performance, however, remained higher in 2000 than in 1990. The percentage of twelfth-graders at or above *Proficient* increased between 1990 and 1992, but the small changes since that time were not statistically significant. Despite the lack of more recent gains, the percentage of students reaching the *Proficient* level in 2000 was higher than in 1990. The percentage of twelfth-grade students who reached the *Advanced* level has remained relatively stable since 1990. Only 2 percent of twelfth-graders in 2000 attained this highest achievement level.

Figure 2.2

National Achievement Level Results

Percentage of students within each mathematics achievement level range and at or above achievement levels, grades 4, 8, and 12: 1990–2000



How to read these figures:

- The italicized percentages to the right of the shaded bars represent the percentages of students at or above *Basic* and *Proficient*.
- The percentages in the shaded bars represent the percentages of students within each achievement level.

★ Significantly different from 2000.

NOTE: Percentages within each mathematics achievement level range may not add to 100, or to the exact percentages at or above achievement levels, due to rounding.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessments.

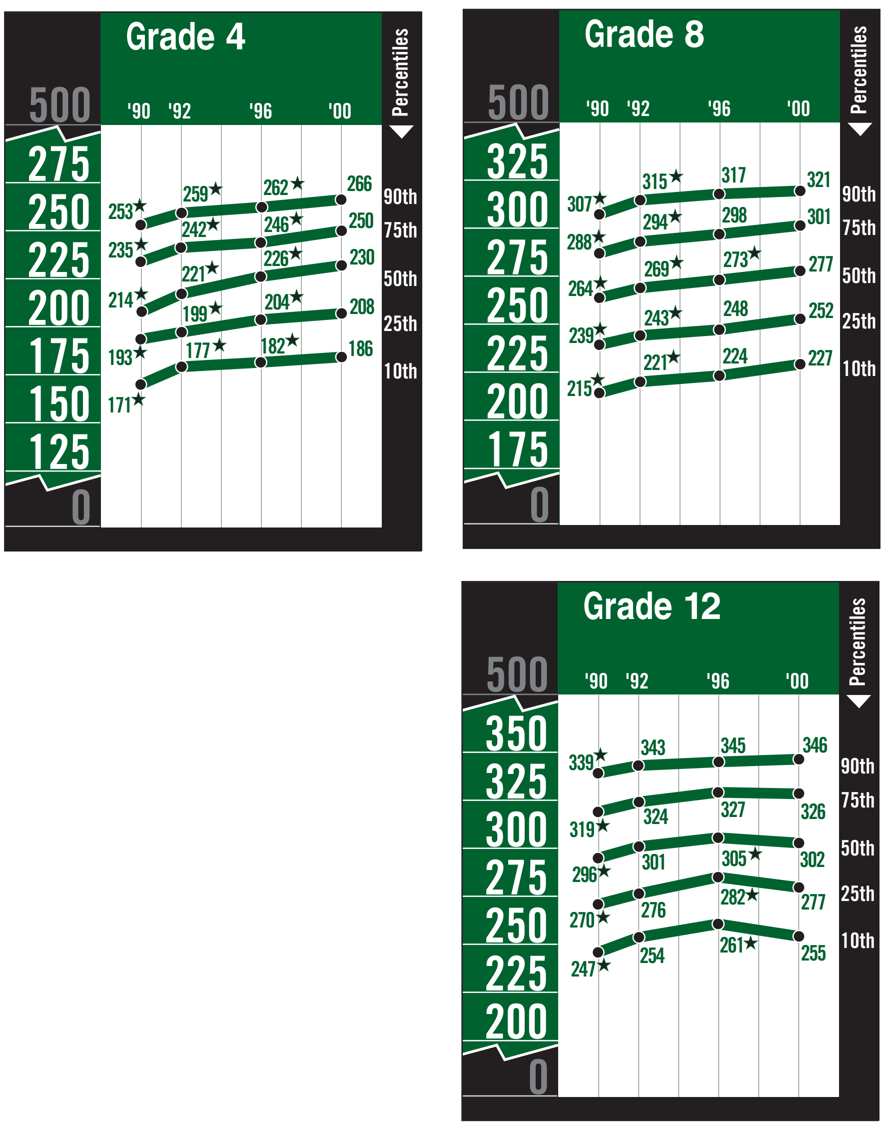
Scale Scores by Percentile

Another perspective on trends in student performance is gained by examining scores at different percentiles across assessment years. The advantage of looking at data in this way is that it shows whether trends in the national average scores presented earlier in this chapter are reflected in scores across the performance distribution. Comparing scores at different percentiles in 2000 to those in previous years reveals, for example, the trends in performance for lower- and higher-performing students. Figure 2.3 displays the mathematics scale scores for grades 4, 8, and 12 at the 10th, 25th, 50th, 75th, and 90th percentiles across the four assessments.

Figure 2.3

National Performance Distribution

National mathematics scale score percentiles, grades 4, 8, and 12: 1990–2000



★ Significantly different from 2000.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessments.

At grade 4, the scale scores at all five percentile points were higher in 2000 than in 1990, 1992, and 1996. At grade 8, all of the scale scores at each of the percentile points were higher in 2000 than in 1990 or 1992. However, the only grade 8 scale score that was higher in 2000 than in 1996 occurred at the 50th percentile. At the other percentiles, apparent changes since 1996 were not statistically significant.

At grade 12, where the average scale score declined from 1996 to 2000, the picture provided by trends in percentile scores is different. At this grade, the scale scores at the lower and middle percentiles (10th, 25th, and 50th) in 2000 were lower than those in 1996. However, the small changes since 1996 in scores at upper percentiles (75th and 90th) were not statistically significant. Viewed over the ten-year period, average scale scores at all percentiles were higher in 2000 than in 1990.

These results indicate that the score gains made over time in grades 4 and 8 are reflected broadly across their score distributions. At grade 12, in contrast, the recent performance decline is primarily focused in the lower and middle points of the score distribution.

Results for Regions of the Nation

NAEP assessments traditionally provide results for four regions of the country: Northeast, Southeast, Central, and West. Appendix A (see page 221) contains a description of the states and jurisdictions that make up each region.

With the exception of the decline in scores at grade 12 in 2000, an encouraging ten-year national trend of improved performance is generally reflected in average scale scores across the regions of the nation. As shown in figure 2.4, the apparent gains for fourth- and eighth-grade students in all regions of the country between 1996 and 2000 were not statistically significant for any individual region.[2] Nevertheless, fourth- and eighth-graders in each region had higher scores in 2000 than in 1992 and 1990. For twelfth-graders, results appeared to be lower in 2000 than in 1996 for all regions, but not significantly so in any one region. Results for the Southeast, Central, and West regions were higher in 2000 than in 1990 at grade 12. The apparent change in average scores between 1990 and 2000 for twelfth-graders in the Northeast was not statistically significant.

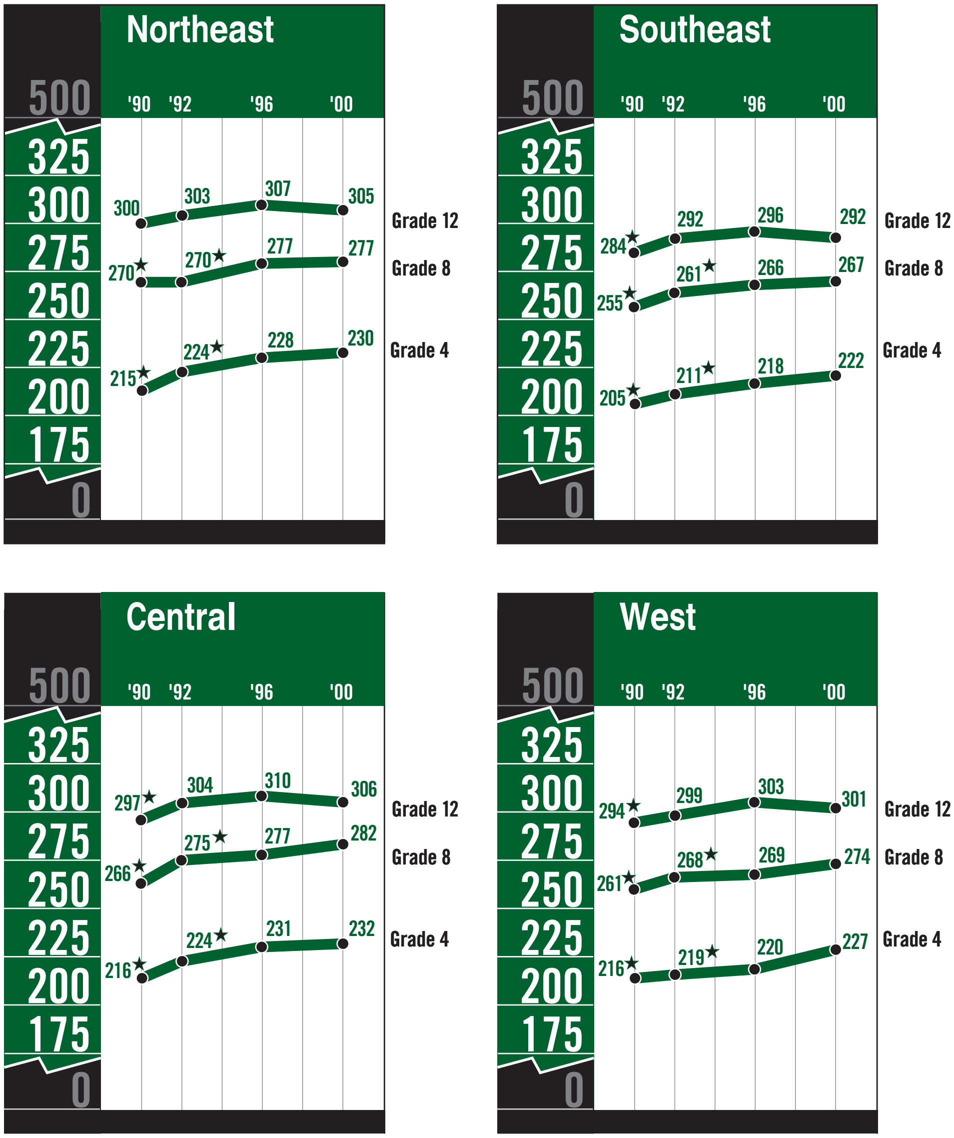
Performance differences among regions of the country are evident in 2000. At grade 4, students in the Northeast and Central regions had higher scores than students in the Southeast. At grades 8 and 12, students in the Northeast, Central and West regions outperformed those in the Southeast.

[2] The significance tests used in figure 2.4 and all other figures or tables in this report that compare results among subgroups or jurisdictions are based on the False Discovery Rate (FDR) procedure for multiple comparisons. (Further details on the FDR procedure are presented in appendix A, see pages 218–220.)

Figure 2.4

National Scale Score Results by Region

National mathematics scale score results by region of the country, grades 4, 8, and 12: 1990–2000



★ Significantly different from 2000.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessments.

Achievement level results for the four regions are displayed in figure 2.5. At grade 4, gains in the percentage of students at or above *Basic* and at or above *Proficient* are evident in each region. From 1990 to 2000, all four regions had a higher percentage of fourth-graders reaching or exceeding these two levels of performance. However, from 1996 to 2000 only the West region showed a gain, which occurred in the percentage of fourth-graders who performed at or above the *Proficient* level.

At grade 8, the percentage of students at or above *Basic* increased between 1990 and 2000 in the Southeast, Central, and West regions. Although the percentage of Northeast students in 2000 who were at or above *Basic* was higher than in 1992, the apparent increase between 1990 and 2000 for these students was not statistically significant. All four regions showed gains in the percentage of students at or above *Proficient* between 1990 and 2000. In addition, there were small, but statistically significant, increases since 1990 in the percentage of students reaching the *Advanced* level in each region. Although some gains were evident across the decade for each of the four regions, none of the apparent changes since 1996 for eighth-graders in any region of the country were statistically significant.

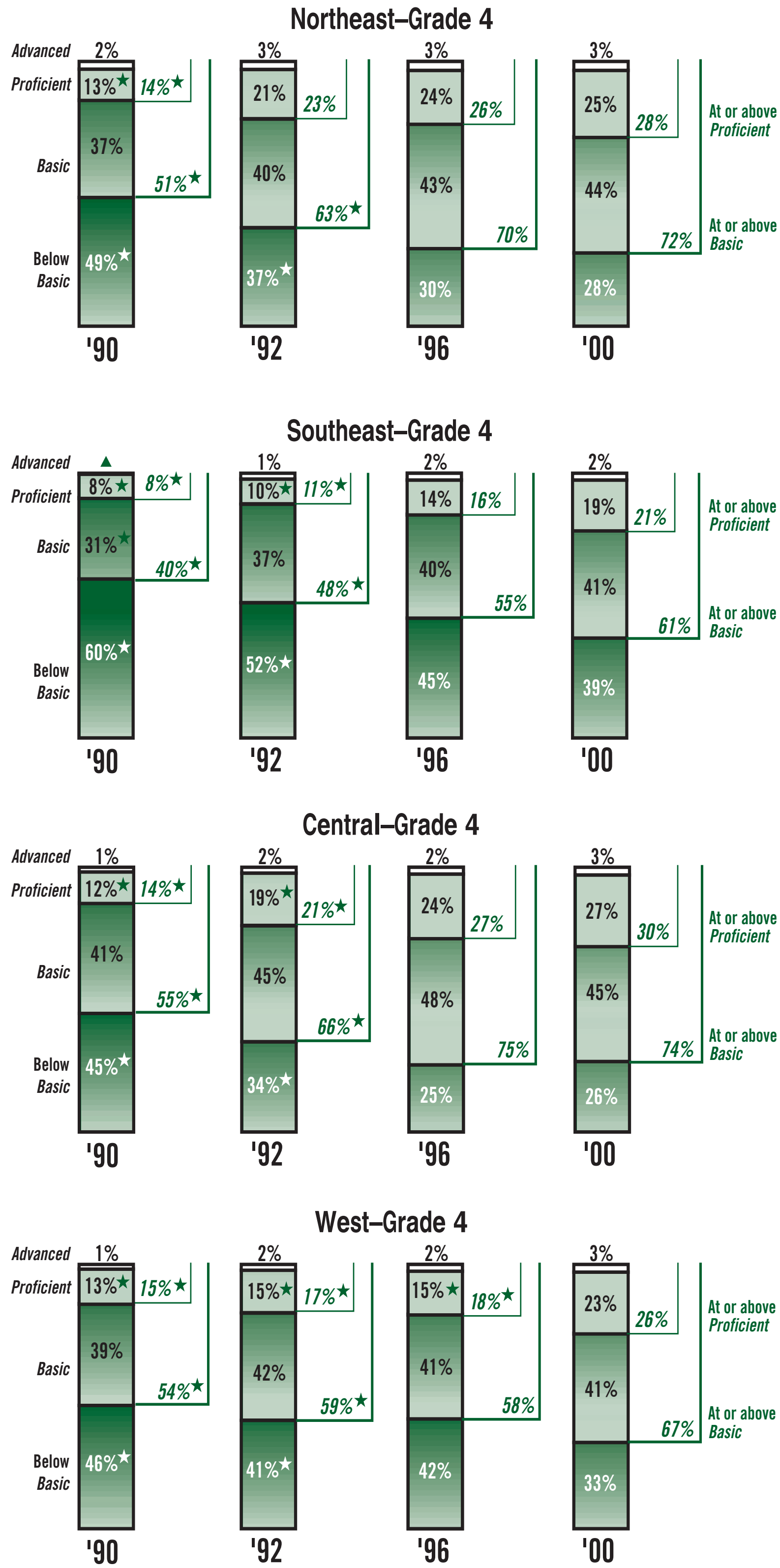
At grade 12, only the Southeast and Central regions had gains based on achievement level results between 1990 and 2000. In both regions, the percentage of students at or above *Proficient* was higher in 2000 than in 1990. Any apparent changes between 1996 and 2000 in achievement level results for the regions were not statistically significant.

As with the scale score results presented earlier in this chapter, differences between regions in the percentages of students at or above the different achievement levels were evident in 2000. Both the Northeast and the Central regions had higher percentages of fourth-graders at or above the *Basic* level than did the Southeast. Also, a greater percentage of fourth-graders in the Central region than in the Southeast performed at or above *Proficient*. At both grades 8 and 12, a greater percentage of students in the Northeast, Central, and West regions were at or above *Basic* and at or above *Proficient* than in the Southeast.

Figure 2.5

National Achievement Level Results by Region

Percentage of students within each mathematics achievement level range and at or above achievement levels by region of the country, grades 4, 8, and 12: 1990–2000

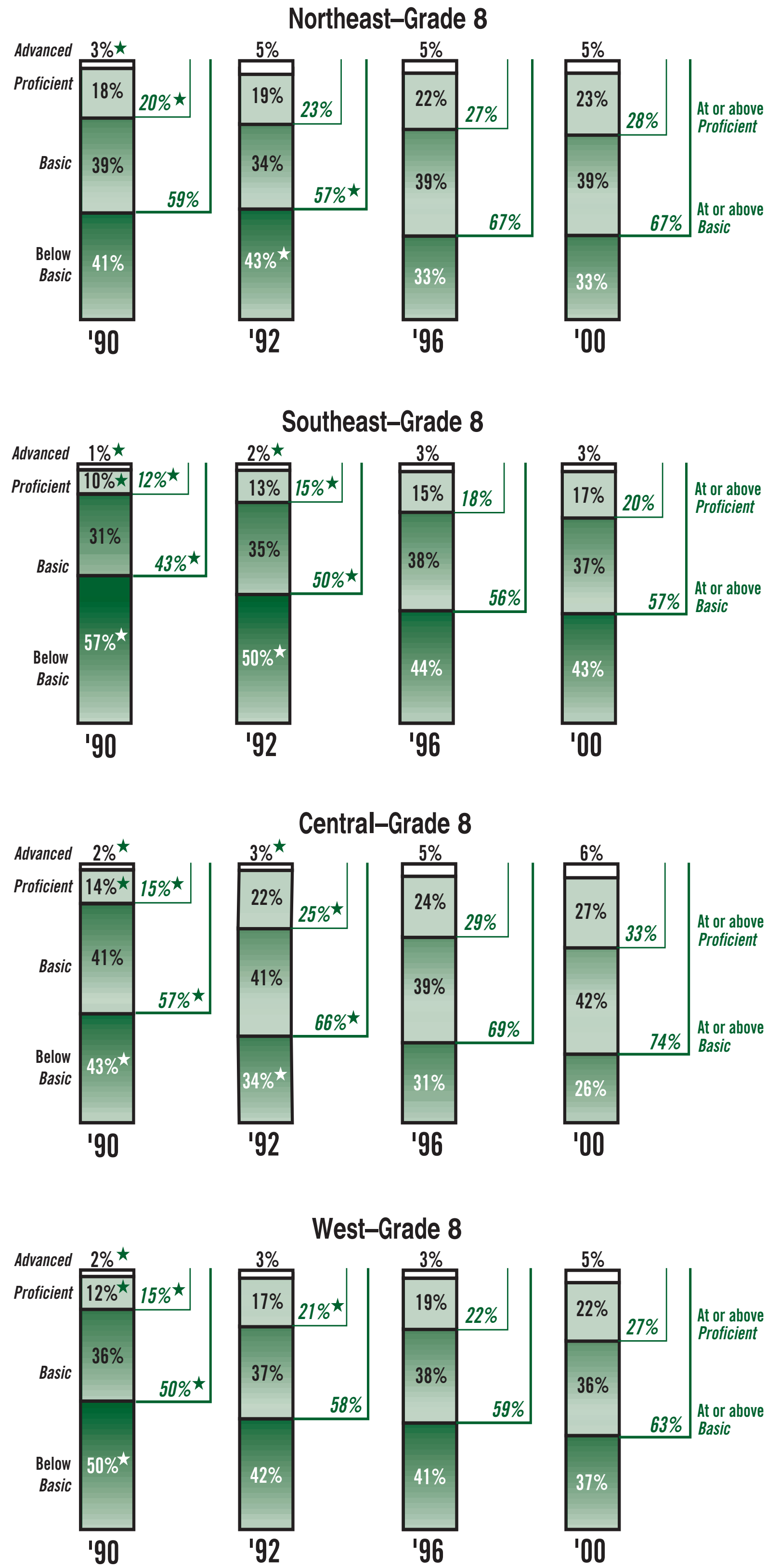


See footnotes at end of figure. ▶

Figure 2.5

National Achievement Level Results by Region (continued)

Percentage of students within each mathematics achievement level range and at or above achievement levels by region of the country, grades 4, 8, and 12: 1990–2000

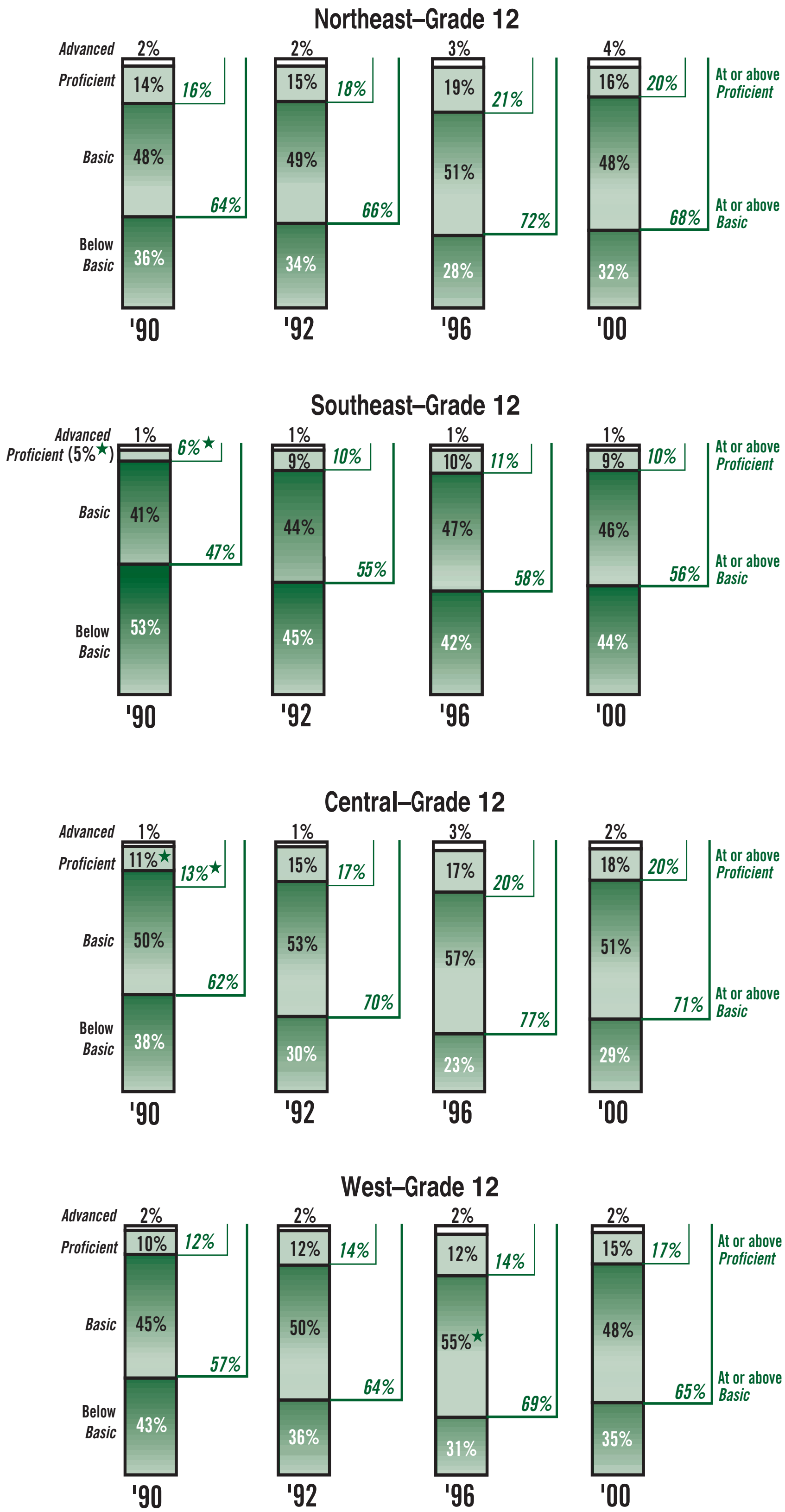


See footnotes at end of figure. ▶

Figure 2.5

National Achievement Level Results by Region (continued)

Percentage of students within each mathematics achievement level range and at or above achievement levels by region of the country, grades 4, 8, and 12: 1990–2000



★ Significantly different from 2000.

▲ Percentage is between 0.0 and 0.5.

NOTE: Percentages within each mathematics achievement level range may not add to 100, or to the exact percentages at or above achievement levels, due to rounding.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessments.

State Results

In addition to the national results, the 2000 mathematics assessment produced results for participating states and jurisdictions for fourth- and eighth-grade public school students.[3] Results are also available for many of these jurisdictions from previous assessments beginning with 1990 in grade 8 and with 1992 in grade 4. Not all jurisdictions met minimum school participation guidelines in every NAEP assessment. (See appendix A, pages 195–198, for details on the participation and reporting guidelines.) In 2000, results for grades 4 and 8 in Wisconsin and grade 8 in the Virgin Islands are not included in the relevant tables and appendices because they failed to meet the initial public school participation rate of 70 percent.

As with the national results presented in this chapter, the results addressed here were obtained by assessing a representative sample of students in each jurisdiction under conditions that did not offer accommodations to special-needs students. These were the same conditions under which results were obtained in previous assessments. Consequently, it is possible to report trends in student performance across the assessment years. In 2000, a separate representative sample was assessed in each participating jurisdiction for which accommodations were offered to special-needs students. Those results are presented in chapter 4, along with a comparison of "accommodations-permitted" and "accommodations-not-permitted" results for each state.

In examining the "accommodations-not-permitted" results for jurisdictions presented in this chapter, it should be noted that schools participating in the NAEP assessments under these conditions are permitted to exclude those students who can not be assessed meaningfully without accommodations. Exclusion rates vary considerably across years in many jurisdictions. In 2000, in the sample that did not permit accommodations, the pattern in most jurisdictions was for more special-needs students to be excluded from the assessment than in previous years. This may be accounted for in a variety of ways. Among the most far-reaching is the implementation of the Individuals with Disabilities Education Act (IDEA). Jurisdictions that have been diligent in implementing IDEA in their assessment programs may have higher exclusion rates in the 2000 assessment than in previous years. Local district and school staff who have become accustomed to providing accommodations in their jurisdictions' testing situations may have opted for exempting special-needs students from the 2000 NAEP assessment rather than including them without their accommodations.

In addition to changes across years in exclusion rates for a particular jurisdiction, there is considerable variation in exclusion rates across jurisdictions. Exclusion rates vary across jurisdictions not only because of differences in IDEA policy implementation, but also because of real population shifts in the percentage of students with disabilities and, especially, limited English proficient students. Therefore, comparisons of assessment results across jurisdictions and within jurisdictions across years should be made with caution. The percentage of students excluded from the assessment has implications for the representativeness of

[3] Throughout this and subsequent chapters the term jurisdiction is used to refer to the states, territories, and Department of Defense Education Activity schools that participated in the 2000 NAEP state-by-state assessment.

the sample assessed within a jurisdiction. No adjustments have been made for differing exclusion rates across jurisdictions or across years. Thus, a comparison within a jurisdiction across years or between two jurisdictions may be based on samples with exclusion rates that differ considerably. The exclusion rates for each jurisdiction across years are presented in appendix A (see pages 202 and 203).

Scale Score Results by Jurisdiction

The average scale scores for participating jurisdictions in 2000 are presented in table 2.1 for grade 4 and table 2.2 for grade 8, along with the changes in scores from previous assessments. The national public school average scores shown at the top of these tables are based on the national sample (not on the aggregated jurisdiction samples) and, like the jurisdiction results, represent the performance of public schools only. The national results shown in previous sections of this chapter represent both public and private school students.

Fourth-grade results are reported for the 46 jurisdictions that participated in the 2000 mathematics assessment with average scale scores ranging from 157 to 235. Thirty-six of these jurisdictions also participated in state NAEP in 1992; 26 of these had higher average scores in 2000.[4] Of the 39 jurisdictions that participated in the last two assessments, 11 had higher average scores in 2000 than in 1996. From the grade 4 state assessment base year of 1992 to the year 2000, the average gain for public school students in the national sample was 8 score points. Significant gains among jurisdictions' average scores ranged from 4 to 20 points. Only one jurisdiction (Guam) had a significantly lower average at grade 4 in 2000 than in 1992.

At grade 8, average scale scores for the 44 jurisdictions that participated in the 2000 assessment ranged from 195 to 288. Thirty-one jurisdictions at grade 8 participated in state NAEP in both 2000 and 1990, the first state-assessment year at grade 8. Of these, 27 showed improvement between the first and most recent assessments—their 2000 average scores were higher than their 1990 average scores. The average gain for public school students in the national sample from 1990 to 2000 was 13 score points. Significant gains at grade 8 among the jurisdictions ranged from 5 to 30 points over the ten-year time span. No jurisdiction had a lower average score in 2000 than in 1990. Of the 37 jurisdictions that participated in the last two assessments, 13 had higher average scores in 2000 than in 1996. Average scores by state for each of the assessment years are displayed in appendix B, tables B.6 and B.7 (see pages 232 and 233).

Eight of 36 jurisdictions had significant improvements in both grades 4 and 8 between the 1996 and 2000 assessments (Indiana, Louisiana, Massachusetts, North Carolina, South Carolina, Vermont, Virginia, and Department of Defense Dependent Schools (Overseas)).

[4] Two types of statistical tests were calculated for the between-year comparisons of results for jurisdictions. The first type of test examines each jurisdiction's results in isolation. The second type of test uses a multiple-comparison procedure that takes into account the decrease in certainty of the difference between years for any given jurisdiction when examining all the jurisdictions together. (See appendix A for further details on multiple-comparison procedures.) In these and all subsequent tables that present results for participating jurisdictions across years, two sets of notations are used to represent the results of the two different statistical tests. The asterisk (*) indicates that the difference between years is statistically significant only when examining results for a single jurisdiction. The dagger (‡) indicates that the difference between years is statistically significant both when examining the jurisdiction in isolation and when using the multiple-comparison procedure based on all participating jurisdictions. Throughout this report, differences between years for jurisdictions are discussed only if they are statistically significant based on the multiple-comparison procedure as indicated by the dagger (‡) in the figure or table.

Table 2.1: State Scale Score Results, Grade 4 Public Schools

Average mathematics scale score results by state for grade 4 public schools: 1992–2000

	2000 Average scale score	Change from 1996 average scale score	Change from 1992 average scale score
Nation	226	4 *	8 *
Alabama	218	6 ‡	10 ‡
Arizona	219	1	4
Arkansas	217	1	7 ‡
California †	214	4	5 ‡
Connecticut	234	2	7 ‡
Georgia	220	4 *	4 ‡
Hawaii	216	1	2
Idaho †	227	—	5 ‡
Illinois †	225	—	—
Indiana †	234	5 ‡	13 ‡
Iowa †	233	4 *	3
Kansas †	232	—	—
Kentucky	221	1	6 ‡
Louisiana	218	9 ‡	14 ‡
Maine †	231	-2	-1
Maryland	222	2	5 ‡
Massachusetts	235	6 ‡	8 ‡
Michigan †	231	5 *	11 ‡
Minnesota †	235	3	7 ‡
Mississippi	211	3	9 ‡
Missouri	229	4 *	6 ‡
Montana †	230	2	—
Nebraska	226	-2	1
Nevada	220	3	—
New Mexico	214	▲	1
New York †	227	4 *	8 ‡
North Carolina	232	8 ‡	20 ‡
North Dakota	231	▲	2
Ohio †	231	—	12 ‡
Oklahoma	225	—	5 ‡
Oregon †	227	3	—
Rhode Island	225	4 *	9 ‡
South Carolina	220	7 ‡	8 ‡
Tennessee	220	1	9 ‡
Texas	233	4 *	15 ‡
Utah	227	1	3 *
Vermont †	232	7 ‡	—
Virginia	230	8 ‡	10 ‡
West Virginia	225	1	10 ‡
Wyoming	229	6 ‡	4 ‡
Other Jurisdictions			
American Samoa	157	—	—
District of Columbia	193	6 ‡	1
DDESS	228	4 *	—
DoDDS	228	4 ‡	—
Guam	184	-4	-9 ‡
Virgin Islands	183	—	—

* Significantly different from 2000 if only one jurisdiction or the nation is being examined.

‡ Significantly different from 2000 when examining only one jurisdiction and when using a multiple-comparison procedure based on all jurisdictions that participated both years.

† Indicates that the jurisdiction did not meet one or more of the guidelines for school participation.

— Indicates that the jurisdiction did not participate.

▲ Difference is between −0.5 and 0.5.

DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools. DoDDS: Department of Defense Dependent Schools (Overseas).

NOTE: National results are based on the national sample, not on aggregated state assessment samples.

Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 1992, 1996, and 2000 Mathematics Assessments.

Table 2.2: State Scale Score Results, Grade 8 Public Schools

Average mathematics scale score results by state for grade 8 public schools: 1990–2000

	2000 Average scale score	Change from 1996 average scale score	Change from 1992 average scale score	Change from 1990 average scale score
Nation	274	4 *	8 *	13 *
Alabama	262	6	10 ‡	9 ‡
Arizona †	271	3	5 ‡	11 ‡
Arkansas	261	▲	5 ‡	5 ‡
California †	262	-1	1	6 ‡
Connecticut	282	2	8 ‡	12 ‡
Georgia	266	4	7 ‡	7 ‡
Hawaii	263	1	5 ‡	12 ‡
Idaho †	278	—	3	6 ‡
Illinois †	277	—	—	16 ‡
Indiana †	283	8 ‡	13 ‡	16 ‡
Kansas †	284	—	—	—
Kentucky	272	5 ‡	9 ‡	14 ‡
Louisiana	259	7 ‡	9 ‡	13 ‡
Maine †	284	▲	5 ‡	—
Maryland	276	6 ‡	11 ‡	15 ‡
Massachusetts	283	6 ‡	10 ‡	—
Michigan †	278	2	11 ‡	14 ‡
Minnesota †	288	4	5 ‡	12 ‡
Mississippi	254	4 *	8 ‡	—
Missouri	274	▲	2	—
Montana †	287	4 *	—	6 ‡
Nebraska	281	-2	3	5 ‡
Nevada	268	—	—	—
New Mexico	260	-2	▲	3
New York †	276	6 *	10 ‡	15 ‡
North Carolina	280	12 ‡	22 ‡	30 ‡
North Dakota	283	-1	▲	2
Ohio	283	—	15 ‡	19 ‡
Oklahoma	272	—	4	8 ‡
Oregon †	281	4	—	9 ‡
Rhode Island	273	5 ‡	8 ‡	13 ‡
South Carolina	266	6 ‡	6 ‡	—
Tennessee	263	▲	5 *	—
Texas	275	5 *	10 ‡	17 ‡
Utah	275	-1	1	—
Vermont †	283	4 ‡	—	—
Virginia	277	7 ‡	9 ‡	12 ‡
West Virginia	271	6 ‡	12 ‡	15 ‡
Wyoming	277	2	2	5 ‡
Other Jurisdictions				
American Samoa	195	—	—	—
District of Columbia	234	2	▲	3
DDESS	277	8 ‡	—	—
DoDDS	278	3 ‡	—	—
Guam	233	-5	-2	2

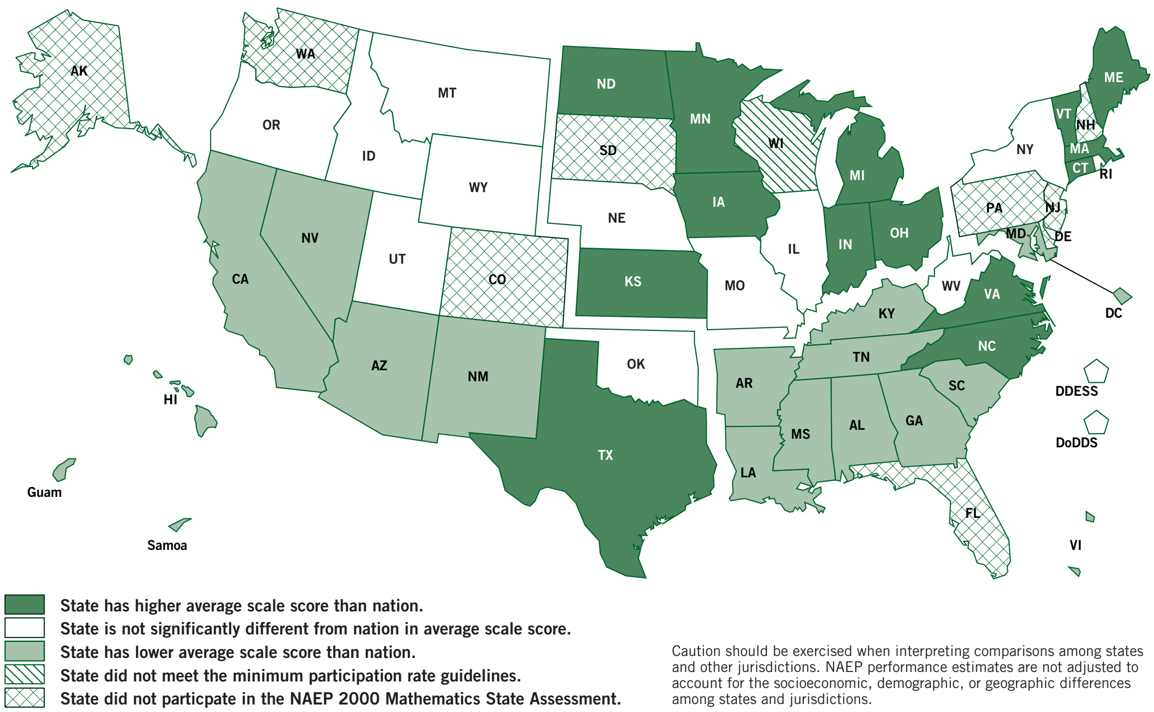
* Significantly different from 2000 if only one jurisdiction or the nation is being examined.
‡ Significantly different from 2000 when examining only one jurisdiction and when using a multiple-comparison procedure based on all jurisdictions that participated both years.
† Indicates that the jurisdiction did not meet one or more of the guidelines for school participation.
— Indicates that the jurisdiction did not participate.
▲ Difference is between −0.5 and 0.5.
DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools. DoDDS: Department of Defense Dependent Schools (Overseas).
NOTE: National results are based on the national sample, not on aggregated state assessment samples.
Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples.
SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 1990, 1992, 1996, and 2000 Mathematics Assessments.

The maps in figures 2.6 (grade 4) and 2.7 (grade 8) show the jurisdictions divided into three groups by performance on the 2000 assessment: those whose average scale scores were above the national average, at or around the national average, and below the national average. In examining these results, it should be noted that differences in mathematics performance among jurisdictions likely reflect an interaction between the effectiveness of the educational programs within the jurisdiction and the challenges posed by economic constraints and varying student demographic characteristics.

Figure 2.6

State vs National Scale Score, Grade 4

Comparison results of state and national average mathematics scale scores for grade 4: 2000



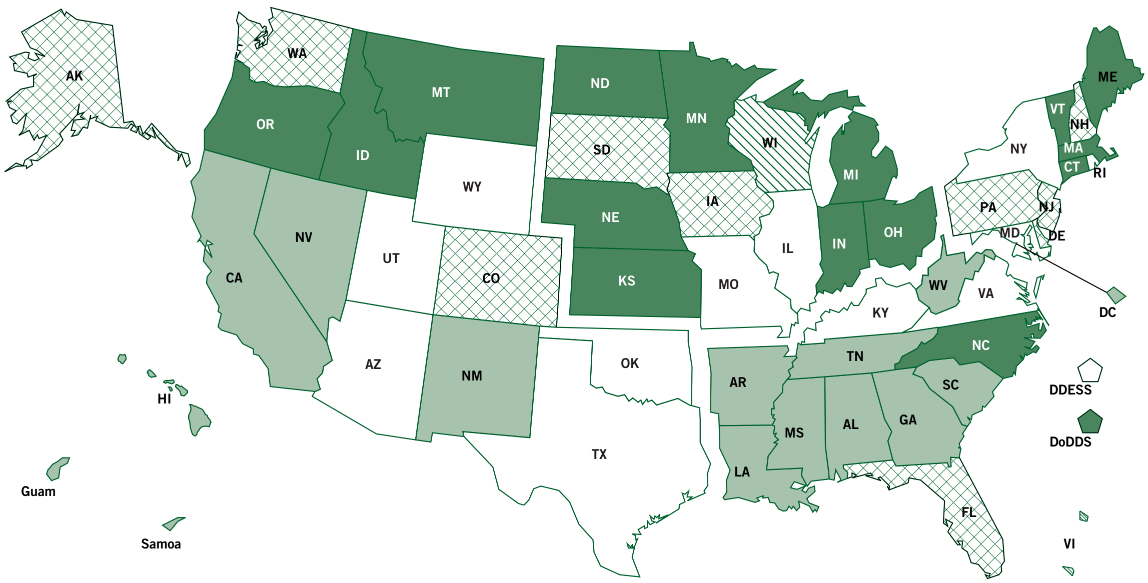
Caution should be exercised when interpreting comparisons among states and other jurisdictions. NAEP performance estimates are not adjusted to account for the socioeconomic, demographic, or geographic differences among states and jurisdictions.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Figure 2.7

State vs National Scale Score, Grade 8

Comparison results of state and national average mathematics scale scores for grade 8: 2000



State has higher average scale score than nation.
State is not significantly different from nation in average scale score.
State has lower average scale score than nation.
State did not meet the minimum participation rate guidelines.
State did not particpate in the NAEP 2000 Mathematics State Assessment.

Caution should be exercised when interpreting comparisons among states and other jurisdictions. NAEP performance estimates are not adjusted to account for the socioeconomic, demographic, or geographic differences among states and jurisdictions.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Cross-State Scale Score Comparisons

Figures 2.8 and 2.9 indicate whether differences between the scale scores of any pairs of participating jurisdictions are statistically significant. These figures for grades 4 and 8, respectively, permit comparisons of a jurisdiction with any other jurisdiction For example, in figure 2.8 Minnesota appears first at the top row. The second row is Massachusetts. Jurisdictions are ranked from highest to lowest average scale score in this table, both from left to right across the columns and down the rows. The state abbreviation, MA, in the second row of the first column indicates that Massachusetts is being compared with Minnesota (the column head). The lack of shading for this cell indicates that there was no significant difference between the averages scale scores of these two states. Moving down the first column to ND (or North Dakota), the shading changes to indicate that, in this comparison, the scale score average for Minnesota was significantly higher than that for North Dakota. Thus the shading in the intersection of each row and column indicates the result of the statistical comparison of the two respective jurisdictions (i.e., whether the jurisdiction at the top of the table was higher than, lower than, or not significantly different from the jurisdiction listed in the table cell being examined).

At grade 4, the top group of 9 jurisdictions in 2000 had average scores which did not differ significantly from each other (Minnesota, Massachusetts, Indiana, Connecticut, Iowa, Texas, North Carolina, Kansas, and Vermont). At grade 8, the top group of 3 jurisdictions (Minnesota, Montana, and Kansas) did not differ significantly from each other.

Figure 2.8: Cross-State Scale Score Comparisons, Grade 4

Comparisons of average mathematics scale scores for grade 4 public schools: 2000

Instructions: Read down the column directly under a jurisdiction name listed in the heading at the top of the chart. Match the shading intensity surrounding a jurisdiction's abbreviation to the key below to determine whether the average math scale score of this jurisdiction is higher than, the same as, or lower than the jurisdiction in the column heading. For example, in the column under Michigan, Michigan's score was lower than Minnesota and Massachusetts, about the same as all the states from Indiana through Oregon, and higher than the remaining states down the column.

Minnesota (MN)†	Massachusetts (MA)	Indiana (IN)†	Connecticut (CT)	Iowa (IA)†	Texas (TX)	North Carolina (NC)	Kansas (KS)†	Vermont (VT)†	North Dakota (ND)	Michigan (MI)†	Ohio (OH)†	Maine (ME)†	Virginia (VA)	Montana (MT)†	Wyoming (WY)	Missouri (MO)	DoDEA/DDESS (DD)	DoDEA/DoDDS (DI)	Utah (UT)	Idaho (ID)†	Oregon (OR)†	New York (NY)†	Nebraska (NE)	Oklahoma (OK)	Illinois (IL)†	West Virginia (WV)	Rhode Island (RI)	Maryland (MD)	Kentucky (KY)	South Carolina (SC)	Nevada (NV)	Tennessee (TN)	Georgia (GA)	Arizona (AZ)	Louisiana (LA)	Alabama (AL)	Arkansas (AR)	Hawaii (HI)	New Mexico (NM)	California (CA)†	Mississippi (MS)	District of Columbia (DC)	Guam (GU)	Virgin Islands (VI)	American Samoa (AS)
MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
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IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
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KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS
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RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI
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NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
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HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI
NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
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GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU
VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI
AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS

Jurisdiction has statistically significantly higher average scale score than the jurisdiction listed at the top of the chart.

No statistically significant difference from the jurisdiction listed at the top of the chart.

Jurisdiction has statistically significantly lower average scale score than the jurisdiction listed at the top of the chart.

The between jurisdiction comparisons take into account sampling and measurement error and that each jurisdiction is being compared with every other jurisdiction. Significance is determined by an application of a multiple-comparison procedure (see appendix A).

† Indicates that the jurisdiction did not satisfy one or more of the guidelines for school participation rates (see appendix A).

NOTE: Differences between states and jurisdictions may be partially explained by other factors not included in this table.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress, 2000 Mathematics Assessment.

Figure 2.9: Cross-State Scale Score Comparisons, Grade 8

Comparisons of average mathematics scale scores for grade 8 public schools: 2000

Instructions: Read down the column directly under a jurisdiction name listed in the heading at the top of the chart. Match the shading intensity surrounding a jurisdiction's abbreviation to the key below to determine whether the average math scale score of this jurisdiction is higher than, the same as, or lower than the jurisdiction in the column heading. For example, in the column under Maine, Maine's score was lower than Minnesota, about the same as all the states from Montana through Nebraska, and higher than the remaining states down the column.

Minnesota (MN)†	Montana (MT)†	Kansas (KS)†	Maine (ME)†	Vermont (VT)†	Massachusetts (MA)	North Dakota (ND)	Indiana (IN)†	Ohio (OH)	Connecticut (CT)	Oregon (OR)†	Nebraska (NE)	North Carolina (NC)	Michigan (MI)†	DoDEA/DoDDS (DI)	Idaho (ID)†	DoDEA/DDESS (DD)	Illinois (IL)†	Wyoming (WY)	Virginia (VA)	New York (NY)†	Maryland (MD)	Utah (UT)	Texas (TX)	Missouri (MO)	Rhode Island (RI)	Oklahoma (OK)	Kentucky (KY)	West Virginia (WV)	Arizona (AZ)†	Nevada (NV)	South Carolina (SC)	Georgia (GA)	Tennessee (TN)	Hawaii (HI)	California (CA)†	Alabama (AL)	Arkansas (AR)	New Mexico (NM)	Louisiana (LA)	Mississippi (MS)	District of Columbia (DC)	Guam (GU)	American Samoa (AS)
MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
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NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
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VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA
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MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
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TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX
MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO
RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI
OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY
WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV
AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ
NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC
GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA
TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
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CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
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NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
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AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS

Jurisdiction has statistically significantly higher average scale score than the jurisdiction listed at the top of the chart.

No statistically significant difference from the jurisdiction listed at the top of the chart.

Jurisdiction has statistically significantly lower average scale score than the jurisdiction listed at the top of the chart.

The between jurisdiction comparisons take into account sampling and measurement error and that each jurisdiction is being compared with every other jurisdiction. Significance is determined by an application of a multiple-comparison procedure (see appendix A).

† Indicates that the jurisdiction did not satisfy one or more of the guidelines for school participation rates (see appendix A).

NOTE: Differences between states and jurisdictions may be partially explained by other factors not included in this table.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress, 2000 Mathematics Assessment.

Achievement Level Results by Jurisdiction

Achievement level results for the jurisdictions are presented here in two ways: 1) the percentage within each achievement level range, and 2) the percentage at or above the *Proficient* achievement level. Figure 2.10 presents the percentage of grade 4 students within each achievement level range for each participating jurisdiction in 2000. Figure 2.11 presents the same information for participating jurisdictions for grade 8. The shaded bars in these figures represent the proportion of the population in each range: below *Basic, Basic, Proficient* and *Advanced*. The sections to the left of the center vertical line represent the proportion of students who were at *Basic* or below *Basic*. The sections of bars to the right of the vertical line represent the proportion of students who reached the *Proficient* and *Advanced* levels of performance. Scanning down the horizontal bars to the right of the vertical line allows easy comparison of jurisdictions' percentages of students who were at or above *Proficient*.

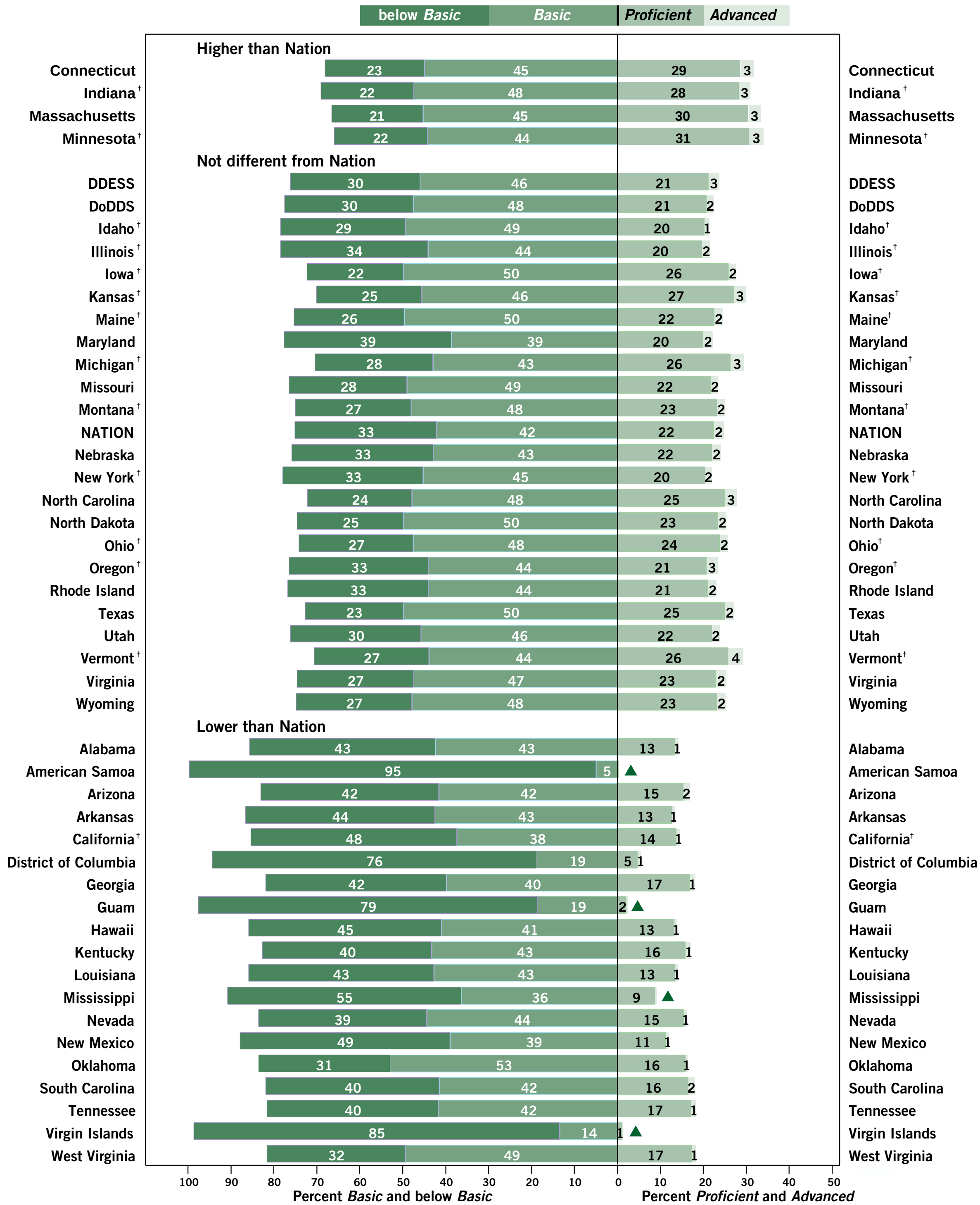
The jurisdictions are presented in these figures in three clusters based on a statistical comparison of the percentage of students at or above *Proficient* within each jurisdiction to the national percentage. The cluster of jurisdictions at the top of each figure had a higher percentage of students at or above *Proficient* in comparison to the nation. For jurisdictions in the middle cluster, the percentage of students did not differ significantly from the national percentage. Jurisdictions listed in the bottom cluster had percentages lower than the national percentage. Within each of the three clusters, jurisdictions are listed in alphabetical order.

Figure 2.10

State Achievement Level Results, Grade 4

Percentage of students within each mathematics achievement level range by state for grade 4 public schools: 2000

The bars below contain estimated percentages of students in each NAEP mathematics achievement category. Each population of students is aligned at the point where the *Proficient* category begins, so that they may be compared at *Proficient* and above.



† Indicates that the jurisdiction did not meet one or more of the guidelines for school participation.

▲ Percentage is between 0.0 and 0.5.

DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools. DoDDS: Department of Defense Dependent Schools (Overseas).

NOTE: Numbers may not add to 100 due to rounding. National results are based on the national sample, not on aggregated state assessment samples.

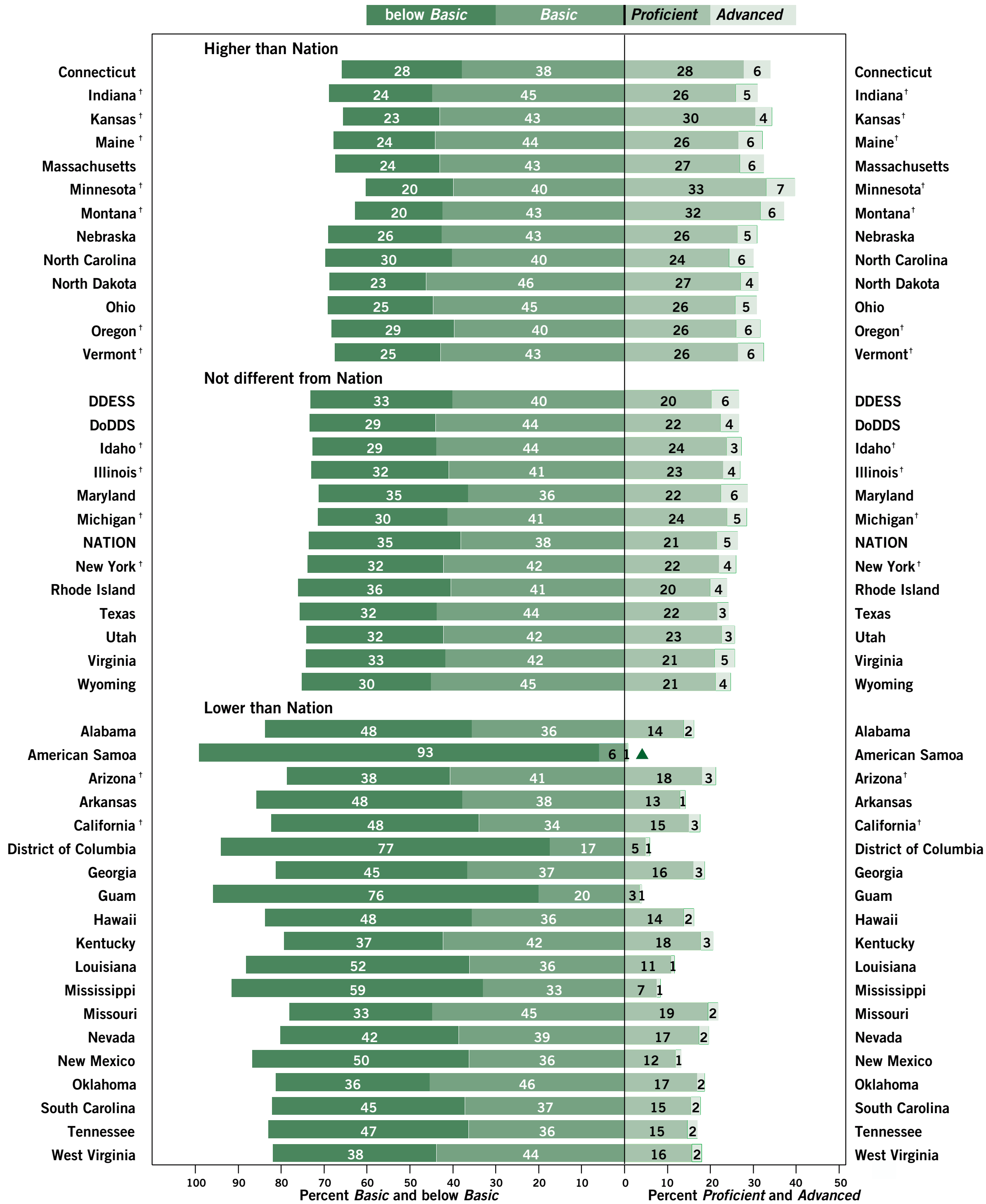
SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Figure 2.11

State Achievement Level Results, Grade 8

Percentage of students within each mathematics achievement level range by state for grade 8 public schools: 2000

The bars below contain estimated percentages of students in each NAEP mathematics achievement category. Each population of students is aligned at the point where the *Proficient* category begins, so that they may be compared at *Proficient* and above.



† Indicates that the jurisdiction did not meet one or more of the guidelines for school participation.

▲ Percentage is between 0.0 and 0.5.

DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools. DoDDS: Department of Defense Dependent Schools (Overseas).

NOTE: Numbers may not add to 100 due to rounding. National results are based on the national sample, not on aggregated state assessment samples.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Tables 2.3 and 2.4 present the percentages of students by jurisdiction who were performing at or above the *Proficient* achievement level for grades 4 and 8 across the assessment years.

At grade 4, from 0 percent to 34 percent of students in the various jurisdictions were at or above the *Proficient* level in 2000. Of the 36 jurisdictions at grade 4 that participated in both 1992 and 2000, 23 made gains between these two years in the percentage of students at or above *Proficient*. Between the two most recent assessments (1996 and 2000), 11 of 39 participating jurisdictions had an increase in the percentage of students attaining this level of performance.

At grade 8, from 1 percent to 40 percent of students in the various jurisdictions were at or above the *Proficient* level in 2000. Of the 31 jurisdictions at grade 8 that participated in both 1990 and 2000, 29 made gains between these two years in the percentage of students at or above *Proficient*. Between the two most recent assessments (1996 and 2000), 2 of 37 participating jurisdictions had an increase in the percentage of students attaining this level of performance. Students in grades 4 and 8 also made gains over time in percentages at or above *Basic.* These results by jurisdiction are presented in appendix B.

Table 2.3: State *Proficient* Level Results, Grade 4 Public Schools

Percentage of students at or above the *Proficient* level in mathematics by state for grade 4 public schools: 1992–2000

	1992	1996	2000
Nation	17 *	20 *	25
Alabama	10 ‡	11	14
Arizona	13 *	15	17
Arkansas	10 ‡	13	13
California †	12	11	15
Connecticut	24 ‡	31	32
Georgia	15	13 ‡	18
Hawaii	15	16	14
Idaho †	16 ‡	—	21
Illinois †	—	—	21
Indiana †	16 ‡	24 ‡	31
Iowa †	26	22 *	28
Kansas †	—	—	30
Kentucky	13 ‡	16	17
Louisiana	8 ‡	8 ‡	14
Maine †	27	27	25
Maryland	18 *	22	22
Massachusetts	23 ‡	24 ‡	33
Michigan †	18 ‡	23 ‡	29
Minnesota †	26 ‡	29	34
Mississippi	6 ‡	8	9
Missouri	19 ‡	20	23
Montana †	—	22	25
Nebraska	22	24	24
Nevada	—	14	16
New Mexico	11	13	12
New York †	17 ‡	20	22
North Carolina	13 ‡	21 ‡	28
North Dakota	22	24	25
Ohio †	16 ‡	—	26
Oklahoma	14	—	16
Oregon †	—	21	23
Rhode Island	13 ‡	17 ‡	23
South Carolina	13 ‡	12 ‡	18
Tennessee	10 ‡	17	18
Texas	15 ‡	25	27
Utah	19 ‡	23	24
Vermont †	—	23 ‡	29
Virginia	19 ‡	19 ‡	25
West Virginia	12 ‡	19	18
Wyoming	19 ‡	19 ‡	25
Other Jurisdictions			
American Samoa	—	—	▲
District of Columbia	5	5	6
DDESS	—	20	24
DoDDS	—	19 *	22
Guam	5 ‡	3	2
Virgin Islands	—	—	1

* Significantly different from 2000 if only one jurisdiction or the nation is being examined.
‡ Significantly different from 2000 when examining only one jurisdiction and when using a multiple-comparison procedure based on all jurisdictions that participated both years.
† Indicates that the jurisdiction did not meet one or more of the guidelines for school participation. — Indicates that the jurisdiction did not participate.
▲ Percentage is between 0.0 and 0.5.
DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools. DoDDS: Department of Defense Dependent Schools (Overseas).
NOTE: National results are based on the national sample, not on aggregated state assessment samples.
Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples.
SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1992, 1996, and 2000 Mathematics Assessments.

Table 2.4: State *Proficient* Level Results, Grade 8 Public Schools

Percentage of students at or above the *Proficient* level in mathematics by state for grade 8 public schools: 1990–2000

	1990	1992	1996	2000
Nation	15 *	20 *	23 *	26
Alabama	9 ‡	10 ‡	12	16
Arizona †	13 ‡	15 ‡	18	21
Arkansas	9 ‡	10 ‡	13	14
California †	12 ‡	16	17	18
Connecticut	22 ‡	26 ‡	31	34
Georgia	14 ‡	13 ‡	16	19
Hawaii	12 ‡	14	16	16
Idaho †	18 ‡	22 ‡	—	27
Illinois †	15 ‡	—	—	27
Indiana †	17 ‡	20 ‡	24 *	31
Kansas †	—	—	—	34
Kentucky	10 ‡	14 ‡	16 *	21
Louisiana	5 ‡	7 ‡	7 *	12
Maine †	—	25 ‡	31	32
Maryland	17 ‡	20 ‡	24	29
Massachusetts	—	23 ‡	28 *	32
Michigan †	16 ‡	19 ‡	28	28
Minnesota †	23 ‡	31 ‡	34 *	40
Mississippi	—	6	7	8
Missouri	—	20	22	22
Montana †	27 ‡	—	32 *	37
Nebraska	24 ‡	26 *	31	31
Nevada	—	—	—	20
New Mexico	10 ‡	11	14	13
New York †	15 ‡	20 ‡	22	26
North Carolina	9 ‡	12 ‡	20 ‡	30
North Dakota	27	29	33	31
Ohio	15 ‡	18 ‡	—	31
Oklahoma	13 ‡	17	—	19
Oregon †	21 ‡	—	26 *	32
Rhode Island	15 ‡	16 ‡	20 *	24
South Carolina	—	15	14 *	18
Tennessee	—	12 ‡	15	17
Texas	13 ‡	18 ‡	21	24
Utah	—	22 *	24	26
Vermont †	—	—	27 *	32
Virginia	17 ‡	19 ‡	21 *	26
West Virginia	9 ‡	10 ‡	14 ‡	18
Wyoming	19 ‡	21 ‡	22 *	25
Other Jurisdictions				
American Samoa	—	—	—	1
District of Columbia	3 ‡	4	5	6
DDESS	—	—	21	27
DoDDS	—	—	23 *	27
Guam	4	6	6	4

* Significantly different from 2000 if only one jurisdiction or the nation is being examined.

‡ Significantly different from 2000 when examining only one jurisdiction and when using a multiple-comparison procedure based on all jurisdictions that participated both years.

† Indicates that the jurisdiction did not meet one or more of the guidelines for school participation.

— Indicates that the jurisdiction did not participate.

DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools. DoDDS: Department of Defense Dependent Schools (Overseas).

NOTE: National results are based on the national sample, not on aggregated state assessment samples.

Comparative performance results may be affected by changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessments.

Cross-State Achievement Level Comparisons

Figures 2.12 and 2.13 present the same type of data display for the 2000 assessment as the two comparison charts presented earlier for scale scores, only this time the performance measure used is percentages of students at or above the *Proficient* level, for grades 4 and 8, respectively. At grade 4, the seven highest performing jurisdictions (Minnesota, Massachusetts, Connecticut, Indiana, Kansas, Michigan, and Vermont) have similar percentages. At grade 8, in figure 2.13, two jurisdictions (Minnesota and Montana) form the top-performing group and have similar percentages of students at or above *Proficient*. At grade 8, Minnesota is significantly higher than all jurisdictions, except Montana. Montana's percentage at or above *Proficient* exceeds all jurisdictions but Minnesota, Kansas, and Connecticut.

Figure 2.12: Cross-State Achievement Level Comparisons, Grade 4

Comparisons of percentage of students at or above *Proficient* in mathematics for grade 4 public schools: 2000

Instructions: Read down the column directly under a jurisdiction name listed in the heading at the top of the chart. Match the shading intensity surrounding a jurisdiction's abbreviation to the key below to determine whether the percentage of students at or above *Proficient* in this jurisdiction is higher than, the same as, or lower than the jurisdiction in the column heading. For example, in the column under North Carolina, North Carolina's percentage was lower than Minnesota and Massachusetts, about the same as all the states from Connecticut through Oregon, and higher than the remaining states down the column.

Minnesota (MN)†	Massachusetts (MA)	Connecticut (CT)	Indiana (IN)†	Kansas (KS)†	Michigan (MI)†	Vermont (VT)†	North Carolina (NC)	Iowa (IA)†	Texas (TX)	Ohio (OH)†	North Dakota (ND)	Virginia (VA)	Wyoming (WY)	Montana (MT)†	Maine (ME)†	Nebraska (NE)	Utah (UT)	DoDEA/DDESS (DD)	Missouri (MO)	Oregon (OR)†	Rhode Island (RI)	DoDEA/DoDDS (DI)	Maryland (MD)	New York (NY)†	Idaho (ID)†	Illinois (IL)†	West Virginia (WV)	Tennessee (TN)	South Carolina (SC)	Georgia (GA)	Kentucky (KY)	Arizona (AZ)	Oklahoma (OK)	Nevada (NV)	California (CA)†	Alabama (AL)	Louisiana (LA)	Hawaii (HI)	Arkansas (AR)	New Mexico (NM)	Mississippi (MS)	District of Columbia (DC)	Guam (GU)	Virgin Islands (VI)	American Samoa (AS)
MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA
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KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS
MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
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VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA
WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY
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RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI
DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI
MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY
ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL
WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV
TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC
GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA
KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY
AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ
OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL
LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR
NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS
DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC
GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU
VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI	VI
AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS

Jurisdiction has statistically significantly higher percentage than the jurisdiction listed at the top of the chart.

No statistically significant difference from the jurisdiction listed at the top of the chart.

Jurisdiction has statistically significantly lower percentage than the jurisdiction listed at the top of the chart.

The between jurisdiction comparisons take into account sampling and measurement error and that each jurisdiction is being compared with every other jurisdiction. Significance is determined by an application of a multiple-comparison procedure (see appendix A).

† Indicates that the jurisdiction did not satisfy one or more of the guidelines for school participation rates (see appendix A).

NOTE: Differences between states and jurisdictions may be partially explained by other factors not included in this table.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress, 2000 Mathematics Assessment.

Figure 2.13: Cross-State Achievement Level Comparisons, Grade 8

Comparisons of percentage of students at or above *Proficient* in mathematics for grade 8 public schools: 2000

Instructions: Read down the column directly under a jurisdiction name listed in the heading at the top of the chart. Match the shading intensity surrounding a jurisdiction's abbreviation to the key below to determine whether the percentage of students at or above *Proficient* in this jurisdiction is higher than, the same as, or lower than the jurisdiction in the column heading. For example, in the column under Kansas, Kansas' percentage was lower than Minnesota, about the same as all the states from Montana through North Carolina, and higher than the remaining states down the column.

Minnesota (MN)†	Montana (MT)†	Kansas (KS)†	Connecticut (CT)	Massachusetts (MA)	Vermont (VT)†	Maine (ME)†	Oregon (OR)†	North Dakota (ND)	Indiana (IN)†	Nebraska (NE)	Ohio (OH)	North Carolina (NC)	Maryland (MD)	Michigan (MI)†	Idaho (ID)†	Illinois (IL)†	DoDEA/DDESS (DD)	DoDEA/DoDDS (DI)	New York (NY)†	Utah (UT)	Virginia (VA)	Wyoming (WY)	Texas (TX)	Rhode Island (RI)	Missouri (MO)	Arizona (AZ)†	Kentucky (KY)	Nevada (NV)	Oklahoma (OK)	Georgia (GA)	West Virginia (WV)	South Carolina (SC)	California (CA)†	Tennessee (TN)	Hawaii (HI)	Alabama (AL)	Arkansas (AR)	New Mexico (NM)	Louisiana (LA)	Mississippi (MS)	District of Columbia (DC)	Guam (GU)	American Samoa (AS)
MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT
KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS	KS
CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT	CT
MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA	MA
VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT	VT
ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME	ME
OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH	OH
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL	IL
DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI	DI
NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY
UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT	UT
VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA	VA
WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY	WY
TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX	TX
RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI	RI
MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO	MO
AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ
KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY	KY
NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA	GA
WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV	WV
SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC
CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI	HI
AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR
NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA
MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS
DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC
GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU	GU
AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS	AS

- Jurisdiction has statistically significantly higher percentage than the jurisdiction listed at the top of the chart.
- No statistically significant difference from the jurisdiction listed at the top of the chart.
- Jurisdiction has statistically significantly lower percentage than the jurisdiction listed at the top of the chart.

The between jurisdiction comparisons take into account sampling and measurement error and that each jurisdiction is being compared with every other jurisdiction. Significance is determined by an application of a multiple-comparison procedure (see appendix A).

† Indicates that the jurisdiction did not satisfy one or more of the guidelines for school participation rates (see appendix A).

NOTE: Differences between states and jurisdictions may be partially explained by other factors not included in this table.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress, 2000 Mathematics Assessment.