

the condition of education 2002



INDICATOR 12

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

The indicator and corresponding tables are taken directly from *The Condition of Education 2002*. 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 2002*, visit the NCES web site (<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2002025>) or contact ED PUBs at 1-877-4ED-PUBS.

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NATIONAL CENTER FOR EDUCATION STATISTICS

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

Academic Outcomes

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

The science performance of both 4th- and 8th-graders did not change significantly from 1996 to 2000, while 12th-grade scores declined by 3 points.

The National Assessment of Educational Progress (NAEP) assessed 4th-, 8th-, and 12th-grade student performance in science in 1996 and 2000. The average science scale scores of both 4th- and 8th-graders did not change significantly from 1996 to 2000, while there was a 3-point decline in grade 12 between the 2 years. NAEP also provides achievement levels indicating what students should know and be able to do in each grade. In 2000, 29 percent of 4th-graders, 32 percent of 8th-graders, and 18 percent of 12th-graders performed at or above the *Proficient* level set for each grade. In 8th grade, there was an increase in the percentage of students reaching the *Proficient* level or above between 1996 and 2000 (see supplemental table 12-1).

Student and school characteristics were associated with student performance. Males had a higher average score than females in 2000 at grades 4 and 8, but the two had similar scores in grade 12. Whites in grade 4 and Whites and Asian/Pacific Islanders in grades 8 and 12 had higher average scores than their Black, Hispanic, and American Indian counterparts; in all three grades, American Indians had a higher score than Hispanics and Blacks. The poverty

rate, as measured by the percentage of students in a school eligible for the National School Lunch Program, was also related to achievement. As the percentage of students in a school eligible for the program increased, the average score of students in the school decreased (see supplemental table 12-2).

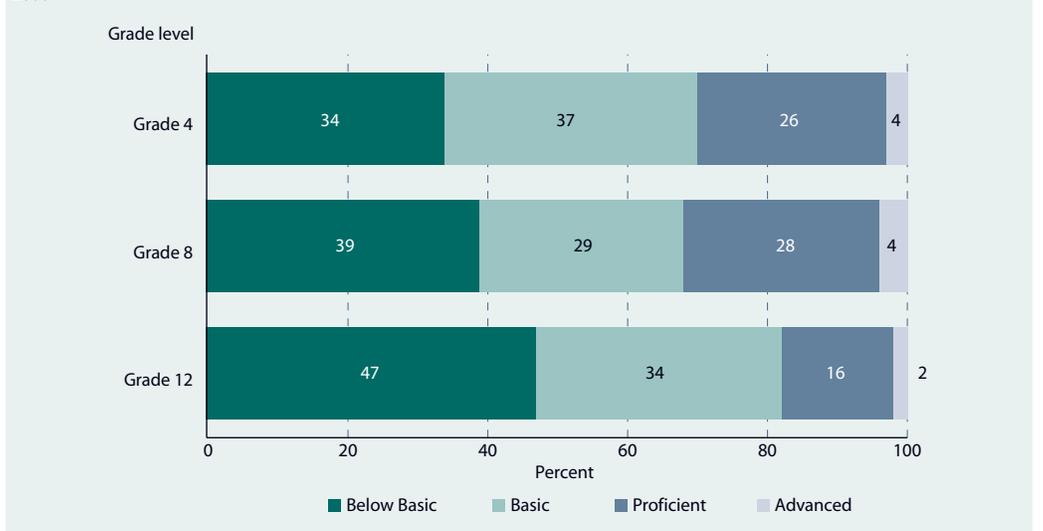
Coursetaking was also associated with student achievement. Eighth-graders who were not taking science had the lowest average scores of all 8th-graders assessed in 2000. Eighth-graders enrolled in a life science course had a lower average score than their peers enrolled in other science courses. Twelfth-graders who had taken 1st-year biology, chemistry, or physics at some point since grade 8 had higher scores than students who had not taken these courses.

NAEP also collected performance data of public school students by state or jurisdiction in 4th grade in 2000 and in 8th grade in 1996 and 2000. In 8th grade, there was no significant difference in average scores from 1996 to 2000 in 37 jurisdictions, while 3 jurisdictions showed significant score gains and no jurisdiction showed a significant decline (see supplemental table 12-3).

NOTE: Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002-451).

SCIENCE PERFORMANCE: Percentage distribution of students performing at each science achievement level, by grade: 2000



FOR MORE INFORMATION:
Supplemental Notes 1, 3
Supplemental Tables 12-1,
12-2, 12-3

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

Table 12-1 Average science scale score and percentage of students at or above each science achievement level, by grade: 1996 and 2000

Achievement level	Grade 4		Grade 8		Grade 12	
	1996	2000	1996	2000	1996	2000
Total	150	150	Average scale score		*150	147
			150	151		
			Percentage at achievement level			
Below Basic	33	34	39	39	*43	47
At or above Basic	67	66	61	61	*57	53
At or above Proficient	29	29	*29	32	21	18
At Advanced	3	4	3	4	3	2

*Significantly different from 2000.

NOTE: See *Supplemental Note 3* for more information on the National Assessment of Educational Progress (NAEP).

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002-451).

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

Table 12-2 Average science 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	150	151	147
Sex			
Male	153	154	148
Female	147	147	145
Race/ethnicity			
White	160	162	154
Black	124	122	123
Hispanic	129	128	128
Asian/Pacific Islander	(f)	156	153
American Indian/Alaska Native	140	134	139
Parents' education			
High school diploma or less	—	136	132
Bachelor's degree or higher	—	162	157
Current science class in 8th grade			
Not taking	—	117	—
Life sciences	—	142	—
Earth sciences	—	152	—
Integrated sciences	—	154	—
Physical sciences	—	155	—
General sciences	—	156	—
Courses taken by 12th grade			
General science			
Not taken	—	—	148
Taken	—	—	147
1st-year biology			
Not taken	—	—	126
Taken	—	—	150
1st-year chemistry			
Not taken	—	—	128
Taken	—	—	157
1st-year physics			
Not taken	—	—	139
Taken	—	—	165

See footnotes at end of table.

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

Table 12-2 Average science scale score for 4th-, 8th-, and 12th-graders, by selected student and school characteristics: 2000—Continued

Student and school characteristics	Average scale score		
	Grade 4	Grade 8	Grade 12
Control			
Public	148	149	145
Private	163	166	161
Type of location			
Central city	140	142	144
Urban fringe/large town	155	156	149
Rural/small town	152	152	145
Enrollment			
Less than 300	156	157	143
300–999	150	152	147
1,000 or more	133	148	147
Percentage of students in the school eligible for free or reduced-price lunch			
0–10	167	165	156
11–25	162	160	149
26–50	149	151	142
51–75	141	136	131
76–100	124	122	121

—Not available.

†Omitted due to concerns about its accuracy.

NOTE: See *Supplemental Note 3* for more information on the National Assessment of Educational Progress (NAEP).

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002–451), and unpublished data from the NAEP 2000 Grade 4 Science Assessment, provided by the Educational Testing Service.

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

Table 12-3 Average science scale score for public school 4th- and 8th-graders in 2000 and change in score since 1996 in grade 8, by state and jurisdiction

State and jurisdiction	Grade 4	Grade 8	Change from 1996 average scale score
	Average scale score in 2000	Average scale score in 2000	
Nation	148	149	1
Alabama	**143	**141	3
Arizona ¹	**141	146	1
Arkansas	144	**143	-1
California ¹	**131	**132	-6
Connecticut	**156	**154	-1
Georgia	**143	**144	2
Hawaii	**136	**132	-2
Idaho ¹	**153	**159	—
Illinois ¹	151	150	—
Indiana ¹	**155	**156	3
Iowa ¹	**160	—	—
Kentucky	**152	152	4
Louisiana	**139	**136	3
Maine ¹	**161	**160	-3
Maryland	146	149	4
Massachusetts	**162	**161	4
Michigan ¹	**154	**156	3
Minnesota ¹	**157	**160	1
Mississippi	**133	**134	1
Missouri	**156	**156	*5
Montana ¹	**160	**165	3
Nebraska	150	**157	0
Nevada	**142	**143	—
New Mexico	**138	**140	-1
New York ¹	149	149	3
North Carolina	148	147	1
North Dakota	**160	**161	-1
Ohio ¹	**154	**161	—
Oklahoma	**152	149	—
Oregon ¹	150	**154	0
Rhode Island	148	150	1
South Carolina	**141	**142	3
Tennessee	147	146	3

See footnotes at end of table.

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

Table 12-3 Average science scale score for public school 4th- and 8th-graders in 2000 and change in score since 1996 in grade 8, by state and jurisdiction
—Continued

State and jurisdiction	Grade 4	Grade 8	
	Average scale score in 2000	Average scale score in 2000	Change from 1996 average scale score
Texas	147	**144	-1
Utah	**155	**155	-1
Vermont ¹	**159	**161	4
Virginia	**156	152	3
West Virginia	150	150	2
Wyoming	**158	**158	0
Other jurisdictions			
American Samoa	**51	**72	—
DDESS ²	**157	**159	*6
DoDDS ³	**156	**159	*4
Guam	**110	**114	-6
Virgin Islands ¹	**116	—	—

—The jurisdiction did not participate in 1996 or 2000 or did not meet the minimum guidelines for participation.

*Difference is significantly different.

**Significantly different from national average.

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

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 3* for more information on the NAEP.

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002–451).

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

Table S12 Standard errors for the percentage distribution of students performing at each science achievement level, by grade: 2000

Achievement level	Grade 4	Grade 8	Grade 12
Below Basic	0.8	0.8	1.1
Basic	0.7	0.5	0.7
Proficient	0.7	0.7	0.9
Advanced	0.3	0.4	0.3

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002-451).

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

Table S12-1 Standard errors for the average science scale score and percentage of students at or above each science achievement level, by grade: 1996 and 2000

Achievement level	1996	2000	1996	2000	1996	2000
			Average scale score			
Total	0.8	0.7	0.9	0.6	0.9	1.0
			Percentage at achievement level			
Below Basic	1.2	0.8	1.1	0.8	1.1	1.1
At or above Basic	1.2	0.8	1.1	0.8	1.1	1.1
At or above Proficient	0.9	0.8	1.2	0.8	1.1	1.0
At Advanced	0.4	0.3	0.5	0.4	0.3	0.3

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002-451).

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

Table S12-2 Standard errors for the average science 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	0.7	0.6	1.0
Sex			
Male	0.8	0.7	1.1
Female	0.8	0.8	1.0
Race/ethnicity			
White	0.8	0.7	1.2
Black	1.6	1.3	1.4
Hispanic	1.3	1.3	1.9
Asian/Pacific Islander	(†)	2.4	2.5
American Indian/Alaska Native	2.8	3.2	3.6
Parents' education			
High school diploma or less	—	0.8	1.2
Bachelor's degree or higher	—	0.8	1.1
Current science class in 8th grade			
Not taking	—	2.8	—
Life sciences	—	2.5	—
Earth sciences	—	1.3	—
Integrated sciences	—	1.3	—
Physical sciences	—	1.3	—
General sciences	—	1.1	—
Courses taken by 12th grade			
General science			
Not taken	—	—	1.1
Taken	—	—	1.2
1st-year biology			
Not taken	—	—	3.5
Taken	—	—	0.9
1st-year chemistry			
Not taken	—	—	1.2
Taken	—	—	0.9
1st-year physics			
Not taken	—	—	1.0
Taken	—	—	1.1

See footnotes at end of table.

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

Table S12-2 Standard errors for the average science scale score for 4th-, 8th-, and 12th-graders, by selected student and school characteristics: 2000—Continued

Student and school characteristics	Average scale score		
	Grade 4	Grade 8	Grade 12
Control			
Public	0.8	0.7	1.1
Private	0.9	0.9	1.0
Type of location			
Central city	1.7	1.6	1.9
Urban fringe/large town	1.2	1.1	1.3
Rural/small town	1.7	1.7	2.0
Enrollment			
Less than 300	1.9	2.6	3.8
300–999	0.9	0.9	1.7
1,000 or more	4.5	2.3	1.3
Percentage of students in the school eligible for free or reduced-price lunch			
0–10	1.2	1.2	1.8
11–25	1.4	1.3	1.5
26–50	1.3	1.1	1.7
51–75	1.7	2.3	3.0
76–100	2.1	2.2	2.1

—Not available.

†Not applicable.

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002–451), and unpublished data from the NAEP 2000 Grade 4 Science Assessment, provided by the Educational Testing Service.

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

Table S12-3 Standard errors for the average science scale score for public school 4th- and 8th-graders in 2000 and change in score since 1996 in grade 8, by state and jurisdiction

State and jurisdiction	Grade 4	Grade 8	
	Average scale score in 2000	Average scale score in 2000	Change from 1996 average scale score
Nation	0.8	0.7	1.2
Alabama	1.7	1.9	2.5
Arizona	1.4	1.6	2.3
Arkansas	1.7	1.3	1.9
California	2.0	1.5	2.3
Connecticut	1.3	1.4	1.9
Georgia	1.4	1.5	2.1
Hawaii	1.4	1.2	1.5
Idaho	1.5	1.1	—
Illinois	1.6	1.9	—
Indiana	1.6	1.7	2.2
Iowa	1.4	—	—
Kentucky	1.1	1.3	1.8
Louisiana	1.9	1.7	2.3
Maine	1.0	1.0	1.4
Maryland	1.3	1.3	2.0
Massachusetts	1.2	1.6	2.1
Michigan	1.8	1.7	2.2
Minnesota	1.5	2.1	2.4
Mississippi	1.4	1.2	1.8
Missouri	1.6	1.1	1.6
Montana	2.1	1.2	1.7
Nebraska	1.8	1.0	1.4
Nevada	1.3	1.1	—
New Mexico	2.0	1.6	1.9
New York	1.4	2.4	2.9
North Carolina	1.4	1.5	1.9
North Dakota	0.8	0.9	1.2
Ohio	1.6	1.5	—
Oklahoma	1.4	1.2	—
Oregon	1.9	1.6	2.2
Rhode Island	1.5	1.3	1.5
South Carolina	1.2	1.3	2.0
Tennessee	1.5	1.5	2.4

See footnotes at end of table.

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

Table S12-3 Standard errors for the average science scale score for public school 4th- and 8th-graders in 2000 and change in score since 1996 in grade 8, by state and jurisdiction—Continued

State and jurisdiction	Grade 4	Grade 8	Change from 1996 average scale score
	Average scale score in 2000	Average scale score in 2000	
Texas	1.6	1.5	2.3
Utah	1.1	0.9	1.2
Vermont	1.7	0.9	1.3
Virginia	1.6	1.2	2.0
West Virginia	1.1	1.1	1.4
Wyoming	1.1	1.0	1.2
Other jurisdictions			
American Samoa	1.7	2.3	—
DDESS	0.7	1.2	1.7
DoDDS	0.5	0.8	1.1
Guam	2.3	4.5	4.7
Virgin Islands	1.1	—	—

—The jurisdiction did not participate in 1996 or 2000 or did not meet the minimum guidelines for participation.

SOURCE: U.S. Department of Education, NCES. (forthcoming). *The Nation's Report Card: Science 2000* (NCES 2002–451).