

the condition of education 2003



INDICATOR 11

Mathematics Performance of Students in Grades 4, 8, and 12

The indicator and corresponding tables are taken directly from *The Condition of Education 2003*. Therefore, the page numbers may not be sequential.

Additional information about the survey data and supplementary notes can be found in the full report. For a copy of *The Condition of Education 2003*, visit the NCES web site (<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003067>) or contact ED PUBs at 1-877-4ED-PUBS.

Suggested Citation:

U.S. Department of Education, National Center for Education Statistics, *The Condition of Education 2003*, NCES 2003-067, Washington, DC: U.S. Government Printing Office, 2003.

Academic Outcomes

Mathematics Performance of Students in Grades 4, 8, and 12

The mathematics performance of 4th- and 8th-graders increased steadily from 1990 to 2000, while the performance of 12th-graders increased from 1990 to 1996 but then declined between 1996 and 2000.

The National Assessment of Educational Progress (NAEP) has assessed performance in mathematics in grades 4, 8, and 12 since 1990. Students in grades 4 and 8 showed steady growth in mathematics achievement from 1990 to 2000. In contrast, 12th-graders in 2000 scored higher than in 1990 but lower than in 1996. Achievement levels, which identify what students should know and be able to do at each grade, provide another measure of student performance. In 2000, 26 percent of 4th-graders, 27 percent of 8th-graders, and 17 percent of 12th-graders performed at or above the *Proficient* levels for their respective grades (see supplemental table 11-1).

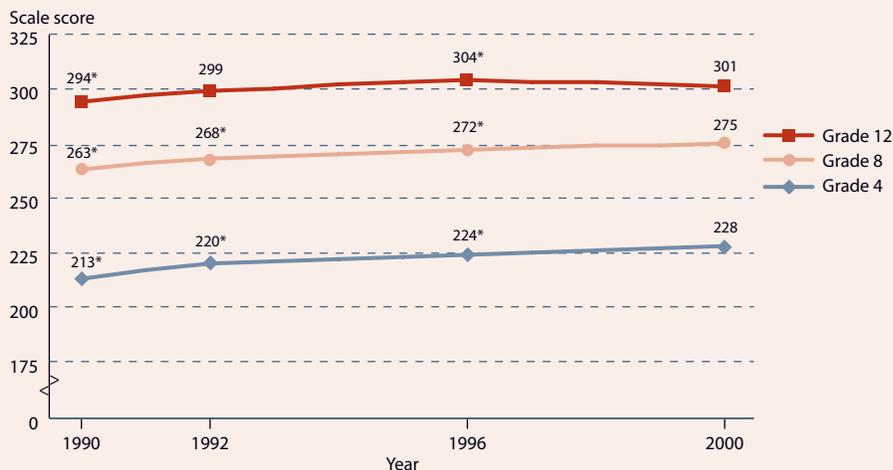
Certain subgroups of students outperformed other groups in 2000. Males, on average, scored higher than females in grades 8 and 12; however, in grade 4, there was no difference detected between the average scores of boys and girls. Whites at all three grade levels and Asians/Pacific Islanders in grades 8 and 12 scored higher, on average, than their Black, Hispanic, and American Indian counterparts. Asians/Pacific Islanders scored higher than Whites at grade 12. The level of poverty in

the school was associated with student achievement. In all three grades, average scale scores decreased as the percentage of students in the school eligible for a free or reduced-price lunch increased (see supplemental table 11-2).

Assessment results were associated with the opportunity to study challenging material and the degree to which students took advantage of these opportunities. Among 8th-grade students in 2000, those taking 8th-grade mathematics or prealgebra scored lower than those taking algebra I or II, geometry, or sequential or integrated mathematics. Twelfth-graders who had taken the most advanced mathematics courses scored higher than students who had taken low- or middle-level courses.

NAEP also provided a state comparison of public schools in grades 4 and 8. Of the 36 jurisdictions that participated in the assessment in 4th grade in 1992 and 2000, 26 had a higher average score and 1 had a lower score in 2000 than in 1992. Thirty-one jurisdictions participated in grade 8 in 1990 and 2000; 27 had a higher average score, and none had a lower score in 2000 than in 1990 (see supplemental table 11-3).

MATHEMATICS PERFORMANCE: Average mathematics scale scores for 4th-, 8th-, and 12th-graders: 1990, 1992, 1996, and 2000



*Significantly different from 2000.

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001-517), figure 2.1 and table B.1. Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessment.

FOR MORE INFORMATION:
Supplemental Notes 1, 4
Supplemental Tables 11-1,
11-2, 11-3



Mathematics Performance of Students in Grades 4, 8, and 12

Table 11-1. Average mathematics scale score and percentage of students at or above each mathematics achievement level, by grade: 1990, 1992, 1996, and 2000

Grade and achievement level	1990	1992	1996	2000
	Average scale score			
Grade 4	213*	220*	224*	228
Grade 8	263*	268*	272*	275
Grade 12	294*	299	304*	301
	Percentage at achievement level			
Grade 4				
Below Basic	50*	41*	36*	31
At or above Basic	50*	59*	64*	69
At or above Proficient	13*	18*	21*	26
At Advanced	1*	2*	2	3
Grade 8				
Below Basic	48*	42*	38*	34
At or above Basic	52*	58*	62*	66
At or above Proficient	15*	21*	24*	27
At Advanced	2*	3*	4	5
Grade 12				
Below Basic	42*	36	31*	35
At or above Basic	58*	64	69*	65
At or above Proficient	12*	15	16	17
At Advanced	1	2	2	2

*Significantly different from 2000.

NOTE: See *supplemental note 4* for more information on achievement levels and the National Assessment of Educational Progress (NAEP).

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001-517), tables B.1 and B.2. Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessment.

Mathematics Performance of Students in Grades 4, 8, and 12

Table 11-2. Average mathematics scale score for 4th-, 8th-, and 12th-graders, by selected student and school characteristics: 2000

Student and school characteristics	Average scale score		
	Grade 4	Grade 8	Grade 12
Total	228	275	301
Sex			
Male	229	277	303
Female	226	274	299
Race/ethnicity ¹			
American Indian	216	255	293
Asian/Pacific Islander	†	289	319
Black	205	247	274
White	236	286	308
Hispanic	212	253	283
Parents' education			
High school diploma or less	—	262	286
Bachelor's degree or higher	—	287	313
Current mathematics class in 8th grade			
Group 1	—	267	—
Group 2	—	295	—
Mathematics courses taken by 12th grade			
Low-level	—	—	275
Middle-level	—	—	292
High-level	—	—	318
Control			
Public	226	274	300
Private	238	287	315
Location			
Central city	222	268	298
Urban fringe/large town	232	280	304
Rural/small town	227	276	300
Enrollment			
Less than 300	230	281	300
300–999	228	276	301
1,000 or more	217	273	301
Percent of students in school eligible for free or reduced-price lunch			
0–10	243	291	311
11–25	234	285	303
26–50	228	273	297
51–75	218	261	280
76–100	207	248	276

—Not available.

†Not applicable (omitted due to concerns about its accuracy).

¹American Indian includes Alaska Native, Black includes African American, Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

NOTE: See *supplemental note 4* for more information on the National Assessment of Educational Progress (NAEP), including descriptions of the 8th- and 12th-grade mathematics course-taking levels. See *supplemental note 7* for information on parents' education and location.

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001–517), tables B.1, B.12, B.14, B.20, and B.22, and previously unpublished tabulations (September 2001) from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Mathematics Performance of Students in Grades 4, 8, and 12

Table 11-3. Average mathematics scale score for public school 4th- and 8th-graders in 2000 and change in score since 1992 in grade 4 and since 1990 in grade 8, by state and jurisdiction: 2000

State and jurisdiction	Grade 4		Grade 8	
	Average scale score in 2000	Change from 1992 average scale score	Average scale score in 2000	Change from 1990 average scale score
Nation	226	8*	274	13*
Alabama	218**	10*	262**	9*
Arizona ¹	219**	4	271	11*
Arkansas	217**	7*	261**	5*
California ¹	214**	5*	262**	6*
Connecticut	234**	7*	282**	12*
Georgia	220**	4*	266**	7*
Hawaii	216**	2	263**	12*
Idaho ¹	227	5*	278**	6*
Illinois ¹	225	—	277	16*
Indiana ¹	234**	13*	283**	16*
Iowa ¹	233**	3	—	—
Kansas ¹	232**	—	284**	—
Kentucky	221**	6*	272	14*
Louisiana	218**	14*	259**	13*
Maine ¹	231**	-1	284**	—
Maryland	222**	5*	276	15*
Massachusetts	235**	8*	283**	—
Michigan ¹	231**	11*	278**	14*
Minnesota ¹	235**	7*	288**	12*
Mississippi	211**	9*	254**	—
Missouri	229	6*	274	—
Montana ¹	230	—	287**	6*
Nebraska	226	1	281**	5*
Nevada	220**	—	268**	—
New Mexico	214**	1	260**	3
New York ¹	227	8*	276	15*
North Carolina	232**	20*	280**	30*
North Dakota	231**	2	283**	2
Ohio ¹	231**	12*	283**	19*
Oklahoma	225	5*	272	8*
Oregon ¹	227	—	281**	9*
Rhode Island	225	9*	273	13*
South Carolina	220**	8*	266**	—
Tennessee	220**	9*	263**	—

See notes at end of table.

Mathematics Performance of Students in Grades 4, 8, and 12

Table 11-3. Average mathematics scale score for public school 4th- and 8th-graders in 2000 and change in score since 1992 in grade 4 and since 1990 in grade 8, by state and jurisdiction: 2000—Continued

State and jurisdiction	Grade 4		Grade 8	
	Average scale score in 2000	Change from 1992 average scale score	Average scale score in 2000	Change from 1990 average scale score
Texas	233**	15*	275	17*
Utah	227	3	275	—
Vermont ¹	232**	—	283**	—
Virginia	230**	10*	277	12*
West Virginia	225	10*	271**	15*
Wyoming	229	4*	277	5*
Other jurisdictions				
American Samoa	157**	—	195**	—
District of Columbia	193**	1	234**	3
DDESS ²	228	—	277	—
DoDDS ³	228	—	278**	—
Guam	184**	-9*	233**	2
Virgin Islands	183**	—	—	—

—Indicates the jurisdiction did not participate in 2000, 1992, or 1990.

*Change in score is statistically significant.

**Significantly different from national average in 2000.

¹Jurisdiction did not meet one or more of the guidelines for school participation in 2000.

²Department of Defense Domestic Dependent Elementary and Secondary Schools.

³Department of Defense Dependent Schools.

NOTE: The NAEP assessment at the state level includes only public schools, while other reported national results in this indicator include both public and private school students. Comparative performance results may be affected by variations or changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples. See *supplemental note 4* for more information on the National Assessment of Educational Progress (NAEP).

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001–517), tables B.6 and B.7, and previously unpublished tabulations (October 2001) from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Mathematics Performance of Students in Grades 4, 8, and 12

Table S11. Standard errors for the average mathematics scale scores for 4th-, 8th-, and 12th-graders: 1990, 1992, 1996, and 2000

Average scale score	1990	1992	1996	2000
Grade 4	0.9	0.7	0.9	0.9
Grade 8	1.3	0.9	1.1	0.8
Grade 12	1.1	0.9	1.0	0.9

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001-517), figure 2.1 and table B.1. Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessment.

Mathematics Performance of Students in Grades 4, 8, and 12

Table S11-1. Standard errors for the average mathematics scale score and percentage of students at or above each mathematics achievement level, by grade: 1990, 1992, 1996, and 2000

Grade and achievement level	1990	1992	1996	2000
	Average scale score			
Grade 4	0.9	0.7	0.9	0.9
Grade 8	1.3	0.9	1.1	0.8
Grade 12	1.1	0.9	1.0	0.9
	Percentage at achievement level			
Grade 4				
Below Basic	1.4	1.0	1.2	1.1
At or above Basic	1.4	1.0	1.2	1.1
At or above Proficient	1.2	1.0	0.9	1.1
At Advanced	0.4	0.3	0.3	0.3
Grade 8				
Below Basic	1.4	1.1	1.1	0.8
At or above Basic	1.4	1.1	1.1	0.8
At or above Proficient	1.1	1.0	1.1	0.9
At Advanced	0.3	0.4	0.5	0.5
Grade 12				
Below Basic	1.6	1.1	1.3	1.1
At or above Basic	1.6	1.1	1.3	1.1
At or above Proficient	0.9	0.8	1.1	0.9
At Advanced	0.3	0.3	0.3	0.3

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001-517), tables B.1 and B.2. Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 1990, 1992, 1996, and 2000 Mathematics Assessment.

Mathematics Performance of Students in Grades 4, 8, and 12

Table S11-2. Standard errors for the average mathematics scale score for 4th-, 8th-, and 12th-graders, by selected student and school characteristics: 2000

Student and school characteristics	Average scale score		
	Grade 4	Grade 8	Grade 12
Total	0.9	0.8	0.9
Sex			
Male	1.0	0.9	1.1
Female	0.9	0.9	0.9
Race/ethnicity			
American Indian	2.1	8.3	4.4
Asian/Pacific Islander	†	3.4	2.8
Black	1.6	1.4	1.9
White	1.0	0.8	1.0
Hispanic	1.5	1.5	2.1
Parents' education			
High school diploma or less	—	1.0	1.0
Bachelor's degree or higher	—	1.0	1.1
Current mathematics class in 8th grade			
Group 1	—	0.9	—
Group 2	—	1.1	—
Mathematics courses taken by 12th grade			
Low-level	—	—	1.4
Middle-level	—	—	0.9
High-level	—	—	1.0
Control			
Public	1.0	0.8	1.1
Private	0.8	1.2	1.2
Location			
Central city	1.6	1.8	1.8
Urban fringe/large town	1.5	1.4	1.4
Rural/small town	1.7	1.9	1.9
Enrollment			
Less than 300	2.5	1.9	2.7
300–999	1.0	1.1	2.0
1,000 or more	3.8	2.5	1.5
Percent of students in school eligible for free or reduced-price lunch			
0–10	1.3	1.4	2.0
11–25	1.6	1.6	1.7
26–50	1.7	1.2	1.6
51–75	1.6	2.5	2.5
76–100	1.6	2.8	3.2

—Not available.

†Not applicable.

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001–517), tables B.1, B.12, B.14, B.20, and B.22, and previously unpublished tabulations (September 2001) from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.

Mathematics Performance of Students in Grades 4, 8, and 12

Table S11-3. Standard errors for the average mathematics scale score for public school 4th- and 8th-graders in 2000 and change in score since 1992 in grade 4 and since 1990 in grade 8, by state and jurisdiction: 2000

State and jurisdiction	Grade 4		Grade 8	
	Average scale score in 2000	Change from 1992 average scale score	Average scale score in 2000	Change from 1990 average scale score
Nation	1.0	1.3	0.8	1.6
Alabama	1.4	2.1	1.8	2.1
Arizona	1.4	1.8	1.5	2.0
Arkansas	1.1	1.4	1.4	1.6
California	1.8	2.4	2.0	2.4
Connecticut	1.2	1.6	1.4	1.7
Georgia	1.1	1.6	1.3	1.8
Hawaii	1.1	1.7	1.3	1.6
Idaho	1.2	1.5	1.3	1.5
Illinois	1.9	—	1.6	2.4
Indiana	1.1	1.5	1.4	1.9
Iowa	1.3	1.6	—	—
Kansas	1.5	—	1.4	—
Kentucky	1.2	1.5	1.4	1.8
Louisiana	1.4	2.0	1.5	1.9
Maine	0.9	1.4	1.2	—
Maryland	1.3	1.8	1.4	2.0
Massachusetts	1.1	1.6	1.3	—
Michigan	1.4	2.2	1.6	2.0
Minnesota	1.3	1.6	1.4	1.7
Mississippi	1.1	1.5	1.3	—
Missouri	1.2	1.7	1.5	—
Montana	1.8	—	1.2	1.5
Nebraska	1.7	2.1	1.1	1.5
Nevada	1.2	—	0.9	—
New Mexico	1.5	2.1	1.7	1.9
New York	1.3	1.8	2.1	2.5
North Carolina	1.0	1.5	1.1	1.5
North Dakota	0.9	1.2	1.1	1.6
Ohio	1.3	1.8	1.5	1.8
Oklahoma	1.3	1.6	1.5	2.0
Oregon	1.6	—	1.6	1.9
Rhode Island	1.2	2.0	1.1	1.3
South Carolina	1.4	1.8	1.4	—
Tennessee	1.5	2.0	1.7	—

See notes at end of table.

Mathematics Performance of Students in Grades 4, 8, and 12

Table S11-3. Standard errors for the average mathematics scale score for public school 4th- and 8th-graders in 2000 and change in score since 1992 in grade 4 and since 1990 in grade 8, by state and jurisdiction: 2000—Continued

State and jurisdiction	Grade 4		Grade 8	
	Average scale score in 2000	Change from 1992 average scale score	Average scale score in 2000	Change from 1990 average scale score
Texas	1.2	1.7	1.5	2.0
Utah	1.2	1.6	1.2	—
Vermont	1.6	—	1.1	—
Virginia	1.3	1.8	1.5	2.1
West Virginia	1.2	1.6	1.0	1.4
Wyoming	1.3	1.6	1.2	1.4
Other jurisdictions				
American Samoa	3.9	—	4.5	—
District of Columbia	1.2	1.3	2.2	2.4
DDESS	1.2	—	2.3	—
DoDDS	0.7	—	1.0	—
Guam	2.3	2.5	2.2	2.3
Virgin Islands	2.8	—	—	—

—Indicates the jurisdiction did not participate in 2000, 1992, or 1990.

SOURCE: U.S. Department of Education, NCES. (2001). *The Nation's Report Card: Mathematics 2000* (NCES 2001–517), tables B.6 and B.7, and previously unpublished tabulations (October 2001) from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 2000 Mathematics Assessment.