

the condition of education 2004



INDICATOR 11

Mathematics Performance of Students in Grades 4 and 8

The indicator and corresponding tables are taken directly from *The Condition of Education 2004*. 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 2004* visit the NCES web site (<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2004077>) or contact ED PUBs at 1-877-4ED-PUBS.

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Academic Outcomes

Mathematics Performance of Students in Grades 4 and 8

The mathematics performance of 4th- and 8th-graders increased steadily from 1990 to 2003. For both grades, the average scale scores in 2003 were higher than in all previous assessments.

The National Assessment of Educational Progress (NAEP) has assessed performance in mathematics in grades 4 and 8 in public and private schools since 1990, using the assessment reported here. Average scale scores, which represent what students know and can do, for 4th- and 8th-graders were higher in 2003 than in all previous assessments. The average score in grade 4 increased from 226 in 2000 to 235 in 2003, and the average score in grade 8 increased from 273 to 278.

Achievement levels, which identify what students should know and be able to do at each grade, provide another measure of student performance. The percentages of 4th- and 8th-graders at or above *Basic* and *Proficient* and at *Advanced* in mathematics were higher in 2003 than in 1990 (see supplemental table 11-1).

Scores at the 10th through 90th percentiles reveal changes in the mathematics scale scores for lower- and higher-performing students. In both grade 4 and 8, student scores at each percentile level were higher in 2003 than in any previous assessment, except for the 75th and 90th percentiles at grade 8 in 2000 where accommodations were not permitted.

Certain subgroups outperformed others in mathematics in 2003. Males, on average, scored higher than females in grades 4 and 8 (see supplemental table 11-2). In both grades, Asian/Pacific Islander students had higher scores than White students, both groups of students achieved higher scores than Black, Hispanic, and American Indian students, and Hispanic and American Indian students outperformed Black students. In grade 8, student coursetaking and parents' education were positively associated with student achievement. The level of poverty in the school, as measured by the percentage of students eligible for free or reduced-price lunch, was negatively associated with student achievement in both grades in 2003.

NAEP also provides a state comparison of public schools in grades 4 and 8. In grade 4, all 42 states and jurisdictions that participated in 1992 and 2003 experienced an increase between the 2 years, and the national average increase for public schools was 15 points (see supplemental table 11-3). In grade 8, the average score for all 38 participating states and jurisdictions increased from 1990 to 2003, and the national average increase for public schools was 14 points.

*Significantly different from 2003.

¹Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

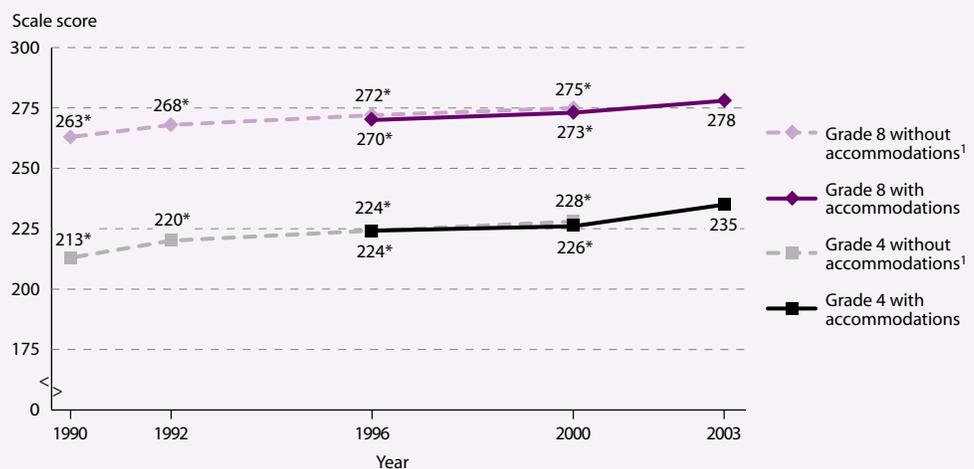
NOTE: In addition to allowing for accommodations, the accommodations-permitted results (1996–2003) differ slightly from previous years' results, and from previously reported results for 1996 and 2000, due to changes in sample weighting procedures. The NAEP national sample in 2003 was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. The 2003 mathematics assessment did not include students in grade 12. See supplemental note 4 for more information on the National Assessment of Educational Progress (NAEP).

SOURCE: U.S. Department of Education, NCES. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451) and NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/search.asp>). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), selected years 1990–2003 Mathematics Assessments.



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

MATHEMATICS PERFORMANCE: Average mathematics scale scores for 4th- and 8th-graders: Selected years 1990–2003



Mathematics Performance of Students in Grades 4 and 8

Table 11-1. Average mathematics scale score by percentile and percentage of students at each achievement level, by grade: Selected years 1990–2003

Grade, percentile, and achievement level	1990 ¹	1992 ¹	1996 ¹	1996	2000 ¹	2000	2003
Average scale score							
Grade 4	213*	220*	224*	224*	228*	226*	235
Grade 8	263*	268*	272*	270*	275*	273*	278
Grade 12	294	299	304	302	301	300	—
Percentile							
Grade 4							
10th	171*	177*	182*	182*	186*	184*	197
25th	193*	199*	204*	203*	208*	205*	216
50th	214*	221*	226*	225*	230*	227*	236
75th	235*	242*	246*	245*	250*	248*	255
90th	253*	259*	262*	262*	266*	265*	270
Grade 8							
10th	215*	221*	224*	221*	227*	223*	230
25th	239*	243*	248*	245*	252*	249*	254
50th	264*	269*	273*	273*	277*	275*	279
75th	288*	294*	298*	297*	301	300*	303
90th	307*	315*	317*	316*	321	320*	323
Grade 12							
10th	247	254	261	257	255	254	—
25th	270	276	282	279	277	276	—
50th	296	301	305	302	302	301	—
75th	319	324	327	326	326	325	—
90th	339	343	345	344	346	346	—
Percentage at achievement level							
Grade 4							
Below Basic	50*	41*	36*	37*	31*	35*	23
At or above Basic	50*	59*	64*	63*	69*	65*	77
At or above Proficient	13*	18*	21*	21*	26*	24*	32
At Advanced	1*	2*	2*	2*	3*	3*	4
Grade 8							
Below Basic	48*	42*	38*	39*	34*	37*	32
At or above Basic	52*	58*	62*	61*	66*	63*	68
At or above Proficient	15*	21*	24*	23*	27	26*	29
At Advanced	2*	3*	4*	4*	5	5	5
Grade 12							
Below Basic	42	36	31	34	35	36	—
At or above Basic	58	64	69	66	65	64	—
At or above Proficient	12	15	16	16	17	16	—
At Advanced	1	2	2	2	2	2	—

— Not available.

*Significantly different from 2003.

¹Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

NOTE: In addition to allowing for accommodations, the accommodations-permitted results (1996–2003) differ slightly from previous years' results, and from previously reported results for 1996 and 2000, due to changes in sample weighting procedures. The NAEP national sample in 2003 was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. The 2003 mathematics assessment did not include students in grade 12. 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. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451) and NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), selected years 1990–2003 Mathematics Assessments.

Mathematics Performance of Students in Grades 4 and 8

Table 11-2. Average mathematics scale score for 4th- and 8th-graders, by selected student and school characteristics: 2003

Student or school characteristic	Grade 4	Grade 8
Total	235	278
Sex		
Male	236	278
Female	233	277
Race/ethnicity ¹		
American Indian	223	263
Asian/Pacific Islander	246	291
Black	216	252
White	243	288
Hispanic	222	259
Parents' education		
Less than high school	—	257
High school diploma or equivalent	—	267
Some college, including vocational/technical	—	280
Bachelor's degree or higher	—	288
Current mathematics class in 8th grade ²		
Group 1	—	269
Group 2	—	298
Control		
Public	234	276
Private	245	294
Location		
Central city	229	271
Urban fringe/large town	238	281
Rural/small town	236	279
Enrollment		
Less than 300	236	280
300–999	235	278
1,000 or more	230	275
Percent of students in school eligible for free or reduced-price lunch		
0–10	250	295
11–25	244	285
26–50	237	278
51–75	229	266
76–100	216	251

—Not available.

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

²Students reported on the mathematics course they were currently taking. Group 1 courses include 8th-grade mathematics and prealgebra. Group 2 courses include algebra I, algebra II, geometry, and integrated or sequential mathematics.

NOTE: See *supplemental note 1* for information on parents' education, location, and free or reduced-price lunch. See *supplemental note 4* for information on the National Assessment of Educational Progress (NAEP), including descriptions of course-taking levels for 8th-grade mathematics.

SOURCE: U.S. Department of Education, NCES. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451), NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>), and previously unpublished tabulation (November 2003). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 2003 Mathematics Assessment.

Mathematics Performance of Students in Grades 4 and 8

Table 11-3. Average mathematics scale score for public school 4th- and 8th-graders and change in score since 1990 and 1992, by state and jurisdiction: 2003

State or jurisdiction	Grade 4		Grade 8	
	Average scale score in 2003	Change from 1992 ¹ average scale score	Average scale score in 2003	Change from 1990 ¹ average scale score
Nation ²	234	15**	276	14**
Alabama	223*	15**	262*	9**
Alaska	233	—	279*	—
Arizona	229*	14**	271*	12**
Arkansas	229*	19**	266*	10**
California	227*	19**	267*	11**
Colorado	235	14**	283*	16**
Connecticut	241*	14**	284*	14**
Delaware	236*	18**	277	16**
Florida	234	20**	271*	16**
Georgia	230*	15**	270*	11**
Hawaii	227*	13**	266*	15**
Idaho	235	13**	280*	8**
Illinois	233	—	277	17**
Indiana	238*	17**	281*	14**
Iowa	238*	9**	284*	6**
Kansas	242*	—	284*	—
Kentucky	229*	14**	274	17**
Louisiana	226*	22**	266*	20**
Maine	238*	6**	282*	—
Maryland	233	16**	278	17**
Massachusetts	242*	15**	287*	—
Michigan	236	16**	276	12**
Minnesota	242*	13**	291*	15**
Mississippi	223*	21**	261*	—
Missouri	235	13**	279*	—
Montana	236*	—	286*	5**
Nebraska	236*	11**	282*	7**
Nevada	228*	—	268*	—
New Hampshire	243*	13**	286*	13**
New Jersey	239*	12**	281*	12**
New Mexico	223*	9**	263*	7**
New York	236*	17**	280*	19**
North Carolina	242*	29**	281*	31**
North Dakota	238*	9**	287*	6**
Ohio	238*	19**	282*	18**
Oklahoma	229*	9**	272*	9**
Oregon	236*	—	281*	10**
Pennsylvania	236	12**	279*	12**
Rhode Island	230*	15**	272*	12**
South Carolina	236	23**	277	—
South Dakota	237*	—	285*	—
Tennessee	228*	17**	268*	—

See notes at end of table.

Mathematics Performance of Students in Grades 4 and 8

Table 11-3. Average mathematics scale score for public school 4th- and 8th-graders and change in score since 1990 and 1992, by state and jurisdiction: 2003—Continued

State or jurisdiction	Grade 4		Grade 8	
	Average scale score in 2003	Change from 1992 ¹ average scale score	Average scale score in 2003	Change from 1990 ¹ average scale score
Texas	237*	19**	277	19**
Utah	235	11**	281*	—
Vermont	242*	—	286*	—
Virginia	239*	18**	282*	17**
Washington	238*	—	281*	—
West Virginia	231*	15**	271*	15**
Wisconsin	237*	8**	284*	9**
Wyoming	241*	16**	284*	11**
Other jurisdictions				
District of Columbia	205*	12**	243*	12**
DDESS ³	237*	—	282*	—
DoDDS ⁴	237*	—	286*	—

—Not available.

*Significantly different from national average in 2003.

**Change in score is statistically significant.

¹Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted on the 1990 and 1992 mathematics assessments.

²National results for assessments prior to 2003 are based on the national sample, not on aggregated state samples.

³Department of Defense Domestic Dependent Elementary and Secondary Schools.

⁴Department of Defense Dependent Schools (overseas).

NOTE: At the state level, the National Assessment of Educational Progress (NAEP) includes only students in public schools, while other reported national results in this indicator include both public and private school students. Variations or changes in exclusion rates for students with disabilities and limited-English-proficient students in the NAEP samples may affect comparative performance results. The NAEP national sample in 2003 was obtained by aggregating the samples from each state, rather than by obtaining an independently selected national sample. As a consequence, the size of the national sample increased, and smaller differences between years or between types of students were found to be statistically significant than would have been detected in previous assessments. See *supplemental note 4* for more information on NAEP.

SOURCE: U.S. Department of Education, NCES. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451), figures 1 and 2 and tables 1 and 2, NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>), and previously unpublished tabulation (November 2003). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 1990, 1992, and 2003 Mathematics Assessments.

Mathematics Performance of Students in Grades 4 and 8

Table S11. Standard errors for the average mathematics scale scores for 4th- and 8th-graders: Selected years 1990–2003

Average scale score	1990 ¹	1992 ¹	1996 ¹	1996	2000 ¹	2000	2003
Grade 4	0.93	0.72	0.90	1.01	0.86	0.88	0.22
Grade 8	1.28	0.89	1.06	0.94	0.78	0.83	0.26

¹Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

SOURCE: U.S. Department of Education, NCES. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451) and NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), selected years 1990–2003 Mathematics Assessments.

Mathematics Performance of Students in Grades 4 and 8

Table S11-1. Standard errors for the average mathematics scale score by percentile and percentage of students at each achievement level, by grade: Selected years 1990–2003

Grade, percentile, and achievement level	1990 ¹	1992 ¹	1996 ¹	1996	2000 ¹	2000	2003
Average scale score							
Grade 4	0.93	0.72	0.90	1.01	0.86	0.88	0.22
Grade 8	1.28	0.89	1.06	0.94	0.78	0.83	0.26
Grade 12	1.11	0.87	1.00	1.03	0.93	1.00	—
Percentile							
Grade 4							
10th	2.14	0.90	1.22	1.34	1.11	1.18	0.28
25th	0.97	1.34	1.30	1.82	0.95	1.03	0.38
50th	1.30	0.98	1.04	0.96	1.05	1.28	0.26
75th	1.03	1.05	0.65	0.94	1.04	1.13	0.23
90th	1.61	0.87	1.16	1.19	1.01	1.10	0.25
Grade 8							
10th	2.28	0.94	1.88	1.72	1.42	1.74	0.58
25th	1.53	0.95	1.52	1.16	1.01	0.91	0.36
50th	1.36	1.66	1.14	0.82	0.81	1.02	0.26
75th	1.28	0.80	1.61	1.18	0.96	0.73	0.28
90th	2.15	1.10	1.24	1.18	1.63	0.95	0.42
Grade 12							
10th	0.98	1.29	1.10	1.46	1.31	1.84	—
25th	1.32	1.49	1.39	1.17	0.97	1.17	—
50th	1.70	1.17	1.19	1.38	0.79	0.95	—
75th	1.37	1.45	1.29	1.51	0.97	0.97	—
90th	1.62	0.84	1.31	1.06	1.35	0.85	—
Percentage at achievement level							
Grade 4							
Below Basic	1.36	1.03	1.24	1.31	1.07	1.29	0.28
At or above Basic	1.36	1.03	1.24	1.31	1.07	1.29	0.28
At or above Proficient	1.19	1.00	0.90	1.05	1.05	1.00	0.31
At Advanced	0.40	0.25	0.32	0.32	0.27	0.28	0.12
Grade 8							
Below Basic	1.43	1.13	1.10	1.03	0.81	0.94	0.28
At or above Basic	1.43	1.13	1.10	1.03	0.81	0.94	0.28
At or above Proficient	1.06	0.97	1.12	0.99	0.90	0.83	0.27
At Advanced	0.33	0.38	0.55	0.45	0.45	0.39	0.15
Grade 12							
Below Basic	1.59	1.14	1.27	1.11	1.05	1.15	—
At or above Basic	1.59	1.14	1.27	1.11	1.05	1.15	—
At or above Proficient	0.92	0.75	1.05	0.86	0.93	0.90	—
At Advanced	0.30	0.26	0.32	0.29	0.34	0.39	—

— Not available.

¹Testing accommodations (e.g., extended time, small group testing) for children with disabilities and limited-English-proficient students were not permitted.

SOURCE: U.S. Department of Education, NCES, (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451) and NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), selected years 1990–2003 Mathematics Assessments.

Mathematics Performance of Students in Grades 4 and 8

Table S11-2. Standard errors for the average mathematics scale score for 4th- and 8th-graders, by selected student and school characteristics: 2003

Student or school characteristic	Grade 4	Grade 8
Total	0.22	0.26
Sex		
Male	0.26	0.31
Female	0.23	0.31
Race/ethnicity		
American Indian	1.00	1.84
Asian/Pacific Islander	1.11	1.27
Black	0.37	0.53
White	0.21	0.26
Hispanic	0.41	0.63
Parents' education		
Less than high school	—	0.55
High school diploma or equivalent	—	0.40
Some college, including vocational/technical	—	0.38
Bachelor's degree or higher	—	0.34
Current mathematics class in 8th grade		
Group 1	—	0.27
Group 2	—	0.40
Control		
Public	0.22	0.27
Private	1.17	1.66
Location		
Central city	0.48	0.59
Urban fringe/large town	0.30	0.46
Rural/small town	0.31	0.35
Enrollment		
Less than 300	0.46	0.79
300–999	0.30	0.35
1,000 or more	1.53	0.68
Percent of students in school eligible for free or reduced-price lunch		
0–10	0.46	0.62
11–25	0.39	0.60
26–50	0.31	0.44
51–75	0.41	0.67
76–100	0.48	0.72

— Not available.

SOURCE: U.S. Department of Education, NCES. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004–451), NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>), and previously unpublished tabulation (November 2003). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 2003 Mathematics Assessment.

Mathematics Performance of Students in Grades 4 and 8

Table S11-3. Standard errors for the average mathematics scale score for public school 4th- and 8th-graders and change in score since 1990 and 1992, by state and jurisdiction: 2003

State or jurisdiction	Grade 4		Grade 8	
	Average scale score in 2003	Change from 1992 average scale score	Average scale score in 2003	Change from 1990 average scale score
Nation	0.22	0.83	0.27	1.38
Alabama	1.18	1.96	1.50	1.87
Alaska	0.80	—	0.94	—
Arizona	1.07	1.52	1.20	1.80
Arkansas	0.92	1.28	1.23	1.51
California	0.91	1.81	1.15	1.73
Colorado	1.02	1.41	1.07	1.40
Connecticut	0.76	1.37	1.17	1.55
Delaware	0.48	0.91	0.67	1.14
Florida	1.06	1.84	1.51	1.96
Georgia	1.00	1.59	1.15	1.76
Hawaii	0.96	1.62	0.78	1.11
Idaho	0.68	1.17	0.91	1.19
Illinois	1.06	—	1.17	2.08
Indiana	0.89	1.37	1.12	1.61
Iowa	0.71	1.24	0.82	1.35
Kansas	1.04	—	1.26	—
Kentucky	1.09	1.48	1.23	1.69
Louisiana	1.05	1.80	1.51	1.95
Maine	0.71	1.23	0.87	—
Maryland	1.27	1.81	0.96	1.72
Massachusetts	0.80	1.42	0.89	—
Michigan	0.93	1.95	1.98	2.32
Minnesota	0.93	1.30	1.07	1.42
Mississippi	1.04	1.50	1.07	—
Missouri	0.94	1.52	1.08	—
Montana	0.83	—	0.79	1.22
Nebraska	0.79	1.46	0.92	1.39
Nevada	0.78	—	0.82	—
New Hampshire	0.86	1.44	0.83	1.23
New Jersey	1.09	1.84	1.14	1.60
New Mexico	1.06	1.79	0.98	1.21
New York	0.88	1.53	1.07	1.78
North Carolina	0.78	1.34	0.99	1.45
North Dakota	0.68	1.02	0.78	1.45
Ohio	1.03	1.56	1.30	1.66
Oklahoma	0.97	1.38	1.10	1.72
Oregon	0.91	—	1.29	1.61
Pennsylvania	1.08	1.73	1.08	1.94
Rhode Island	1.04	1.85	0.72	0.93
South Carolina	0.93	1.42	1.28	—
South Dakota	0.70	—	0.77	—
Tennessee	0.99	1.68	1.78	—

See notes at end of table.

Mathematics Performance of Students in Grades 4 and 8

Table S11-3. Standard errors for the average mathematics scale score for public school 4th- and 8th-graders and change in score since 1990 and 1992, by state and jurisdiction: 2003—Continued

State or jurisdiction	Grade 4		Grade 8	
	Average scale score in 2003	Change from 1992 average scale score	Average scale score in 2003	Change from 1990 average scale score
Texas	0.89	1.50	1.13	1.77
Utah	0.78	1.24	1.02	—
Vermont	0.75	—	0.76	—
Virginia	1.08	1.69	1.29	2.00
Washington	0.95	—	0.95	—
West Virginia	0.84	1.35	1.18	1.52
Wisconsin	0.86	1.37	1.28	1.80
Wyoming	0.60	1.11	0.68	0.96
Other jurisdictions				
District of Columbia	0.66	0.84	0.79	1.17
DDESS	0.69	—	1.48	—
DoDDS	0.45	—	0.73	—

— Not available.

SOURCE: U.S. Department of Education, NCES. (2003). *The Nation's Report Card: Mathematics Highlights 2003* (NCES 2004-451), NAEP web data tool (<http://nces.ed.gov/nationsreportcard/naepdata/>), and previously unpublished tabulation (November 2003). Data from U.S. Department of Education, NCES, National Assessment of Educational Progress (NAEP), 1990, 1992, and 2003 Mathematics Assessments.