

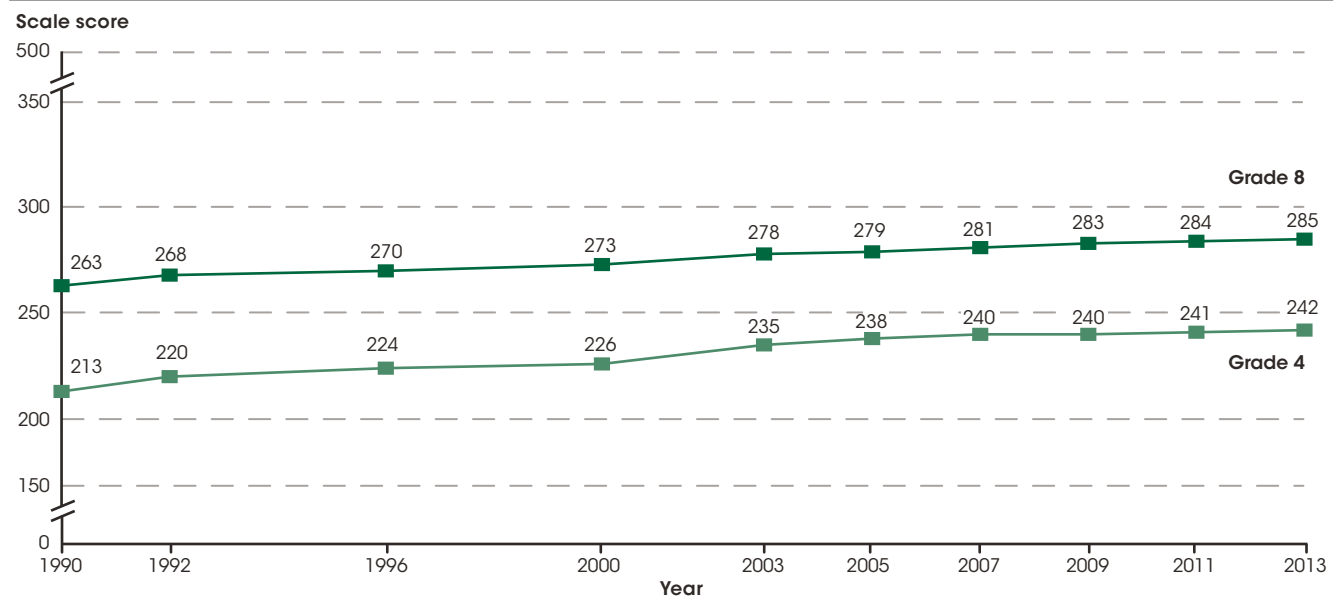
Mathematics Performance

The average 4th- and 8th-grade mathematics scores in 2013 were higher than the scores in all previous assessment years, according to data from the National Assessment of Educational Progress. At grade 12, the average mathematics score in 2013 was higher than in 2005 but not measurably different from the score in 2009.

The National Assessment of Educational Progress (NAEP) assesses student performance in mathematics at grades 4, 8, and 12. NAEP mathematics scores range from 0 to 500 for grades 4 and 8. The framework for the 12th-grade mathematics assessment was revised in 2005; as a result, the 2005, 2009, and 2013 results cannot be compared with those from previous years. At grade 12, mathematics scores on the revised assessment range from 0 to 300.

NAEP achievement levels define what students should know and be able to do: *Basic* indicates partial mastery of fundamental skills, and *Proficient* indicates demonstrated competency over challenging subject matter. NAEP mathematics assessments are administered periodically: prior to 2013, the most recent mathematics assessment data were collected at grades 4 and 8 in 2011 and at grade 12 in 2009.

Figure 1. Average mathematics scale scores of 4th- and 8th-grade students: Selected years, 1990–2013



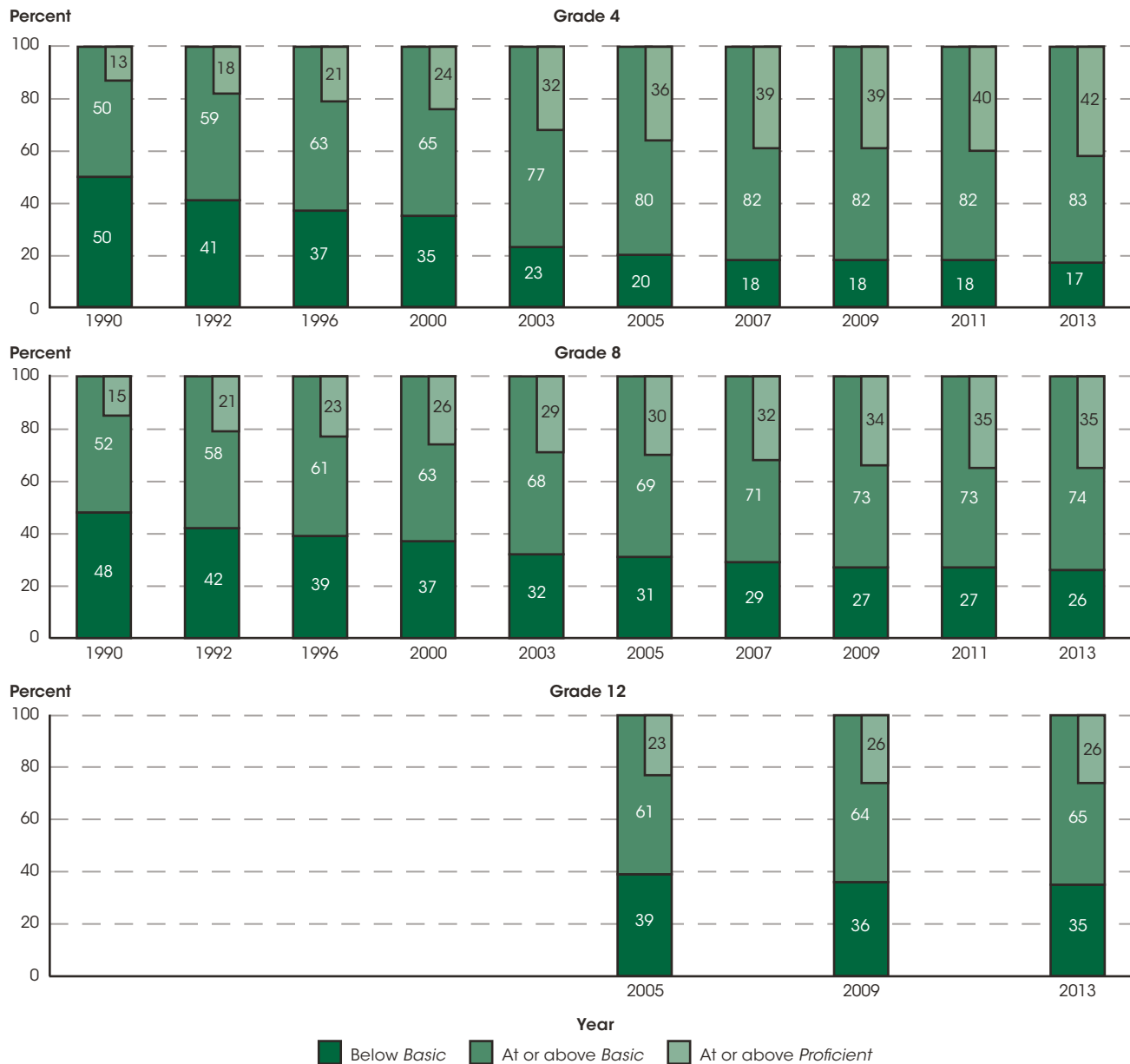
NOTE: Includes public and private schools. At grades 4 and 8, the National Assessment of Educational Progress (NAEP) mathematics scale ranges from 0 to 500. Testing accommodations (e.g., extended time, small group testing) for children with disabilities and English language learners were not permitted in 1990 and 1992.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), selected years, 1990–2013 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2014*, table 222.10.

In 2013, the average mathematics scores for 4th- and 8th-grade students were higher than the average scores in all previous assessment years. From 1990 to 2013, the average 4th-grade mathematics score increased by 28 points, from 213 to 242. During that same period, the average 8th-grade score increased by 22 points,

from 263 to 285. In 2013, the average mathematics score for 12th-grade students (153) was not measurably different from the score in 2009 but was 3 points higher than in 2005 (150), the first year the revised assessment was administered.

Figure 2. Percentage distribution of 4th-, 8th-, and 12th-grade students across National Assessment of Educational Progress (NAEP) mathematics achievement levels: Selected years, 1990–2013

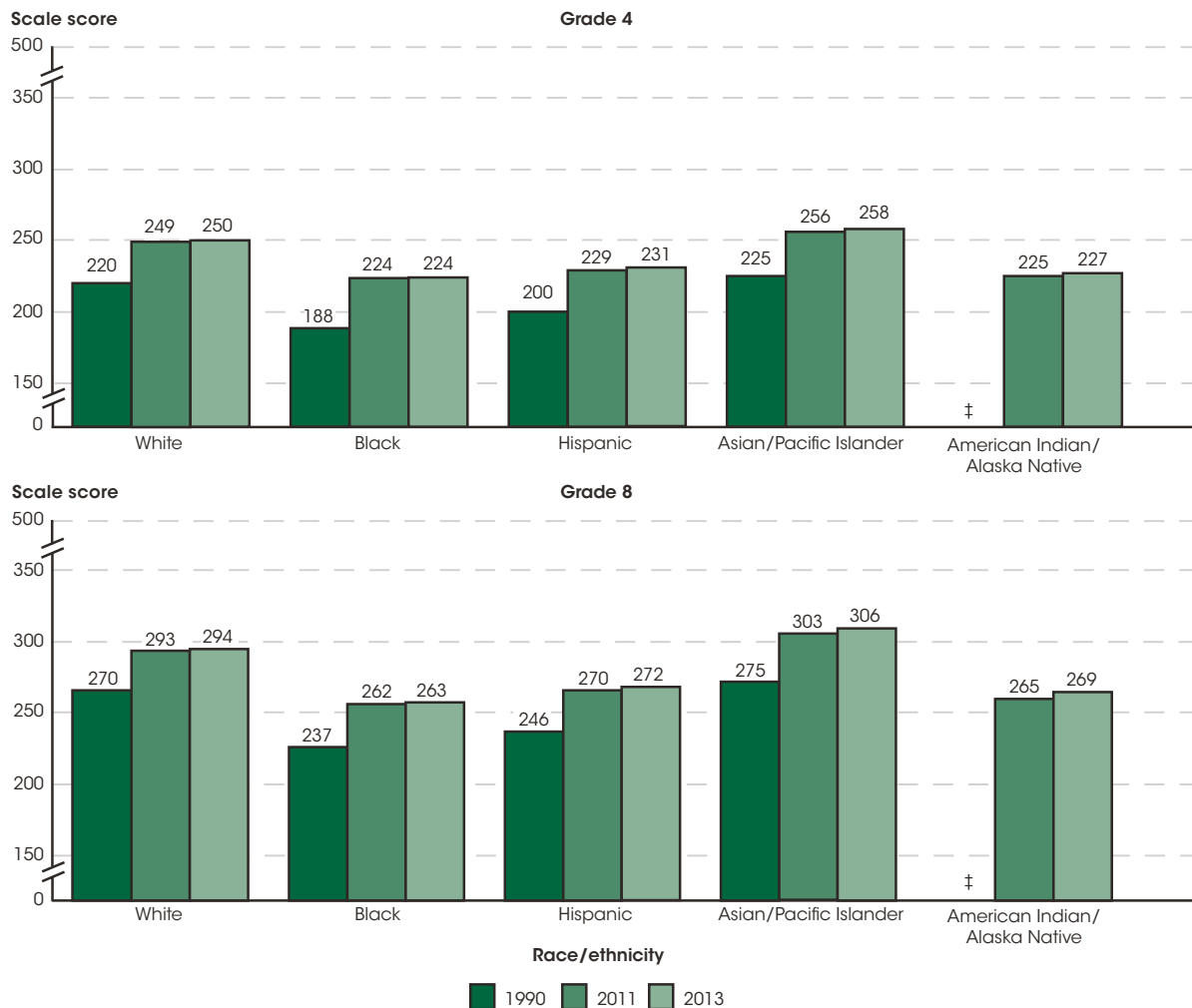


NOTE: Includes public and private schools. Achievement levels define what students should know and be able to do: *Basic* indicates partial mastery of fundamental skills, and *Proficient* indicates demonstrated competency over challenging subject matter. In 2005, there were major changes to the framework and content of the grade 12 assessment and, as a result, scores from 2005 and later assessment years cannot be compared with scores and results from earlier assessment years. Assessment was not conducted for grade 12 in 2007 and 2011. Testing accommodations (e.g., extended time, small group testing) for children with disabilities and English language learners were not permitted in 1990 and 1992. Detail may not sum to totals because of rounding. SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), selected years, 1990–2013 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2014*, table 222.12.

In 2013, some 83 percent of 4th-grade students performed at or above the *Basic* achievement level and 42 percent performed at or above the *Proficient* level in mathematics. While the percentage of students performing at or above the *Basic* level in 2013 was not measurably different from that in 2011, it was higher than the percentage in 1990 (50 percent). A higher percentage of 4th-grade students performed at or above *Proficient* in 2013 than in all previous assessment years. In 2013, some 74 percent of 8th-grade students performed at or above *Basic* and 35 percent performed

at or above *Proficient* in mathematics. The percentages of students at or above *Basic* and at or above *Proficient* in 2013 showed no measurable change from 2011, but they were higher than the percentages in all assessment years prior to 2011. The percentage of 12th-grade students performing at or above *Basic* in 2013 (65 percent) was not measurably different from the percentage in 2009 but was 4 percentage points higher than in 2005. The percentage performing at or above *Proficient* (26 percent) was also not measurably different from the percentage in 2009 but was 3 percentage points higher than in 2005.

Figure 3. Average mathematics scale scores of 4th- and 8th-grade students, by race/ethnicity: 1990, 2011, and 2013



‡ Reporting standards not met (too few cases for a reliable estimate).

NOTE: Includes public and private schools. At grades 4 and 8, the National Assessment of Educational Progress (NAEP) mathematics scale ranges from 0 to 500. Testing accommodations (e.g., extended time, small group testing) for children with disabilities and English language learners were not permitted in 1990. Race categories exclude persons of Hispanic ethnicity.

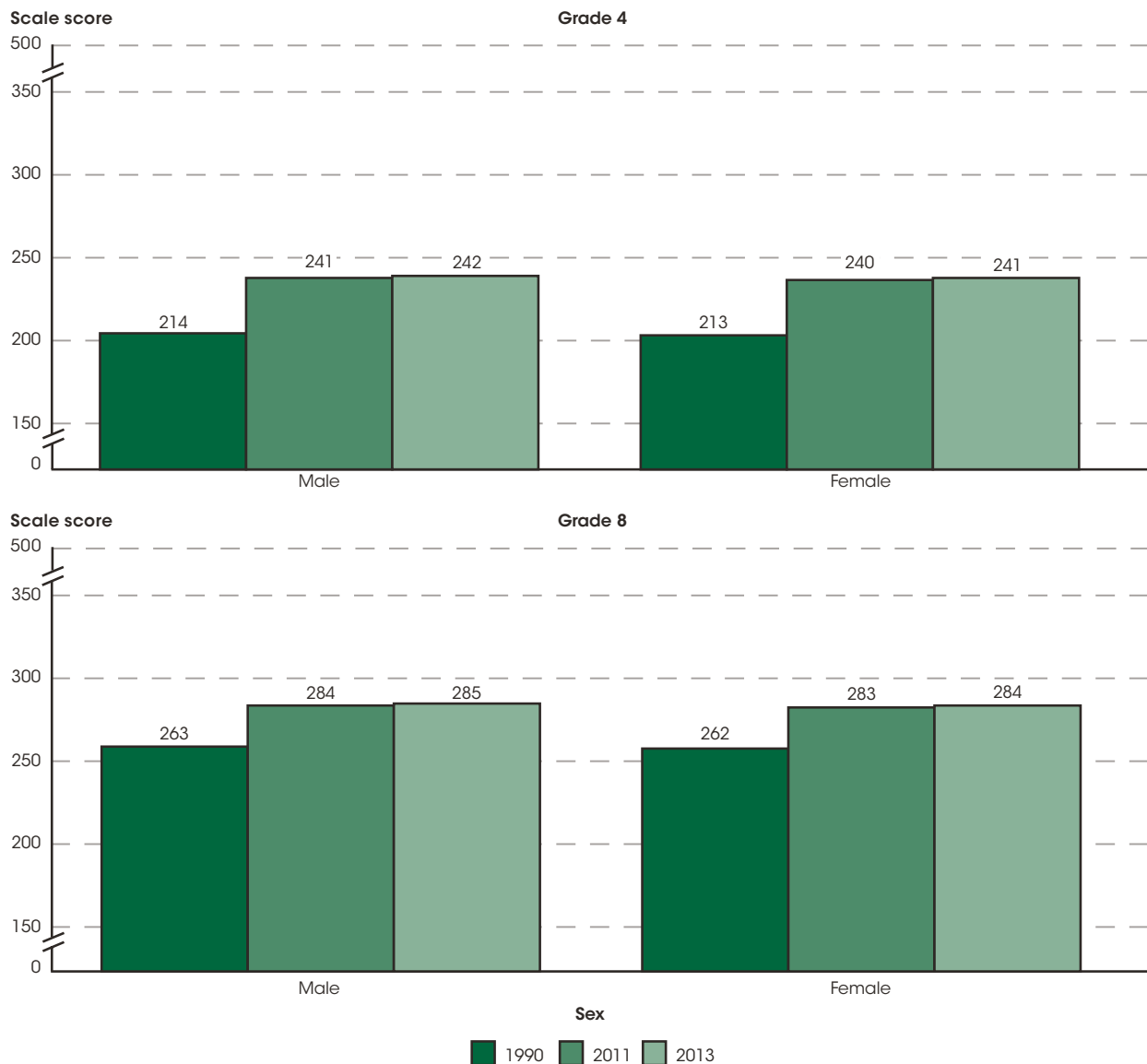
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 2011, and 2013 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2014*, table 222.10.

At grade 4, the average mathematics scores in 2013 for White (250) and Hispanic students (231) were higher than the scores in 2011 (249 and 229, respectively). The 2013 scores for Black (224) and Asian/Pacific Islander (258) 4th-graders were not measurably different from the 2011 scores. White, Black, Hispanic, and Asian/Pacific Islander students all had higher average scores in 2013 than in 1990. At grade 8, the average scores in 2013 for Hispanics (272), Asian/Pacific Islanders (306), and American Indian/Alaska Natives (269) were higher than in 2011 (270, 303, and 265, respectively). Prior to 2011, separate data for Asians, Pacific Islanders, and students of Two or more races were not collected at the school level. At grade 4, the average 2013 mathematics scores for Asians (259), Pacific Islanders (236), and students of Two or more races (245) were not measurably different from the scores in 2011. Similarly, at grade 8 the 2013 scores for Asians

(309), Pacific Islanders (275), and students of Two or more races (288) were not measurably different from the scores in 2011.

Closing achievement gaps is a goal of both national and state education policies. In 2013 and in all previous assessment years since 1990, the average mathematics scores for White students at all grade levels have been higher than the scores for Black and Hispanic students. Although the White-Black and White-Hispanic achievement gaps did not change measurably from 2011 to 2013, there was some narrowing of racial/ethnic score gaps compared to the early 1990s. For example, the White-Black achievement gap at grade 4 narrowed from 1990 (32 points) to 2013 (26 points), and the White-Hispanic achievement gap at grade 8 narrowed from 1992 (28 points) to 2013 (22 points).

Figure 4. Average mathematics scale scores of 4th- and 8th-grade students, by sex: 1990, 2011, and 2013



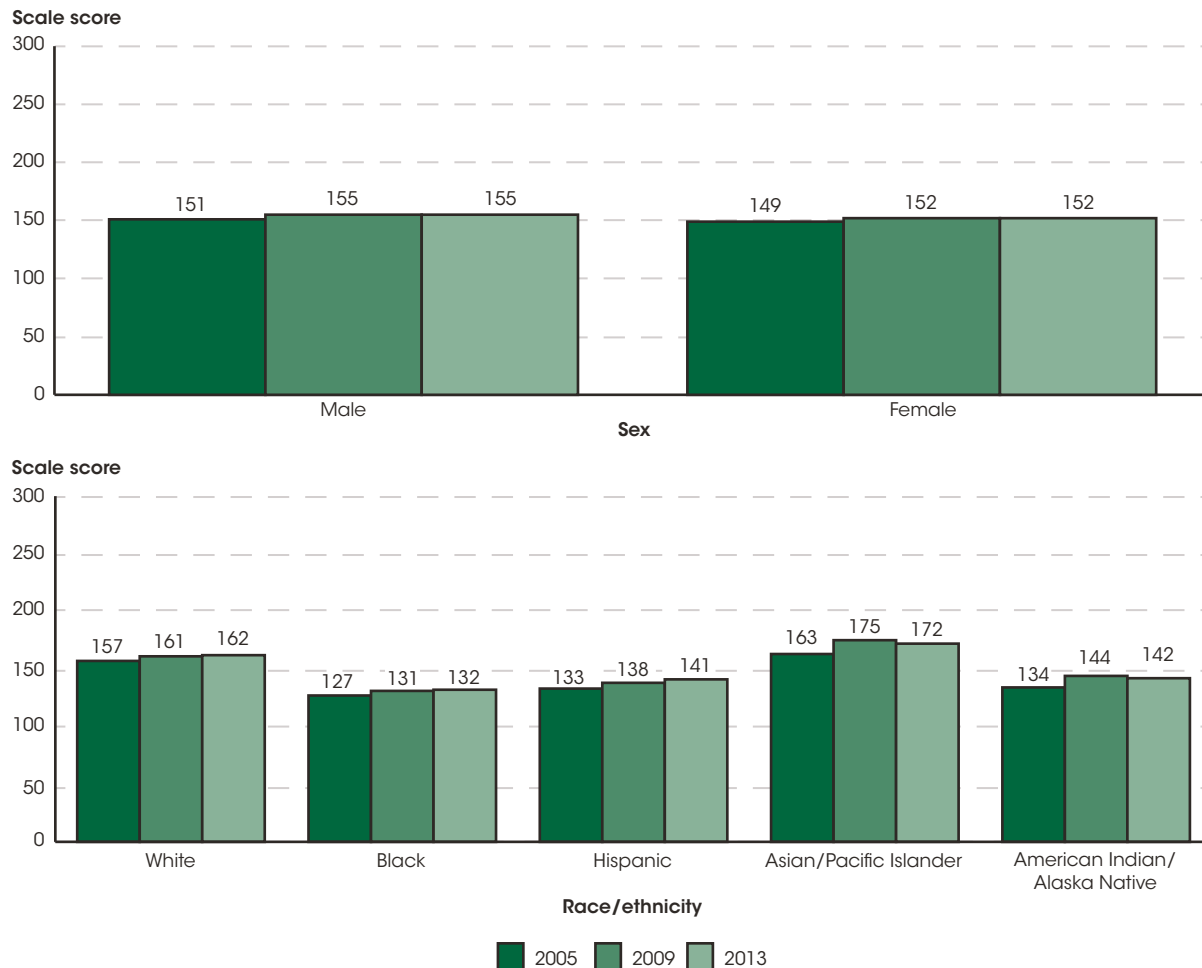
NOTE: Includes public and private schools. At grades 4 and 8, the National Assessment of Educational Progress (NAEP) mathematics scale ranges from 0 to 500. Testing accommodations (e.g., extended time, small group testing) for children with disabilities and English language learners were not permitted in 1990.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1992, 2011, and 2013 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2014*, table 222.10.

The average mathematics score in 2013 for male 4th-grade students (242) was higher than the score in 1990 (214) but not measurably different from that in 2011. For female 4th-grade students, the 2013 score (241) was higher than the scores in both 2011 (240) and 1990 (213). The average mathematics score in 2013 for male 8th-graders (285) was not measurably different from the score in 2011 but was higher than in 1990 (263). For female 8th-graders, the 2013 score (284) was higher than in both 2011 (283) and 1990 (262). In 2013, the mathematics scores for male and female students had an apparent achievement gap of 1 point at both grades 4 and 8. However, the achievement gap was not significant at grade 8. The 2013 gender gaps for grades 4 and 8 were not measurably different from the gaps in 2011 or 1990.

Since 1996, NAEP has collected data regarding student English language learner (ELL) status for grades 4 and 8. In 2013 and in all previous assessment years since 1996, the average mathematics scale scores for non-ELL 4th- and 8th-grade students were higher than their ELL peers' scores. In 2013, the achievement gap between non-ELL and ELL students was 25 points at the 4th-grade level and 41 points at the 8th-grade level. At grade 4, this achievement gap was not measurably different from the gap in any assessment year since 1996. At grade 8, the achievement gap between non-ELL and ELL students in 2013 (41 points) was not measurably different from the achievement gap in 2011, 2009, 2000, or 1996 but was higher than in 2007 (38 points), 2005 (37 points), and 2003 (38 points).

Figure 5. Average mathematics scale scores of 12th-grade students, by sex and race/ethnicity: 2005, 2009, and 2013

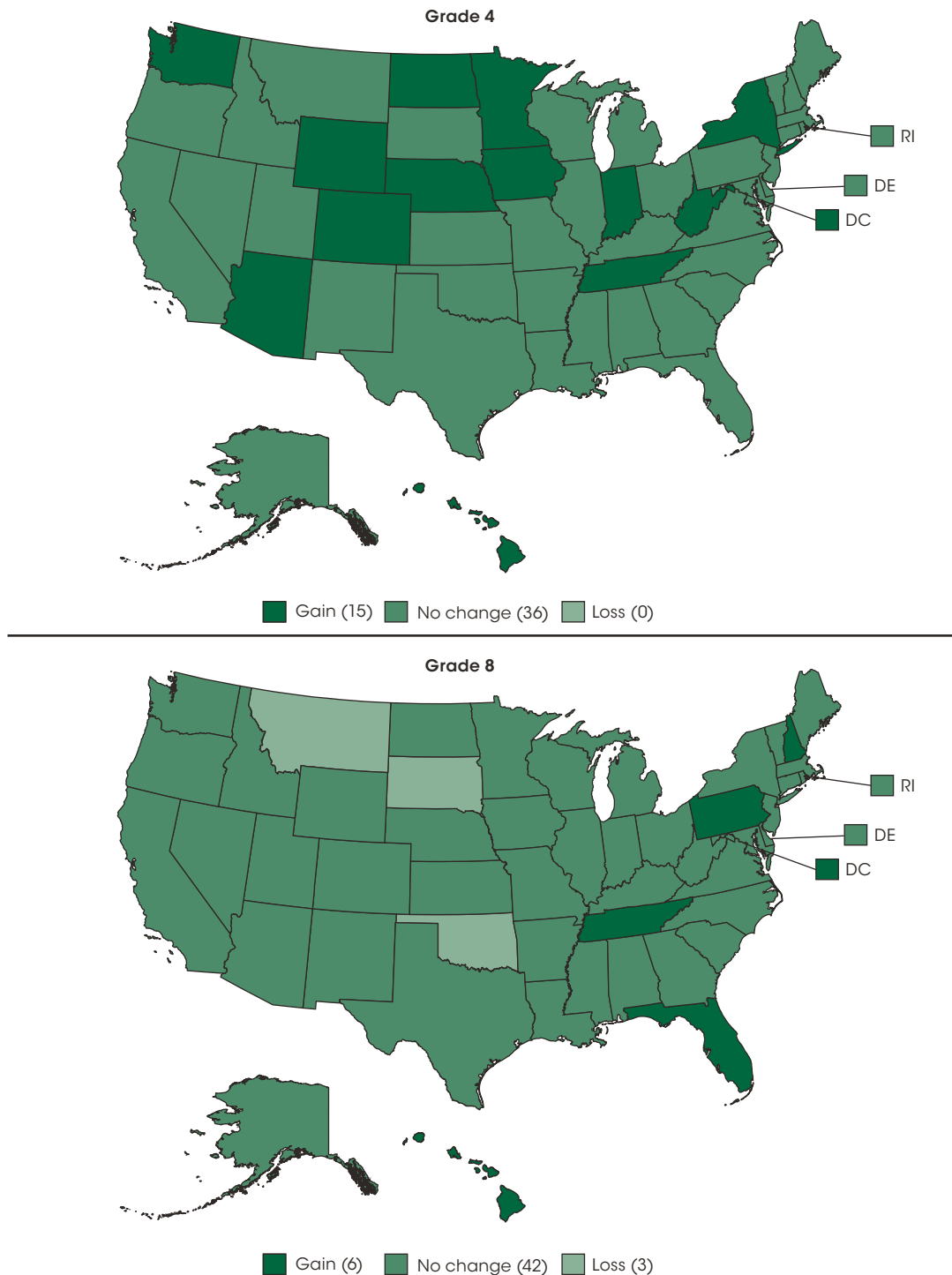


NOTE: Includes public and private schools. At grade 12, the National Assessment of Educational Progress (NAEP) mathematics scale ranges from 0 to 300. Race categories exclude persons of Hispanic ethnicity.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005, 2009, and 2013 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2014*, table 222.10.

At grade 12, the average 2013 scale scores for all racial/ethnic groups were not measurably different from the scores in 2009. However, the average scores for all racial/ethnic groups were higher in 2013 than in 2005, except the score for American Indian/Alaska Natives, which did not change measurably. For example, the average scores for Asian/Pacific Islander students increased from 163 in 2005 to 172 in 2013. In 2013, the average scores for Asians, Pacific Islanders, and students of Two or more races were 174, 151, and 155, respectively. The mathematics scale scores for White 12th-graders were higher than the scores for their Black and Hispanic peers between 2005 and 2013. There were no measurable changes in racial/ethnic achievement gaps during this period.

Average mathematics scores in 2013 for 12th-grade male (155) and female (152) students were not measurably different from those in 2009. Scores in 2013 were higher than those in 2005 for both males and females. In 2005, 2009, and 2013, the gender gap for 12th-grade students has remained at 3 points. The average scores for non-ELL 12th-grade students in 2005, 2009, and 2013 were higher than their ELL peers' scores in these years. The achievement gap between non-ELL and ELL students was 46 points in 2013 and has widened by 15 points since 2005.

Figure 6. Change in average mathematics scale scores of 4th- and 8th-grade public school students, by state:
Between 2011 and 2013



NOTE: At grades 4 and 8, the National Assessment of Educational Progress (NAEP) mathematics scale ranges from 0 to 500. "Gain" is defined as a significant increase from 2011 to 2013, "No Change" is defined as no significant change from 2011 to 2013, and "Loss" is defined as a significant decrease from 2011 to 2013.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 and 2013 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2014*, tables 222.50 and 222.60.

NAEP results also permit state-level comparisons of the mathematics achievement of 4th- and 8th-grade students in public schools. The average mathematics scores for 4th-grade public school students were higher in 2013 than in 2011 in the District of Columbia and 14 states (Arizona, Colorado, Delaware, Hawaii, Indiana, Iowa, Minnesota, Nebraska, New York, North Dakota,

Tennessee, Washington, West Virginia, and Wyoming); however, scores did not change measurably in any other state during this period. At grade 8, scores were higher in 2013 than in 2011 in the District of Columbia and five states (Florida, Hawaii, New Hampshire, Pennsylvania, and Tennessee); however, scores decreased in three states (Montana, Oklahoma, and South Dakota).

Figure 7. Average mathematics scale scores of 4th- and 8th-grade public school students, by jurisdiction: 2013

Jurisdiction	Grade 4	Grade 8
Nation (public)	241	284
Large city	↓ 235	↓ 276
Albuquerque	↓ 235	↓ 274
Atlanta	↓ 233	↓ 267
Austin	↑ 245	◆ 285
Baltimore City	↓ 223	↓ 260
Boston	↓ 237	◆ 283
Charlotte	↑ 247	↑ 289
Chicago	↓ 231	↓ 269
Cleveland	↓ 216	↓ 253
Dallas	↓ 234	↓ 275
Detroit	↓ 204	↓ 240
District of Columbia (DCPS)	↓ 229	↓ 260
Fresno	↓ 220	↓ 260
Hillsborough County (FL)	◆ 243	◆ 284
Houston	↓ 236	↓ 280
Jefferson County (KY)	↓ 234	↓ 273
Los Angeles	↓ 228	↓ 264
Miami-Dade	↓ 237	↓ 274
Milwaukee	↓ 221	↓ 257
New York City	↓ 236	↓ 274
Philadelphia	↓ 223	↓ 266
San Diego	◆ 241	↓ 277

↑ Higher average score than national average score
 ↓ Lower average score than national average score
 ◆ No significant difference between urban district and national average score

NOTE: At grades 4 and 8, the National Assessment of Educational Progress (NAEP) mathematics scale ranges from 0 to 500. "Large city" includes students from all cities in the nation with populations of 250,000 or more, including the participating districts.

SOURCE: U.S. Department of Education, National Center for Education Statistics. (2013). *The Nation's Report Card: A First Look: 2013 Mathematics and Reading Trial Urban District Assessment* (NCES 2014-466), figure 2. See *Digest of Education Statistics 2014*, table 222.80.

NAEP also collects data for Trial Urban Districts at grades 4 and 8. The Trial Urban District Assessment is intended to focus attention on urban education and to measure the educational progress of participating large urban districts. The results of the 21 urban districts

are based on the same mathematics assessment used to report national and state results. This allows each district to compare its performance to the performance of its home state as well as to that of other states and other participating urban districts.

In 2013, the 4th-grade large city average score (235) was lower than the national average score (241). Additionally, students in 17 urban districts had scores lower than the national average, while 2 had scores that were not measurably different. In contrast, students in two urban districts (Austin and Charlotte) had scores higher than the national average. Similarly, the 8th-grade large city average score (276) was lower than the national average score (284). Students in 17 urban districts had scores lower than the national average, while 3 had scores that were not measurably different. In contrast, students in Charlotte scored higher than the national average.

In 2013, fourth-graders in four urban districts (Atlanta, Chicago, the District of Columbia, and Los Angeles) performed better in mathematics than 4th-grade students in those cities did in 2011. Students in other participating

urban districts showed no change. Eighth-graders in three urban districts (Charlotte, the District of Columbia, and Fresno) improved between 2011 and 2013. Students in Detroit saw a decline, while all other participating urban districts showed no change.

In terms of proficiency, 41 percent of 4th-grade public school students nationwide performed at or above the *Proficient* level in mathematics in 2013. Compared with this national average, two urban districts (Austin and Charlotte) had higher percentages of students performing at or above the *Proficient* achievement level. At grade 8, about 34 percent of public school students nationwide performed at or above the *Proficient* level. One urban district (Charlotte) had a percentage of students performing at or above the *Proficient* level that was higher than the national average.

Reference tables: *Digest of Education Statistics 2014*, tables 222.10, 222.12, 222.50, 222.60, and 222.80

Related indicators: English Language Learners (indicator 12), Reading Performance (indicator 23), Reading and Mathematics Score Trends (indicator 25), International Assessments (indicator 26)

Glossary: Achievement gap, Achievement levels