

EA 2.1

READING PROFICIENCY FOR CHILDREN AGES 9, 13, AND 17

Literacy proficiency and reading achievement are vital to educational reform efforts in the United States.²¹ One of the National Education Goals for the year 2000, adopted by Congress, is for adult literacy and lifelong learning, with objectives of having all students demonstrate competency in English and having all adults be literate.²² Levels of reading achievement will help measure the extent to which these goals are being met.

In order to monitor progress in the reading achievement of students in the United States, the National Assessment of Educational Progress (NAEP) has conducted national assessments of the reading performance of 9-, 13-, and 17-year-olds. There are five levels of reading proficiency reported by NAEP, ranging from Level 150 (completing simple, discrete reading tasks) to Level 350 (learning from specialized reading materials).²³ The following tables report the average reading proficiency scores of students in the three age groups between 1971 and 1996.

Trends in Reading Proficiency Scores. Among 9-year-olds, average reading proficiency scores improved between 1971 and 1980, declined between 1980 and 1984, and remained steady until 1996, so that the average score in 1996 (212) was similar to the score in 1975 (210) (see Table EA 2.1.A). Among 13-year-olds, average reading proficiency scores varied from year to year and were similar in 1996 (259) and 1971 (255) (see Table EA 2.1.B). Among 17-year-olds, average scores increased between 1971 and 1988, remained stable between 1988 and 1992, and then showed a slight decline through 1996, so that the average score in 1996 (287) was similar to the score in 1975 (286) (see Table EA 2.1.C).

Differences by Gender. Females have scored consistently higher than males over time and for all ages. For example, among 13-year-olds in 1996, females had an average score of 265, compared with an average score of 253 for males (see Table EA 2.1.B).

Differences by Race and Hispanic Origin.²⁴ There are large and consistent differences in reading proficiency by race and Hispanic origin among all age groups; for example, among 17-year-olds in 1996, whites had higher average reading proficiency scores (294) than either blacks (265) or Hispanics (265) (see Table EA 2.1.C). However, black 17-year-olds had especially high gains in achievement relative to whites in the 1980s; thus, the gaps in reading proficiency scores between whites and blacks have narrowed since the mid-1970s among 17-year-olds (see Figure EA 2.1). The gap has also narrowed between white and Hispanic 17-year-olds (see Figure EA 2.1).

²¹Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics.

²²National Education Goals Panel. 1997. *The National Education Goals Report: Building a Nation of Learners, 1997* (Goal 6, p. xvi). Washington, D.C.: U.S. Government Printing Office.

²³NAEP has regularly been conducting assessments of students in public and private schools in the United States in order to monitor trends in academic achievement in core curriculum areas since the 1970s. NAEP uses proficiency scales that range from 0 to 500. To give meaning to the results, students' performance is characterized at five levels along the proficiency scales (150, 200, 250, 300, 350).

²⁴Estimates for whites and blacks exclude Hispanics of those races.

Differences by Parents' Education Level.²⁵ Average reading proficiency levels vary dramatically by parents' education level;²⁶ for example, among 13-year-olds and 17-year-olds in 1996, the lowest average reading proficiency scores were among teens whose better-educated parent did not have a high school education, while the highest scores were among teens who had a parent with post-high school education. In fact, the average reading proficiency score among 13-year-old children of parents with post-high school education levels (270) was similar to the average score among 17-year-old children of parents without a high school degree (267) (see Tables EA 2.1.B and EA 2.1.C).

Differences by Type of School. Average reading proficiency scores have been consistently higher among students attending nonpublic schools than among students attending public schools. This is true for every age group and every year reported (see Tables EA 2.1.A, EA 2.1.B, and EA 2.1.C).

²⁵Parents' education level refers to the highest level of education completed by either parent.

²⁶Parents' education level is not reported at age 9 because approximately one-third of these students did not know their parents' education level.

Table EA 2.1.A

Average reading proficiency for children age 9 in the United States, by gender, race and Hispanic origin,^a and type of school: selected years, 1971-1996

	1971	1975	1980	1984	1988	1990	1992	1994	1996
Total	208	210	215	211	212	209	211	211	212
Gender									
Male	201	204	210	208	208	204	206	207	207
Female	214	216	220	214	216	215	215	215	218
Race and Hispanic origin^a									
White, non-Hispanic	214	217	221	218	218	217	218	218	220
Black, non-Hispanic	170	181	189	186	189	182	185	185	190
Hispanic	—	183	190	187	194	189	192	186	194
Type of school									
Public	—	—	214	209	210	208	209	209	210
Nonpublic	—	—	227	223	223	228	225	225	227

— = not available

^aPersons of Hispanic origin may be of any race.

Note: The reading proficiency scale ranges from 0 to 500:

Level 150: Simple, discrete reading tasks

Level 200: Partial skills and understanding

Level 250: Interrelates ideas and makes generalizations

Level 300: Understands complicated information

Level 350: Learns from specialized reading materials

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table C.16.

Table EA 2.1.B

Average reading proficiency for children age 13 in the United States, by gender, race and Hispanic origin,^a parents' education level,^b and type of school: selected years, 1971-1996

	1971	1975	1980	1984	1988	1990	1992	1994	1996
Total	255	256	259	257	258	257	260	258	259
Gender									
Male	250	250	254	253	252	251	254	251	253
Female	261	262	263	262	263	263	265	266	265
Race and Hispanic origin^a									
White, non-Hispanic	261	262	264	263	261	262	266	265	267
Black, non-Hispanic	222	226	233	236	243	242	238	234	236
Hispanic	—	233	237	240	240	238	239	235	240
Parents' education level^b									
Less than high school	238	239	239	240	247	241	239	237	241
Graduated high school	256	255	254	253	253	251	252	251	252
Some education after high school	270	270	271	268	265	267	270	269	270
Type of school									
Public	—	—	257	255	256	255	257	256	257
Nonpublic	—	—	271	271	268	270	276	276	274

— = not available

^aPersons of Hispanic origin may be of any race.

^bParents' education level refers to the highest level of education completed by either parent.

Note: The reading proficiency scale ranges from 0 to 500:

Level 150: Simple, discrete reading tasks

Level 200: Partial skills and understanding

Level 250: Interrelates ideas and makes generalizations

Level 300: Understands complicated information

Level 350: Learns from specialized reading materials

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table C.17.

Table EA 2.1.C

Average reading proficiency for children age 17 in the United States, by gender, race and Hispanic origin,^a parents' education level,^b and type of school: selected years, 1971-1996

	1971	1975	1980	1984	1988	1990	1992	1994	1996
Total	285	286	286	289	290	290	290	288	287
Gender									
Male	279	280	282	284	286	284	284	282	280
Female	291	291	289	294	294	297	296	295	294
Race and Hispanic origin^a									
White, non-Hispanic	291	293	293	295	295	297	297	296	294
Black, non-Hispanic	239	241	243	264	274	267	261	266	265
Hispanic	—	252	261	268	271	275	271	263	265
Parents' education level^b									
Less than high school	261	263	262	269	267	270	271	268	267
Graduated high school	283	281	278	281	282	283	281	276	273
Some education after high school	302	301	299	301	300	300	299	299	297
Type of School									
Public	—	—	284	287	289	289	288	286	286
Nonpublic	—	—	298	303	300	311	310	306	294

— = not available

^aPersons of Hispanic origin may be of any race.

^bParents' education level refers to the highest level of education completed by either parent.

Note: The reading proficiency scale ranges from 0 to 500:

Level 150: Simple, discrete reading tasks

Level 200: Partial skills and understanding

Level 250: Interrelates ideas and makes generalizations

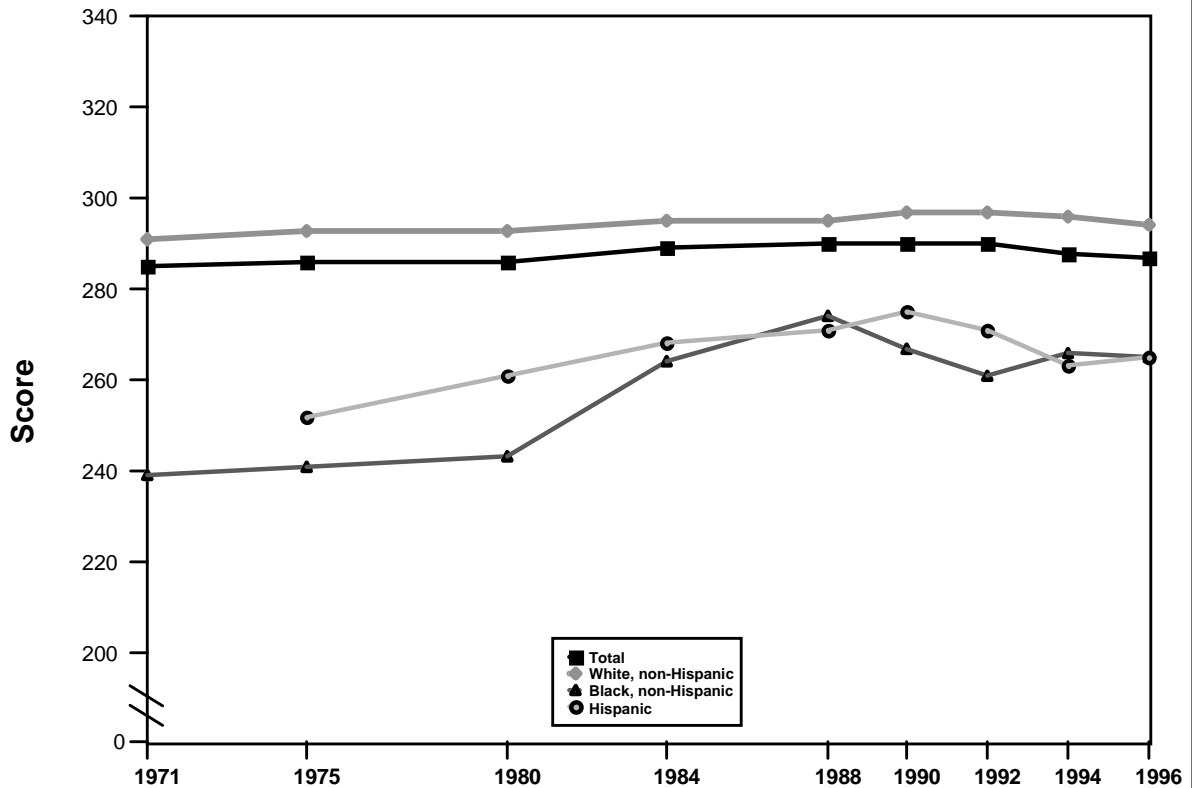
Level 300: Understands complicated information

Level 350: Learns from specialized reading materials

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table C.18.

Figure EA 2.1

Average reading proficiency for children age 17 in the United States, by race and Hispanic origin:^a selected years, 1971-1996



^aPersons of Hispanic origin may be of any race.

Note: The reading proficiency scale ranges from 0 to 500.

Level 150: Simple, discrete reading tasks

Level 200: Partial skills and understanding

Level 250: Interrelates ideas and makes generalizations

Level 300: Understands complicated information

Level 350: Learns from specialized reading materials

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table C.18.

EA 2.2

MATHEMATICS PROFICIENCY FOR CHILDREN AGES 9, 13, AND 17

One of the National Education Goals for the year 2000, adopted by Congress, is to improve the relative standing of students in the United States in mathematics achievement.²⁷ In a 1995 comparison of 8th-graders in the United States with their peers in 40 other countries, the Third International Math and Science Study showed that students in the United States had significantly lower overall mathematics proficiency scores than students in 20 countries, had similar scores to students in 13 countries, and had higher scores than students in 7 countries.²⁸

In order to monitor progress in the mathematics achievement of students in the United States, the National Assessment of Educational Progress (NAEP) has conducted national assessments of the mathematics performance of 9-, 13-, and 17-year-olds. There are five levels of mathematics proficiency reported by NAEP, ranging from Level 150 (understanding simple arithmetic facts) to Level 350 (multi-step problem solving and algebra).²⁹ The following tables report the average mathematics proficiency scores of students in the three age groups between 1973 and 1996.

Trends in Mathematics Proficiency Scores. Among 9-year-olds, average mathematics proficiency scores remained the same between 1973 and 1982 and then increased substantially to 231 in 1994; scores remained stable from 1994 to 1996 (see Table EA 2.2.A). Among 13-year-olds, mathematics proficiency scores increased between 1978 (264) and 1994 (274); again, scores remained stable from 1994 to 1996 (see Table EA 2.2.B). Among 17-year-olds, average proficiency scores declined between 1973 and 1982, after which they increased and stabilized at a level slightly higher than that obtained in 1973 (see Table EA 2.2.C).

Differences by Gender. In 1996, mathematics proficiency scores were higher for males than for females across all age groups; however, differences are small and in many years were virtually nonexistent for 9- and 13-year-olds. Proficiency scores in 1996 were higher for males by an average of 4 points for 9-year-olds and 13-year-olds and 5 points for 17-year-olds.

Differences by Race and Hispanic Origin.³⁰ There are consistently large differences in mathematics proficiency by race and Hispanic origin. For example, among 17-year-olds in 1996, blacks and Hispanics had lower proficiency scores (286 and 292, respectively) than whites (313) (see Table EA 2.2.C); however, black and Hispanic 17-year-olds had substantial gains in achievement between 1973 and 1996 (see Figure EA 2.2).

Differences by Parents' Education Level.³¹ There are large variations in average mathematics proficiency levels by level of parental education for 13- and 17-year-olds (see Tables EA 2.2.B and EA 2.2.C).³² For example, in 1996, 13-year-olds whose better-educated parent did not have a high school education had the lowest average proficiency scores (254), while those whose parent(s) had graduated from college had the highest scores (283) (see Table EA 2.2.B).

Differences by Type of School. Average mathematics proficiency scores among students in public schools have been consistently lower than average scores among students in nonpublic schools. This is true for every age group and every year reported (see Tables EA 2.2.A, EA 2.2.B, and EA 2.2.C).

²⁷National Education Goals Panel. 1997. *The National Education Goals Report: Building a Nation of Learners, 1997* (Goal 5, p. xvi). Washington, D.C.: U.S. Government Printing Office.

²⁸U.S. Department of Education, National Center for Education Statistics. 1997. *Pursuing Excellence: A Study of U.S. Eighth-Grade Mathematics and Science Teaching, Learning, Curriculum, and Achievement in International Context*. No. 97-198. Washington, D.C.: U.S. Government Printing Office.

²⁹NAEP has regularly been conducting assessments of students in public and private schools in the United States in order to monitor trends in academic achievement in core curriculum areas since the 1970s. NAEP uses proficiency scales that range from 0 to 500. To give meaning to the results, students' performance is characterized at five levels along the proficiency scales (150, 200, 250, 300, 350).

³⁰Estimates for whites and blacks exclude Hispanics of those races.

³¹Parents' education level refers to the highest level of education completed by either parent.

³²Parents' education level is not reported at age 9 because approximately one-third of these students did not know their parent's education level.

Table EA 2.2.A

Average mathematics proficiency for children age 9 in the United States, by gender, race and Hispanic origin,^a and type of school: selected years, 1973-1996

	1973	1978	1982	1986	1990	1992	1994	1996
	—	—	—	—	—	—	—	—
Total	219	219	219	222	230	230	231	231
Gender								
Male	218	217	217	222	229	231	232	233
Female	220	220	221	222	230	228	230	229
Race and Hispanic origin^a								
White, non-Hispanic	225	224	224	227	235	235	237	237
Black, non-Hispanic	190	192	195	202	208	208	212	212
Hispanic	202	203	204	205	214	212	210	215
Type of school								
Public	—	217	217	220	229	228	229	230
Nonpublic	—	231	232	230	238	242	245	239

— = not available

^aPersons of Hispanic origin may be of any race.

Note: The mathematics proficiency scale ranges from 0 to 500:

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understanding

Level 250: Numerical operations and beginning problem solving

Level 300: Moderately complex procedures and reasoning

Level 350: Multi-step problem solving and algebra

Sources: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics; data for 1973 appear in *NAEP 1992 Trends in Academic Progress*. Report No. 23-TR01. Washington, D.C.: National Center for Education Statistics, Table B.16.

Table EA 2.2.B

Average mathematics proficiency for children age 13 in the United States, by gender, race and Hispanic origin,^a parents' education level^b and type of school: selected years, 1973-1996

	1973	1978	1982	1986	1990	1992	1994	1996
	—	—	—	—	—	—	—	—
Total	266	264	269	269	270	273	274	274
Gender								
Male	265	264	269	270	271	274	276	276
Female	267	265	268	268	270	272	273	272
Race and Hispanic origin^a								
White, non-Hispanic	274	272	274	274	276	279	281	281
Black, non Hispanic	228	230	240	249	249	250	252	252
Hispanic	239	238	252	254	255	259	256	256
Parents' education level^b								
Less than high school	—	245	251	252	253	256	255	254
Graduated high school	—	263	263	263	263	263	266	267
Some education after high school	—	273	275	274	277	278	277	278
Graduated college	—	284	282	280	280	283	285	283
Type of school								
Public	—	263	267	269	269	272	273	273
Nonpublic	—	279	281	276	280	283	285	286

— = not available

^aPersons of Hispanic origin may be of any race.

^bParents' education level refers to the highest level of education completed by either parent.

Note: The mathematics proficiency scale ranges from 0 to 500:

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understanding

Level 250: Numerical operations and beginning problem solving

Level 300: Moderately complex procedures and reasoning

Level 350: Multi-step problem solving and algebra

Sources: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics; data for 1973 appear in *NAEP 1992 Trends in Academic Progress*. Report No. 23-TR01. Washington, D.C.: National Center for Education Statistics, Table B.17.

Table EA 2.2.C

Average mathematics proficiency for children age 17 in the United States, by gender, race and Hispanic origin,^a parents' education level,^b and type of school: selected years, 1973-1996

	1973	1978	1982	1986	1990	1992	1994	1996
Total	304	300	299	302	305	307	306	307
Gender								
Male	309	304	302	305	306	309	309	310
Female	301	297	296	299	303	305	304	305
Race and Hispanic origin^a								
White, non-Hispanic	310	306	304	308	310	312	312	313
Black, non Hispanic	270	268	272	279	289	286	286	286
Hispanic	277	276	277	283	284	292	291	292
Parents' education level^b								
Less than high school	—	280	279	279	285	286	284	281
Graduated high school	—	294	293	293	294	298	295	297
Some education after high school	—	305	304	305	308	308	305	307
Graduated college	—	317	312	314	316	316	318	317
Type of school								
Public	—	300	297	301	304	305	304	306
Nonpublic	—	314	311	320	318	320	319	316

— = not available

^aPersons of Hispanic origin may be of any race.

^bParents' education level refers to the highest level of education completed by either parent.

Note: The mathematics proficiency scale ranges from 0 to 500:

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understanding

Level 250: Numerical operations and beginning problem solving

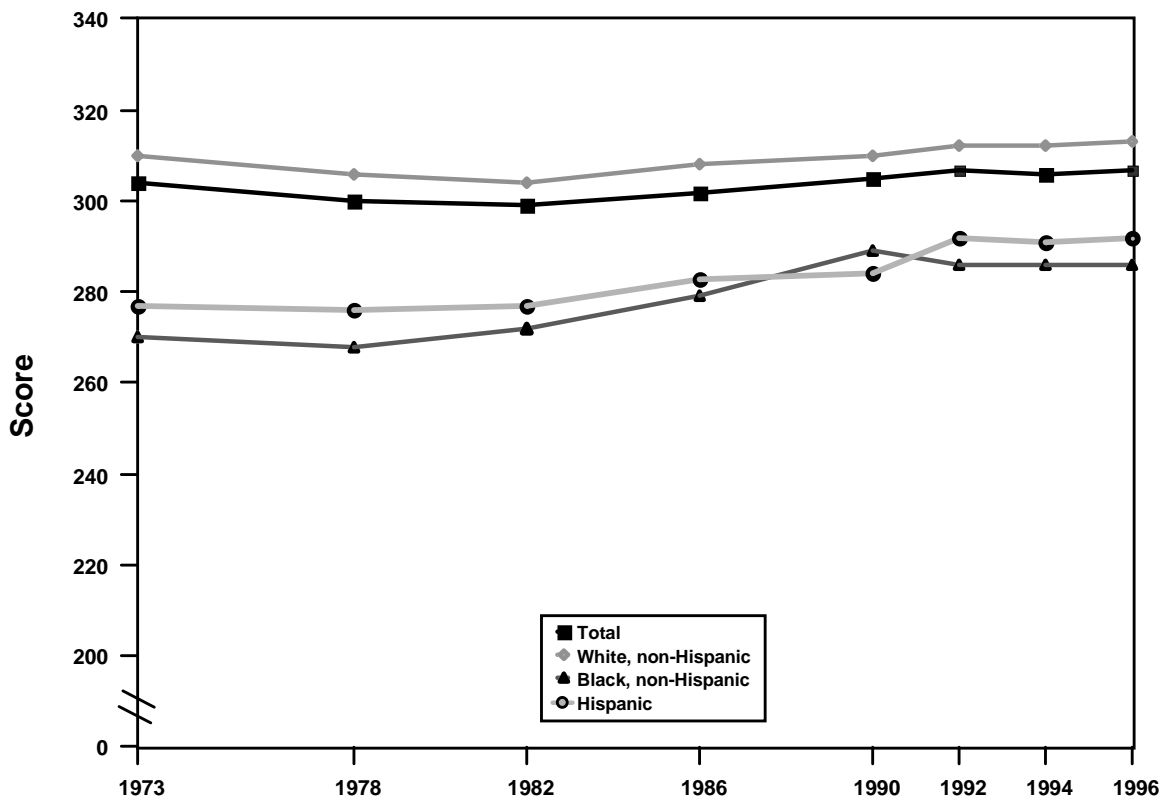
Level 300: Moderately complex procedures and reasoning

Level 350: Multi-step problem solving and algebra

Sources: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics; data for 1973 appear in *NAEP 1992 Trends in Academic Progress*. Report No. 23-TR01. Washington, D.C.: National Center for Education Statistics, Table B.18.

Figure EA 2.2

Average mathematics proficiency for children age 17 in the United States, by race and Hispanic origin:^a selected years, 1973-1996



^aPersons of Hispanic origin may be of any race.

Note: The mathematics proficiency scale ranges from 0 to 500.

Level 150: Simple arithmetic facts

Level 200: Beginning skills and understanding

Level 250: Numerical operations and beginning problem solving

Level 300: Moderately complex procedures and reasoning

Level 350: Multi-step problem solving and algebra

Sources: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics; data for 1973 appear in *NAEP 1992 Trends in Academic Progress*. Report No. 23-TR01. Washington, D.C.: National Center for Education Statistics, Table B.18.

EA 2.3

SCIENCE PROFICIENCY FOR CHILDREN AGES 9, 13, AND 17

One of the National Education Goals for the year 2000, adopted by Congress, is to improve the relative standing of students in the United States in science achievement.³³ In a 1995 comparison of 8th-graders in the United States with 8th-graders in 40 other countries, the Third International Math and Science Study showed that students in the United States had significantly lower overall science proficiency scores than students in 9 countries, had similar scores to students in 16 countries, and had higher scores than students in 15 countries.³⁴

In order to present time trends in science proficiency levels, the National Assessment of Educational Progress (NAEP) reports five different proficiency levels, ranging from Level 150 (knows everyday science facts) to Level 350 (integrates specialized scientific information).³⁵ The following tables report the average science proficiency scores of students in the three age groups between 1977 and 1996.

Trends in Science Proficiency Scores. Average science proficiency scores have increased among all age groups since 1977. Among 9-year-olds, average science proficiency scores increased between 1977 (220) and 1994 (231) and remained stable through 1996 (230) (see Table EA 2.3.A). Similarly, among 13-year-olds, average scores increased between 1977 (247) and 1994 (257) and remained constant through 1996 (256) (see Table EA 2.3.B). Among 17-year-olds, average science proficiency scores declined between 1977 (290) and 1982 (283), after which they increased to 296 in 1996 (see Table EA 2.3.C). Thus, gains in science proficiency levels among 17-year-olds from 1977 to 1996 were not as great as gains for the other two age groups.

Differences by Gender. Average science proficiency scores have been consistently higher for males than females over time and for all age groups, though differences are smaller among 9-year-olds. Among 13-year-olds in 1996, boys scored on average 9 points higher than girls; among 17-year-olds, the average difference was 8 points; and among 9-year-olds, males scored on average 4 points higher than females.

Differences by Race and Hispanic Origin.³⁶ There are large differences in science proficiency scores by race and Hispanic origin among all age groups. For example, among 17-year-olds in 1996, whites had higher average science proficiency scores (307) than blacks (260) or Hispanics (269) (see Table EA 2.3.C); however, black 17-year-olds had especially high gains in achievement since 1977 (see Figure EA 2.3). Black 9-year-olds and 13-year-olds also showed high gains in science achievement over time.

³³National Education Goals Panel. 1997. *The National Education Goals Report: Building a Nation of Learners, 1997* (Goal 5, p. xvi). Washington, D.C.: U.S. Government Printing Office.

³⁴U.S. Department of Education, National Center for Education Statistics. 1997. *Pursuing Excellence: A Study of U.S. Eighth-Grade Mathematics and Science Teaching, Learning, Curriculum, and Achievement in International Context*. No. 97-198. Washington, D.C.: U.S. Government Printing Office.

³⁵NAEP has regularly been conducting assessments of students in public and private schools in the United States in order to monitor trends in academic achievement in core curriculum areas since the 1970s. NAEP uses proficiency scales that range from 0 to 500. To give meaning to the results, students' performance is characterized at five levels along the proficiency scales (150, 200, 250, 300, 350).

³⁶Estimates for whites and blacks exclude Hispanics of those races.

Differences by Parents' Education Level.³⁷ Average science proficiency levels vary dramatically by level of parents' education.³⁸ For example, among 13-year-olds and 17-year-olds in 1996, the lowest average science proficiency scores were among teens whose better-educated parent did not have a high school education, while the highest scores were among teens who had a parent who had graduated from college. In 1996, the average science proficiency score among 13-year-old children of parents with a college education (266) was similar to the average score among 17-year-old children of parents without a high school diploma (261) (see Tables EA 2.3.B and EA 2.3.C).

Differences by Type of School. Average science proficiency scores have been consistently higher among students attending nonpublic schools than among students attending public schools. This is true for every age group and every year reported (see Tables EA 2.3.A, EA 2.3.B, and EA 2.3.C).

³⁷Parents' education level refers to the highest level of education completed by either parent.

³⁸Parents' education is not reported at age 9 because approximately one-third of these students did not know their parents' education level.

Table EA 2.3.A

Average science proficiency for children age 9 in the United States, by gender, race and Hispanic origin,^a and type of school: selected years, 1977-1996

	1977	1982	1986	1990	1992	1994	1996
Total	220	221	224	229	231	231	230
Gender							
Male	222	221	227	230	235	232	232
Female	218	221	221	227	227	230	228
Race and Hispanic origin^a							
White, non-Hispanic	230	229	232	238	239	240	239
Black, non-Hispanic	175	187	196	196	200	201	202
Hispanic	192	189	199	206	205	201	207
Type of school							
Public	218	220	223	228	229	230	229
Nonpublic	235	232	233	237	240	242	238

^aPersons of Hispanic origin may be of any race.

Note: The science proficiency scale ranges from 0 to 500:

Level 150: Knows everyday science facts

Level 200: Understands simple scientific principles

Level 250: Applies general scientific information

Level 300: Analyzes scientific procedures and data

Level 350: Integrates specialized scientific information

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table A.16.

Table EA 2.3.B

Average science proficiency for children age 13 in the United States, by gender, race and Hispanic origin,^a parents' education level,^b and type of school: selected years, 1977-1996

	1977	1982	1986	1990	1992	1994	1996
Total	247	250	251	255	258	257	256
Gender							
Male	251	256	256	259	260	259	261
Female	244	245	247	252	256	254	252
Race and Hispanic origin^a							
White, non-Hispanic	256	257	259	264	267	267	266
Black, non Hispanic	208	217	222	226	224	224	226
Hispanic	213	226	226	232	238	232	232
Parents' education level^b							
Less than high school	224	225	229	233	234	234	232
Graduated high school	245	243	245	247	246	247	248
Some education after high school	260	259	258	263	266	260	260
Graduated college	266	264	264	268	269	269	266
Type of school							
Public	245	249	251	254	257	255	255
Nonpublic	268	264	263	269	265	268	268

^aPersons of Hispanic origin may be of any race.

^bParents' education level refers to the highest level of education completed by either parent.

Note: The science proficiency scale ranges from 0 to 500:

Level 150: Knows everyday science facts

Level 200: Understands simple scientific principles

Level 250: Applies general scientific information

Level 300: Analyzes scientific procedures and data

Level 350: Integrates specialized scientific information

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table A.17.

Table EA 2.3.C

Average science proficiency for children age 17 in the United States, by gender, race and Hispanic origin^a, parents' education level^b, and type of school: selected years, 1977-1996

	1977	1982	1986	1990	1992	1994	1996
Total	290	283	289	290	294	294	296
Gender							
Male	297	292	295	296	299	300	300
Female	282	275	282	285	289	289	292
Race and Hispanic origin^a							
White, non-Hispanic	298	293	298	301	304	306	307
Black, non Hispanic	240	235	253	253	256	257	260
Hispanic	262	249	259	262	270	261	269
Parents' education level^b							
Less than high school	265	259	258	261	262	256	261
Graduated high school	284	275	277	276	280	279	282
Some education after high school	296	290	295	297	296	295	297
Graduated college	309	300	304	306	308	311	308
Type of school							
Public	288	282	287	289	292	292	295
Nonpublic	308	292	321	308	312	310	303

^aPersons of Hispanic origin may be of any race.

^bParents' education level refers to the highest level of education completed by either parent.

Note: The science proficiency scale ranges from 0 to 500:

Level 150: Knows everyday science facts

Level 200: Understands simple scientific principles

Level 250: Applies general scientific information

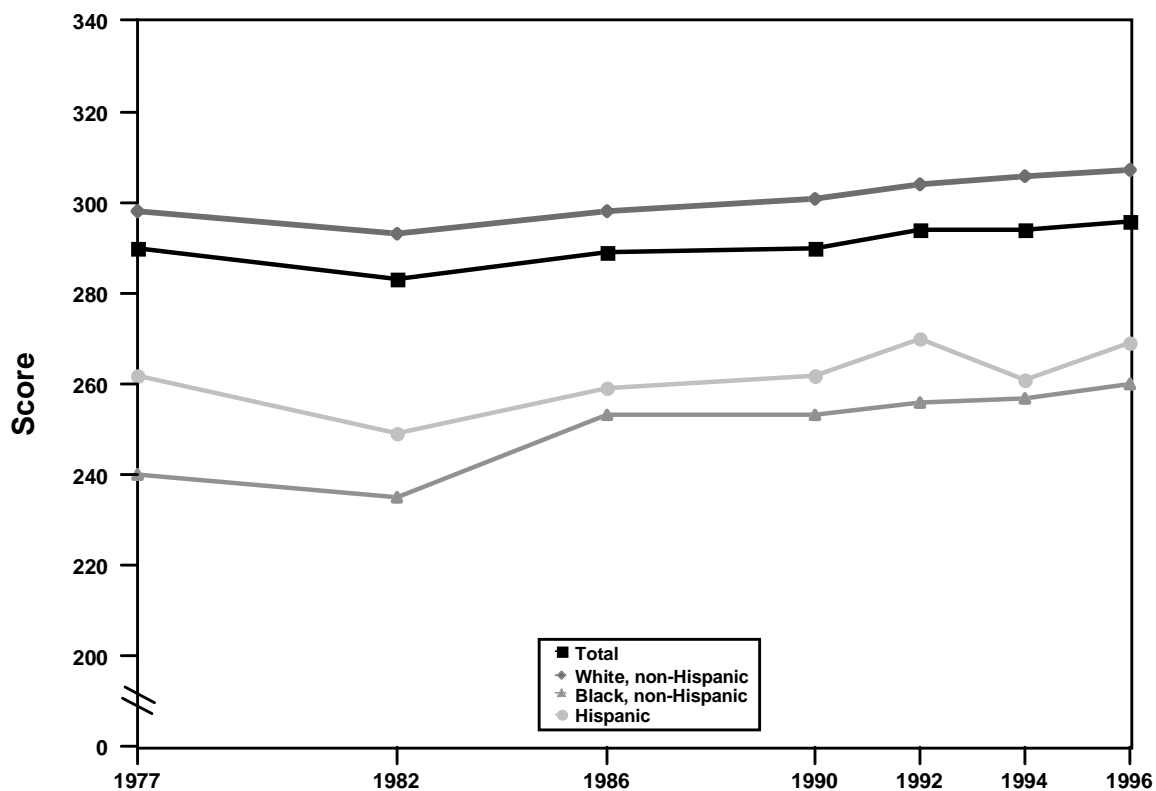
Level 300: Analyzes scientific procedures and data

Level 350: Integrates specialized scientific information

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table A.18.

Figure EA 2.3

Average science proficiency for children age 17 in the United States, by race and Hispanic origin:^a selected years, 1977-1996



^aPersons of Hispanic origin may be of any race.

Note: The science proficiency scale ranges from 0 to 500.

Level 150: Knows everyday science facts

Level 200: Understands simple scientific principles

Level 250: Applies general scientific information

Level 300: Analyzes scientific procedures and data

Level 350: Integrates specialized scientific information

Source: Campbell, J.R., Voelkl, K.E., and Donahue, P.L. 1997. *NAEP 1996 Trends in Academic Progress*. NCES 97-985. Washington, D.C.: National Center for Education Statistics, Table A.18.

EA 2.4

ARTS PROFICIENCY FOR CHILDREN IN GRADE 8

Artistic expression is one of the key vehicles for individual creativity and for the reflection and transmission of cultural messages. An understanding and appreciation of the arts therefore helps to nurture human creativity and fosters the celebration of a diverse cultural heritage. Recent research suggests that arts education can improve student performance in other intellectual and academic areas, including math and science.³⁹ College Board data show that children who have participated in sequential arts programs outperform their peers who have not had arts training on both the verbal and math components of the SAT.⁴⁰

The National Assessment of Educational Progress (NAEP) completed assessments of 8th-graders' music, visual arts, and theatre skills in 1997.⁴¹ For the music and visual arts assessments, data were collected on students' ability to respond to, analyze, or evaluate musical pieces or works of art.⁴² Average scores were coded on a scale of 0 to 300. Because ability scores had different ranges across music and the visual arts, comparisons should not be made between student results across disciplines. In other words, a score of 100 in the visual arts is not necessarily "better" than a score of 90 in music.

Differences by Gender. Girls outperformed boys in responding to and analyzing musical pieces (see Figure EA 2.4.A). For example, 8th-grade girls had an average music score of 160, whereas boys had an average score of 140. For evaluating visual artwork, girls' scores were 8 points higher than boys' scores (154 versus 146).

Differences by Race and Hispanic Origin.⁴³ There are significant differences in students' artistic evaluation skills by racial/ethnic group (see Table EA 2.4). White and Asian students had higher average music scores (158 and 152, respectively) than did black (130) and Hispanic students (127).

A similar pattern is seen for the visual arts (see Table EA 2.4). White and Asian students had higher average scores (159 and 153, respectively) than did black or Hispanic students (124 and 128, respectively).

Differences by Parents' Education Level.⁴⁴ Consistent with other NAEP assessments, higher levels of parental education were associated with higher levels of student performance in both music and the visual arts. For example, 8th-graders whose better-educated parent had graduated from college had higher music scores (159) than students whose parent(s) had some education past high school (150) or whose parent(s) was/were high school graduate(s) (139). Students whose better-educated parent did not finish high school had the lowest scores (129) (see Figure EA 2.4.B). The same pattern is evident for the visual arts scores.

Differences by Type of School. Students from nonpublic schools had higher scores for the visual arts (167) than did students from public schools (148).

³⁹Kane, E., and Frankonis, E. May, 1998. "Arts education in the New Millennium." *Education New York* 2 (5): 3.

⁴⁰Childress, J. May, 1998. "Art Education Pays Off." *Education New York*, 2 (5): 5.

⁴¹Unlike other NAEP assessments that are typically conducted on nationally representative samples of students in grades 4, 8, and 12, the 1997 arts assessments were conducted on grade 8 students only. This was due to budgetary constraints. Because the theatre assessment was conducted on a "targeted" sample rather than a nationally representative sample, results are not presented here. Finally, although NAEP conducted an arts assessment in music and visual arts in 1974 and 1978, considerable changes were made to the 1997 assessment such that comparable data for trends analyses are not possible. Therefore, only results from the 1997 NAEP music and visual arts assessments are presented here.

⁴²Students were also scored on their ability to *create* and *perform* works of art; however, only students' ability to *respond* to art will be discussed here.

⁴³Estimates for whites and blacks exclude Hispanics of those races.

⁴⁴Parents' education level refers to the highest level of education completed by either parent.

Table EA 2.4

Average music and visual arts proficiency for children in grade 8 in the United States, by gender, race and Hispanic origin,^a parents' education level,^b and type of school: 1997

	Music	Visual Arts
Total	150	150
Gender		
Male	140	146
Female	160	154
Race and Hispanic origin^a		
White, non-Hispanic	158	159
Black, non Hispanic	130	124
Hispanic	127	128
Asian	152	153
Parents' education level^b		
Less than high school	129	125
Graduated high school	139	138
Some education after high school	150	153
Graduated college	159	158
Type of school		
Public	149	148
Nonpublic	158	167

^aPersons of Hispanic origin may be of any race.

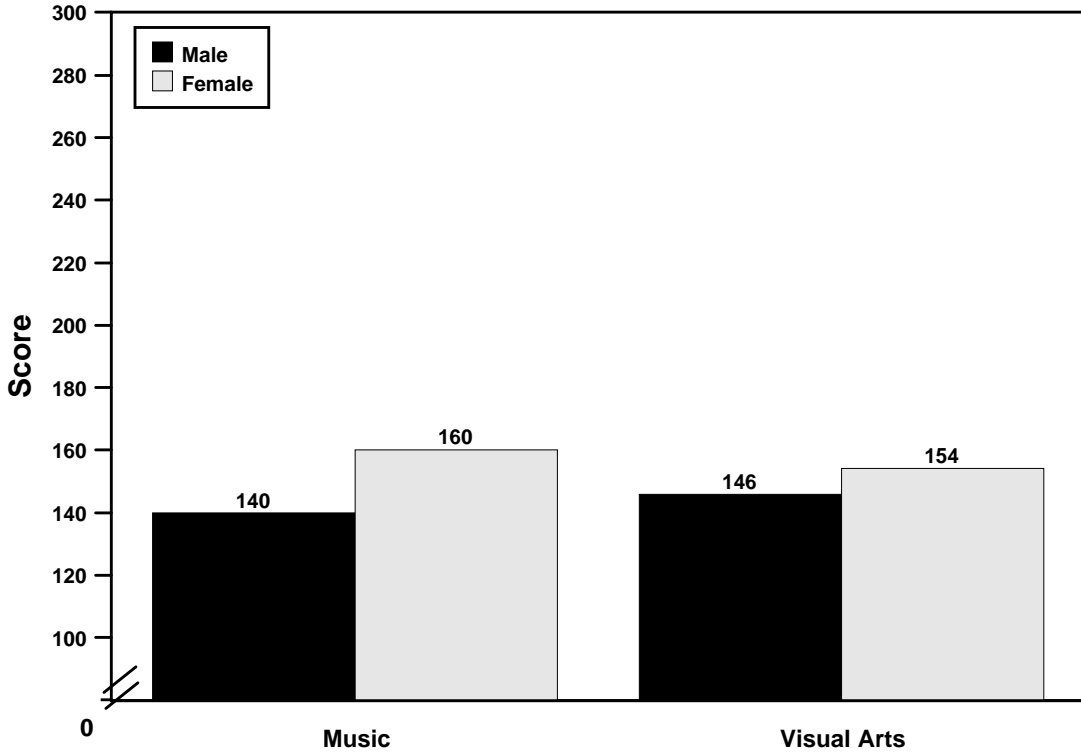
^bParents' education level refers to the highest level of education completed by either parent.

Note: The music and visual arts scale scores range from 0 to 300.

Source: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1997 Arts Assessment. As published in Persky, H.R., Sandene, B.A. and Askew, J.M. 1999. *The NAEP 1997 Arts Report Card: Eighth-Grade Findings from the National Assessment of Educational Progress*. NCES 1999-486. Washington, D.C.: National Center for Education Statistics, Tables 6.4, 6.5, 6.7, 6.8, 6.10, 6.11, 6.13, and 6.14.

Figure EA 2.4.A

Average music and visual arts proficiency scores for children in grade 8 in the United States, by gender: 1997

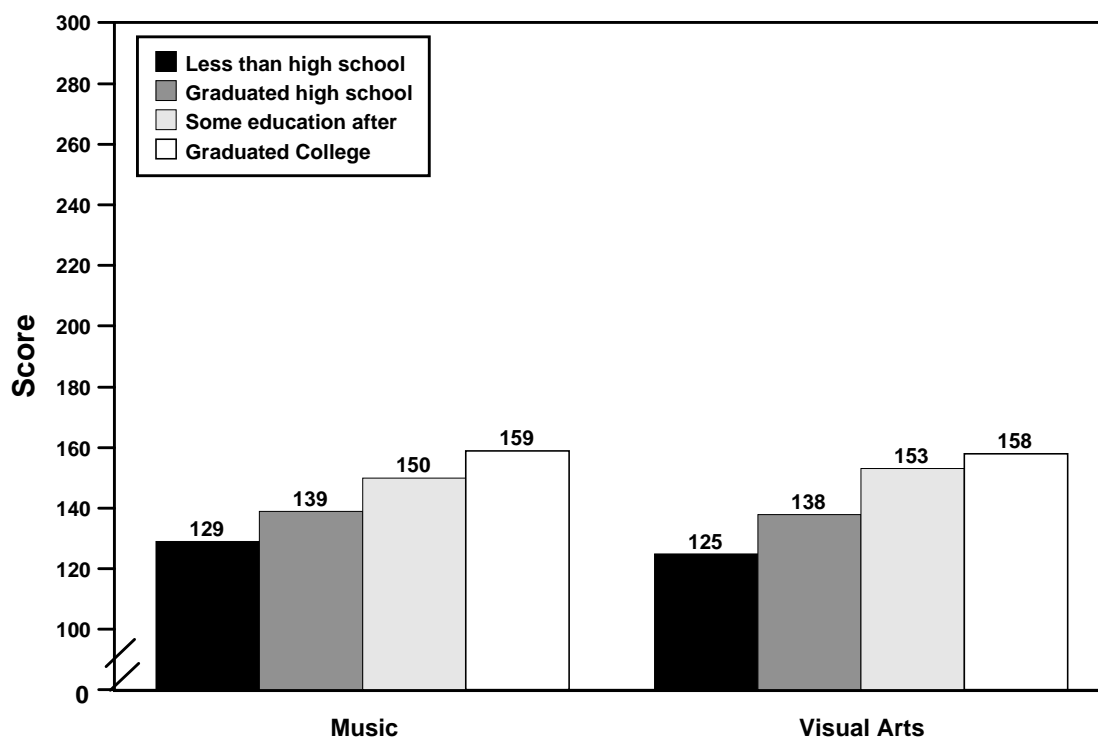


Note: The music and visual arts scale scores range from 0 to 300.

Source: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1997 Arts Assessment. As published in Persky, H.R., Sandene, B.A. and Askew, J.M. 1999. *The NAEP 1997 Arts Report Card: Eighth-Grade Findings from the National Assessment of Educational Progress*. NCES 1999-486. Washington, D.C.: National Center for Education Statistics, Tables 6.4 and 6.5.

Figure EA 2.4.B

Average music and visual arts proficiency scores for children in grade 8 in the United States, by parents' education level:^a 1997



^aParents' education level refers to the highest level of education completed by either parent.

Note: The music and visual arts scale scores range from 0 to 300.

Source: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1997 Arts Assessment. As published in Persky, H.R., Sandene, B.A. and Askew, J.M. 1999. *The NAEP 1997 Arts Report Card: Eighth-Grade Findings from the National Assessment of Educational Progress*. NCES 1999-486. Washington, D.C.: National Center for Education Statistics, Tables 6.13 and 6.14.