

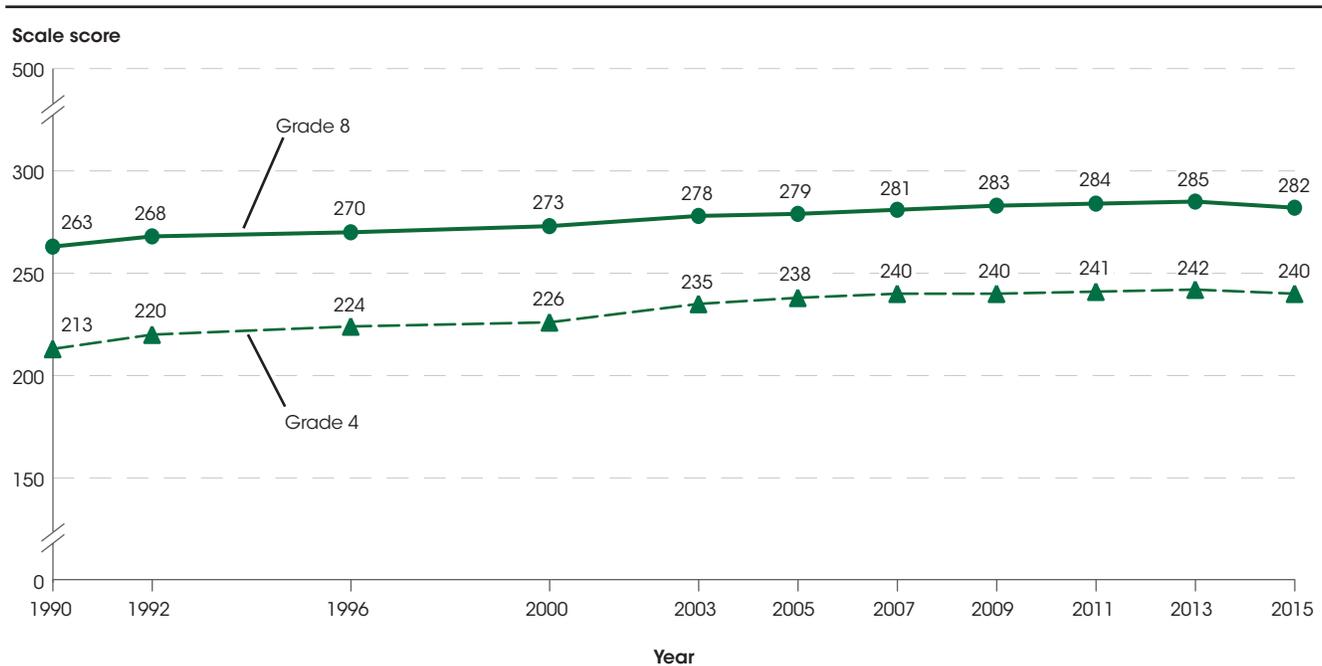
# Mathematics Performance

The average 4th- and 8th-grade mathematics scores in 2015 were lower than the scores in 2013 but were higher than the scores in 1990, according to data from the National Assessment of Educational Progress. At grade 12, the average mathematics score in 2015 was lower than the score in 2013, but not measurably different from the score in 2005.

The National Assessment of Educational Progress (NAEP) assesses student performance in mathematics at grades 4, 8, and 12 in both public and private schools across the nation. NAEP mathematics scores range from 0 to 500 for grades 4 and 8 and from 0 to 300 for grade 12. 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 have been administered periodically since 1990. The most recent mathematics assessments were conducted in 2015 for grades 4, 8, and 12.

**Figure 1. Average National Assessment of Educational Progress (NAEP) mathematics scale scores of 4th- and 8th-grade students: Selected years, 1990–2015**

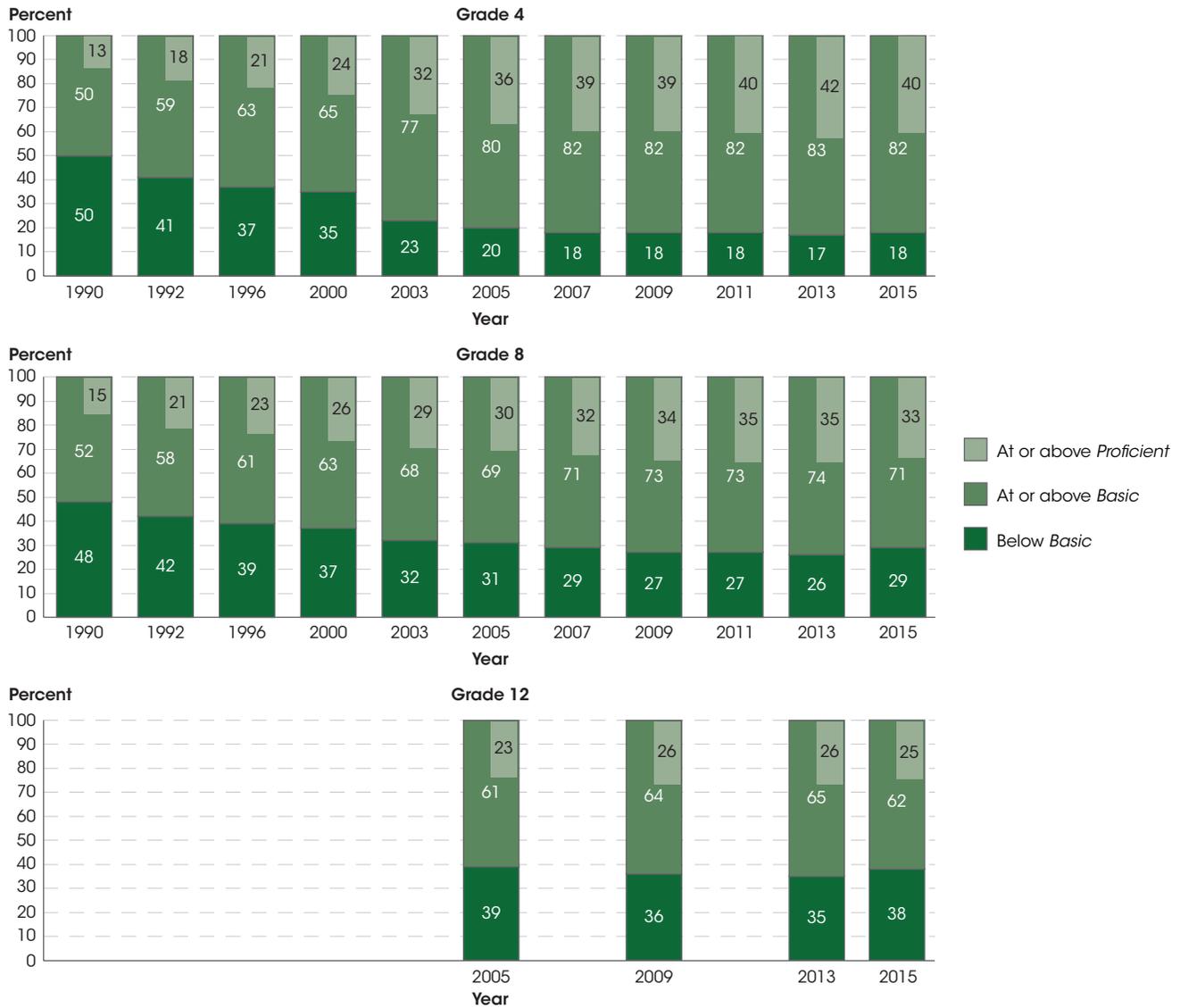


NOTE: Includes public and private schools. At grades 4 and 8, the mathematics scale scores range from 0 to 500. Testing accommodations (e.g., extended time, small group testing) for children with disabilities and English language learners were not permitted in 1990 and 1992. SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), selected years, 1990–2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, table 222.10.

In 2015, for the first time, the average mathematics scores for 4th- and 8th-grade students were lower than the average scores in the previous assessment year. The average 4th-grade mathematics score in 2015 (240) was lower than the score in 2013 (242), although it was higher than the score in 1990 (213). The average 8th-grade mathematics score in 2015 (282) was lower than the score in 2013

(285). However, the average 8th-grade score in 2015 was higher than the score in 1990 (263). The average 12th-grade mathematics score in 2015 (152) was lower than the score in 2013 (153), but not measurably different from the score in 2005, the first year the revised assessment was administered.<sup>1</sup>

**Figure 2. Percentage of 4th-, 8th-, and 12th-grade students across National Assessment of Educational Progress (NAEP) mathematics achievement levels: Selected years, 1990–2015**

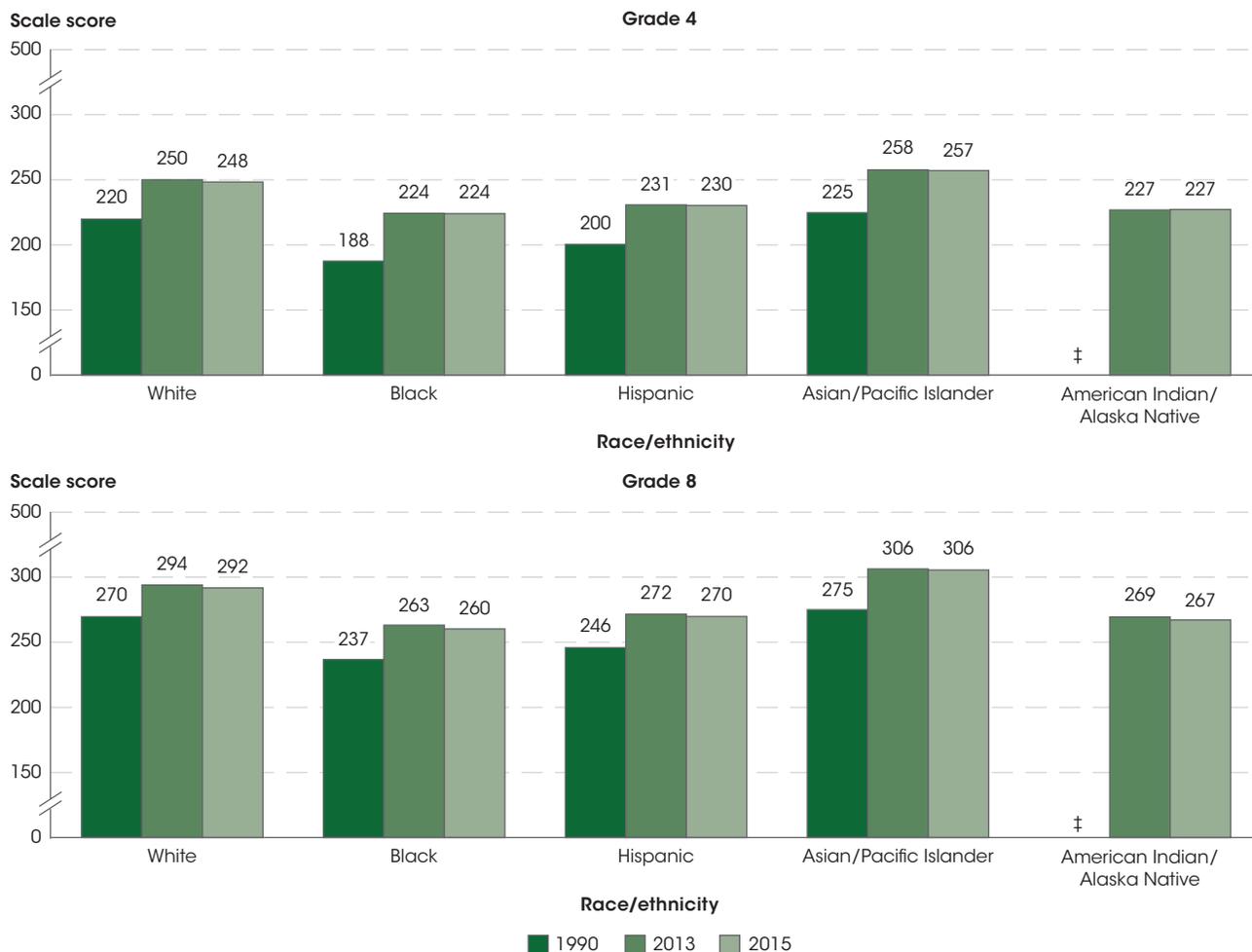


NOTE: Includes public and private schools. Achievement levels define what students should know and be able to do: *Basic* indicates partial mastery of fundamental skills, and *Proficient* indicates demonstrated competency over challenging subject matter. In 2005, there were major changes to the framework 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 2000, 2003, 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. Although rounded numbers are displayed, the figures are based on unrounded estimates. 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, 1990–2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, table 222.12.

In 2015, some 82 percent of 4th-grade students performed at or above the *Basic* achievement level in mathematics, and 40 percent performed at or above the *Proficient* level. While the percentage of 4th-grade students performing at or above *Basic* in 2015 was lower than in 2013 (83 percent), it was higher than the percentage in 1990 (50 percent). The percentage of 4th-grade students performing at or above *Proficient* in 2015 (40 percent) was lower than in 2013 (42 percent). However, the percentage of 4th-grade students performing at or above *Proficient* in 2015 was higher than in 1990 (13 percent). In 2015, some 71 percent of 8th-grade students performed at or above *Basic* in mathematics, and 33 percent performed at or above *Proficient*. The percentage of 8th-grade students

performing at or above *Basic* was lower in 2015 than in 2013 (74 percent), but was higher than the percentage in 1990 (52 percent). The percentage of 8th-grade students who scored at or above *Proficient* in 2015 (33 percent) was also lower than the percentage in 2013 (35 percent), but was higher than the percentage in 1990 (15 percent). The percentage of 12th-grade students performing at or above *Basic* in 2015 (62 percent) was lower than the percentage in 2013 (65 percent), but not measurably different from the percentage in 2005. The percentage performing at or above *Proficient* (25 percent) was not measurably different from the percentages in 2013 and in 2005.

**Figure 3. Average National Assessment of Educational Progress (NAEP) mathematics scale scores of 4th- and 8th-grade students, by race/ethnicity: 1990, 2013, and 2015**



† Reporting standards not met (too few cases for a reliable estimate).  
NOTE: Includes public and private schools. At grades 4 and 8, the mathematics scale scores range 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. Although rounded numbers are displayed, the figures are based on unrounded estimates.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 2013, and 2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, table 222.10.

At grade 4, the average mathematics score in 2015 for White students (248) was lower than the score in 2013 (250), while the average scores in 2015 for Black (224), Hispanic (230), and Asian/Pacific Islander (257) students were not measurably different from the 2013 scores. However, the 4th-grade average scores for White, Black, Hispanic, and Asian/Pacific Islander students were all higher in 2015 than in 1990. The 2015 average score for 4th-grade American Indian/Alaska Native students (227) was not measurably different from the scores in 2013 and in 1996, the first year that data were available for these students. At grade 8, the average scores for White (292), Black (260), and Hispanic students (270) were lower in 2015 than in 2013 (294, 263, and 272, respectively). The 2015 average score for Asian/Pacific Islander students (306) was not measurably different from the score in 2013. However, the average scores for 8th-grade White, Black, Hispanic, and Asian/Pacific Islander students were all higher in 2015 than in 1990. The 2015 average score

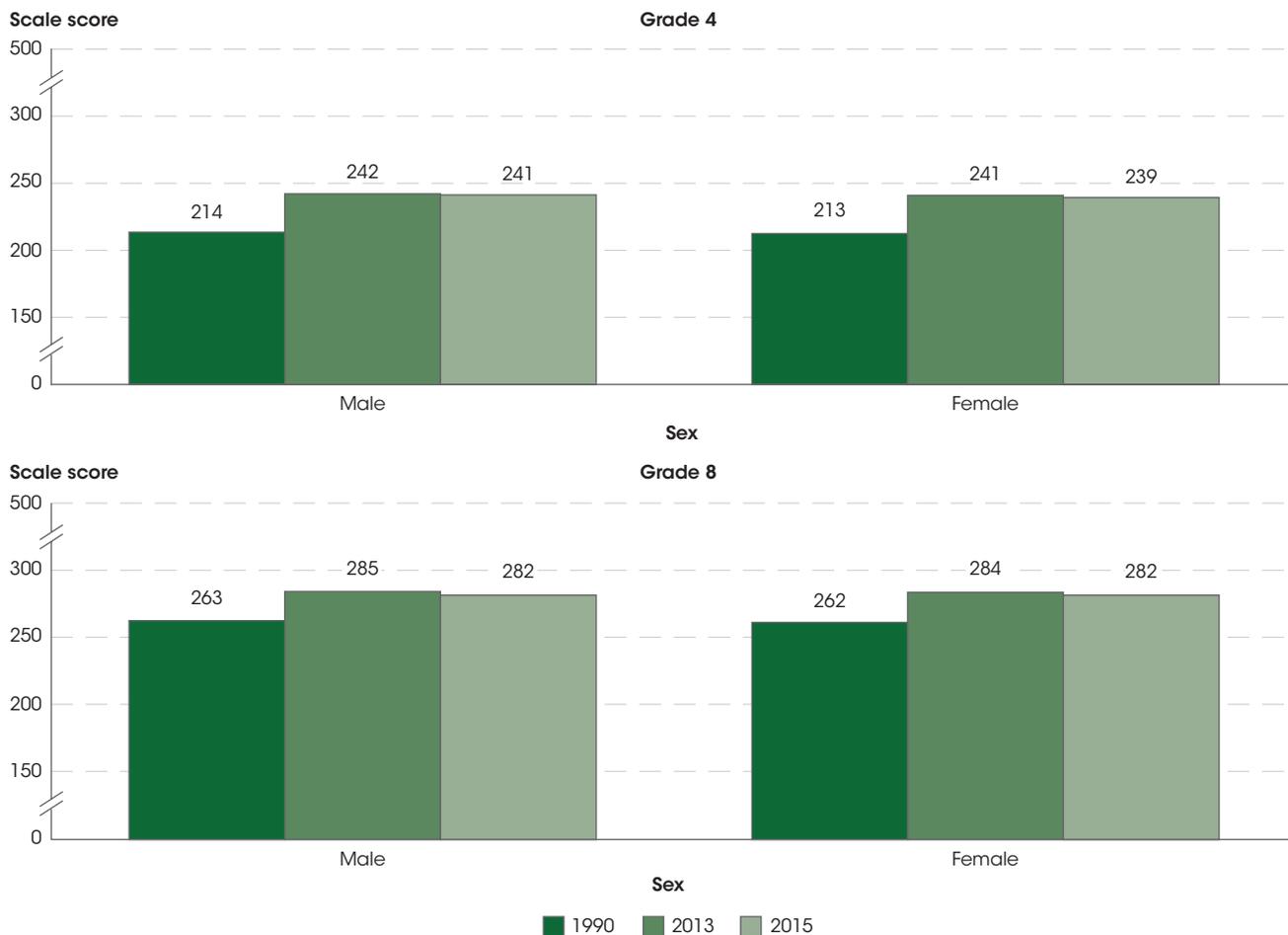
for 8th-grade American Indian/Alaska Native students (267) was not measurably different from the scores in 2013 and in 2000, the first year data were available for these students. Starting in 2011, separate data for Asian students, Pacific Islander students, and students of Two or more races were collected. At grades 4 and 8, the 2015 average mathematics scores for Asian students, Pacific Islander students, and students of Two or more races were not measurably different from the scores in 2013 and 2011.

Closing achievement gaps is a goal of both national and state education policies. In 2015, and in all previous assessment years since 1990, the average mathematics scores for White students in grades 4 and 8 have been higher than the scores of their Black and Hispanic peers. For both grades, there was some narrowing of racial/ethnic achievement gaps since the early 1990s. For example, the White-Black achievement gap at grade 4

narrowed from 32 points in 1990 to 24 points in 2015. Additionally, this 4th-grade White-Black achievement gap narrowed from 26 points in 2013 to 24 points in 2015, due to a decrease in White students' scores from 2013 to 2015. The 4th-grade White-Hispanic achievement gap in 2015 (18 points) was not measurably different from

the gap in 2013. In 2015, the 8th-grade achievement gaps between White and Black students' average scores (32 points) and between White and Hispanic students' scores (22 points) were not measurably different from 2013.

**Figure 4. Average National Assessment of Educational Progress (NAEP) mathematics scale scores of 4th- and 8th-grade students, by sex: 1990, 2013, and 2015**



NOTE: Includes public and private schools. At grades 4 and 8, the mathematics scale scores range 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. Although rounded numbers are displayed, the figures are based on unrounded estimates.  
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1990, 2013, and 2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, table 222.10.

The average mathematics score in 2015 for male 4th-grade students (241) was not measurably different from the score in 2013, but was higher than the score in 1990 (214). For female 4th-grade students, the 2015 average score (239) was lower than the score in 2013 (241), but was higher than the score in 1990 (213). The average mathematics score in 2015 for male 8th-grade students (282) was lower than the score in 2013 (285), but was higher than the score in 1990 (263). Similarly, for female 8th-grade students, the average score in 2015 (282) was lower than in 2013 (284), but was higher than the score

in 1990 (262). In 2015, there was a 2-point gap between the mathematics scores for male and female students at grade 4, which was not measurably different from the gaps in 2013 and 1990. At grade 8, no measurable gender achievement gap was observed in 1990, 2013, and 2015.

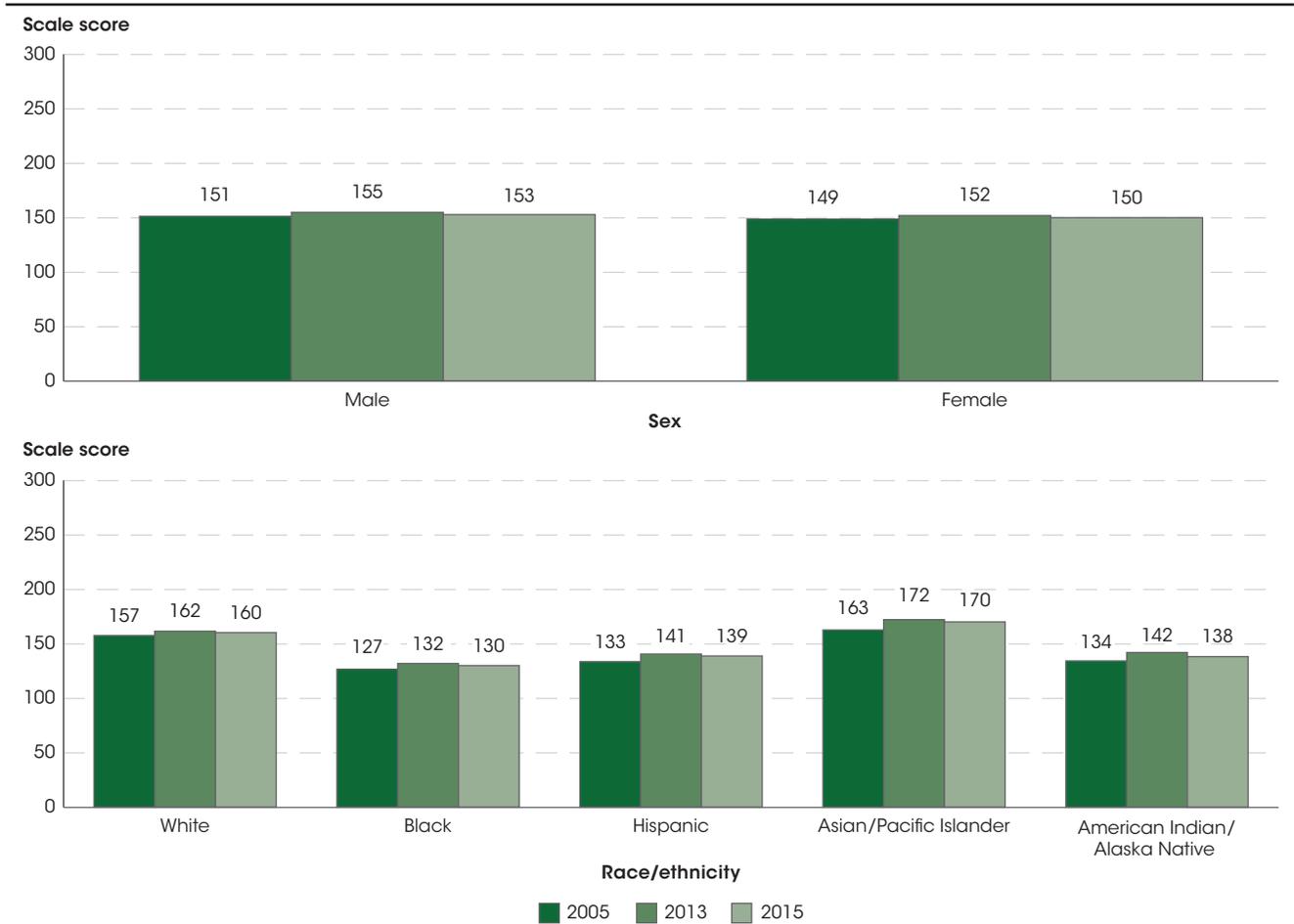
Since 1996, NAEP has collected data on student English language learner (ELL) status for grades 4 and 8.<sup>2</sup> For all available years of data, the average mathematics scores for non-ELL 4th- and 8th-grade students were higher than their ELL peers' scores. In 2015, the achievement

gap between non-ELL and ELL students was 25 points at grade 4 and 38 points at grade 8. At grade 4, this achievement gap was not measurably different from the gap observed in any assessment year since 1996. At grade 8, the achievement gap between non-ELL and ELL students narrowed from 46 points in 1996 and 41 points in 2013 to 38 points in 2015.

In 2015, the average mathematics score for 4th-grade students in high-poverty<sup>3</sup> schools (226) was lower than the average scores for 4th-grade students in mid-high

poverty schools (237), mid-low poverty schools (245), and low-poverty schools (257). At grade 8, the average 2015 mathematics score for students in high-poverty schools (264) was lower than the average scores for students in mid-high poverty schools (276), mid-low poverty schools (287), and low-poverty schools (301). In 2015, the achievement gap between the students at high-poverty schools and low-poverty schools was 30 points at grade 4 and 38 points at grade 8. At both grades 4 and 8, this achievement gap was not measurably different from the gap observed in any assessment year since 2005.

**Figure 5. Average National Assessment of Educational Progress (NAEP) mathematics scale scores of 12th-grade students, by sex and race/ethnicity: 2005, 2013, and 2015**



NOTE: Includes public and private schools. At grade 12, the mathematics scale scores range from 0 to 300. Race categories exclude persons of Hispanic ethnicity. Although rounded numbers are displayed, the figures are based on unrounded estimates.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2005, 2013, and 2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, table 222.10.

At grade 12, the average 2015 scores for White (160), Black (130), Hispanic (139), Asian/Pacific Islander (170), and American Indian/Alaska Native students (138) were not measurably different from the scores in 2013. However, the average scores for all racial/ethnic groups were higher in 2015 than in 2005, except the score for

American Indian/Alaska Native students, which was not measurably different. Starting in 2011, separate data for Asian students, Pacific Islander students, and students of Two or more races were collected. The 2015 average scores for Asian students and students of Two or more races were not measurably different from the scores in 2013.<sup>4</sup> The

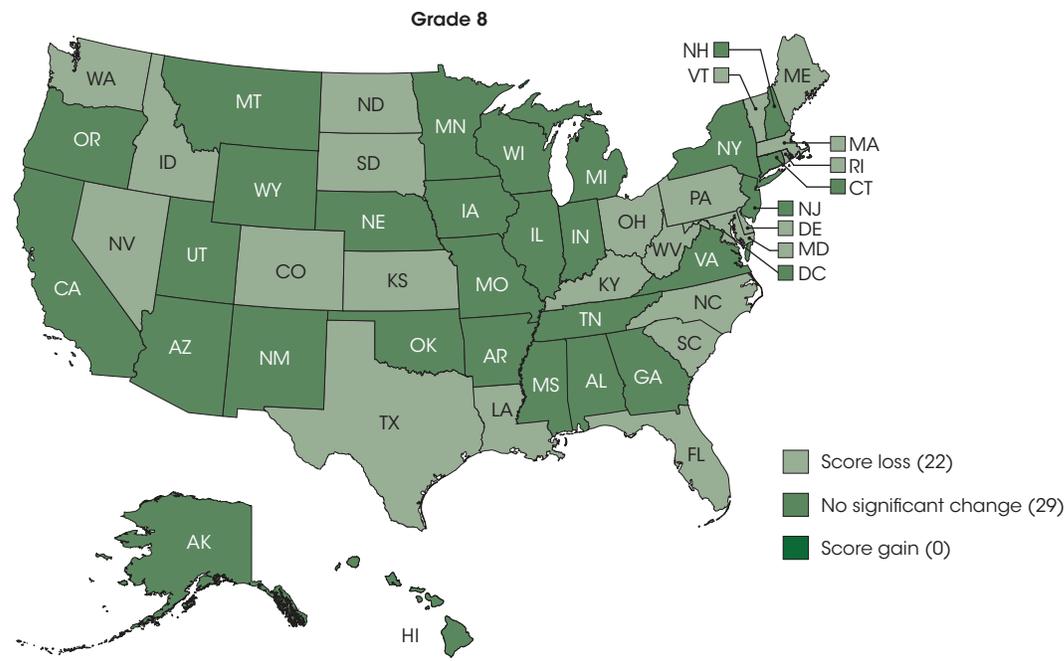
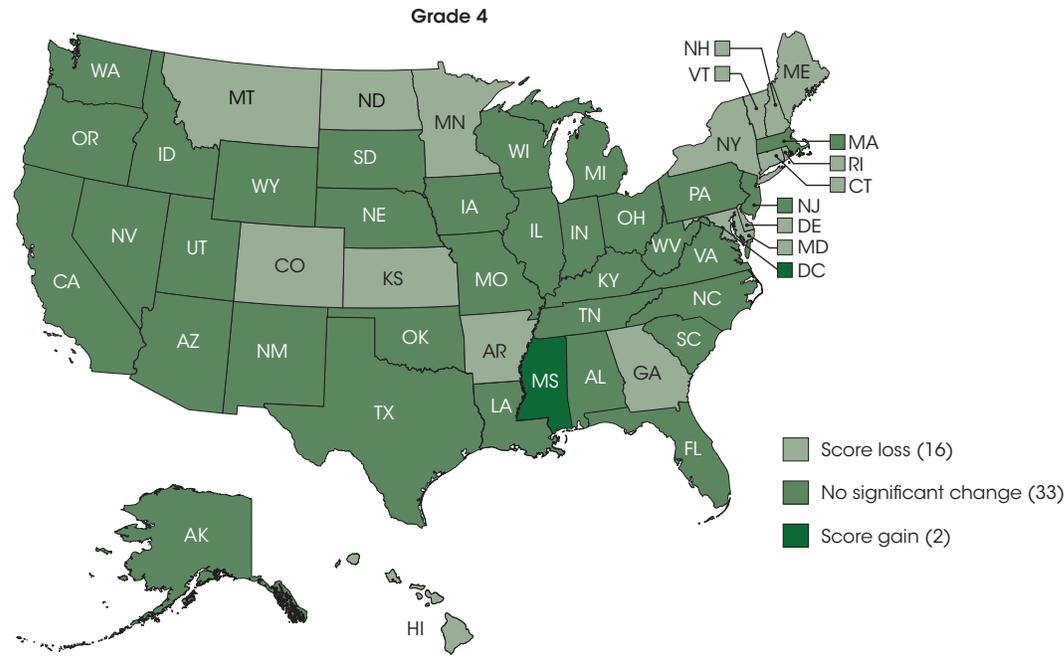
average mathematics scores for White 12th-grade students were higher than the scores for their Black, Hispanic, and American Indian/Alaska Native peers in 2005, 2009, 2013, and 2015. There were no measurable changes in racial/ethnic achievement gaps during this period.

Average mathematics scores in 2015 for 12th-grade male (153) and female (150) students were lower than the scores in 2013 (155 and 152, respectively) and were not measurably different from the scores in 2005. In 2005, 2009, 2013, and 2015, the gender gap for 12th-grade students remained at 3 points. The average scores for non-ELL 12th-grade students in 2005 (151), 2009 (154), 2013 (155), and 2015 (153) were higher than their ELL peers' scores in these years (120, 117, 109, and 115, respectively). The achievement gap between non-ELL and ELL students narrowed from 46 points in 2013 to 37 points in 2015.

In 2015, the average mathematics score for 12th-grade students in high-poverty schools (129) was lower than the average scores for 12th-grade students in mid-high poverty schools (145), mid-low poverty schools (154), and low-poverty schools (164). The achievement gap between the students at high-poverty schools and low-poverty schools was 36 points in 2015, which was not measurably different from the gap in previous assessment years.

NAEP results also permit state-level comparisons of the mathematics achievement of 4th- and 8th-grade students in public schools. In 2015, the average mathematics scores varied across the states for public school students in both grades. At grade 4, the national public school average score was 240, and scores across states ranged from 231 to 251. In 20 states, the average score for public school 4th-grade students was higher than the national public school average score. In 14 states, the average mathematics score for 4th-grade public school students was not measurably different from the national public school average. However, average scores in the District of Columbia and the remaining 16 states were lower than the national public school average. At grade 8, the 2015 national public school average score was 281, and scores among public school students across states ranged from 263 to 297. In 2015, 8th-grade average scores for public school students in 22 states were higher than the national public school average, and in 14 states, the average scores for public school 8th-grade students were not measurably different from the national public school average. However, public school 8th-grade students in the District of Columbia and 14 states had average scores that were lower than the national public school average.

**Figure 6. Change in average National Assessment of Educational Progress (NAEP) mathematics scale scores of 4th- and 8th-grade public school students, by state: 2013 and 2015**



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 2013 to 2015, "no change" is defined as no significant change from 2013 to 2015, and "loss" is defined as a significant decrease from 2013 to 2015.  
 SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 and 2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, tables 222.50 and 222.60.

The average mathematics score for 4th-grade public school students across the nation was lower in 2015 (240) than in 2013 (241). Average 4th-grade mathematics scores for public school students were also lower in 2015 than in 2013 in 16 states. However, the mathematics average score for 4th-grade students in Mississippi and the District of Columbia were higher in 2015 than in 2013. Scores were not measurably different in the other states during this

period. The national public school average mathematics score for 8th-grade students was lower in 2015 (281) than in 2013 (284). Similarly, 22 states had lower 8th-grade average scores in 2015 than in 2013, while scores for the remaining 28 states and the District of Columbia were not measurably different between 2013 and 2015. During this time, no state experienced a score increase at the 8th-grade level.

**Figure 7. Average National Assessment of Educational Progress (NAEP) mathematics scale scores of 4th- and 8th-grade public school students, by jurisdiction: 2015**

Jurisdiction	Grade 4	Grade 8
<b>Nation (public)</b>	<b>240</b>	<b>281</b>
<b>Large city</b>	<b>↓ 234</b>	<b>↓ 274</b>
Albuquerque (NM)	↓ 231	↓ 271
Atlanta (GA)	↓ 228	↓ 266
Austin (TX)	↑ 246	↑ 284
Baltimore City (MD)	↓ 215	↓ 255
Boston (MA)	↓ 236	◆ 281
Charlotte (NC)	↑ 248	↑ 286
Chicago (IL)	↓ 232	↓ 275
Cleveland (OH)	↓ 219	↓ 254
Dallas (TX)	◆ 238	↓ 271
Detroit (MI)	↓ 205	↓ 244
District of Columbia (DC)	↓ 232	↓ 258
Duval County (FL)	↑ 243	↓ 275
Fresno (CA)	↓ 218	↓ 257
Hillsborough County (FL)	↑ 244	↓ 276
Houston (TX)	◆ 239	↓ 276
Jefferson County (KY)	↓ 236	↓ 272
Los Angeles (CA)	↓ 224	↓ 263
Miami-Dade (FL)	◆ 242	↓ 274
New York City (NY)	↓ 231	↓ 275
Philadelphia (PA)	↓ 217	↓ 267
San Diego (CA)	↓ 233	◆ 280

↑ 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 mathematics scale scores range 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, National Assessment of Educational Progress (NAEP), 2015 Mathematics Assessments, NAEP Data Explorer. See *Digest of Education Statistics 2015*, table 222.80.

NAEP also collects public school data from urban districts at grades 4 and 8, based on the same mathematics assessment used to report national and state results. In 2015, 21 urban districts participated. The Trial

Urban District Assessment (TUDA) is intended to focus attention on urban education and to measure the educational progress of participating large urban districts.

In 2015, average mathematics scores across participating urban districts varied for both grades. The average mathematics scores of 4th-grade public school students in large cities<sup>5</sup> (234) was lower than the national public school average score (240). At grade 4, average urban district scores for public school students in participating districts ranged from 205 to 248. Students in four urban districts (Austin, Charlotte, Duval County, and Hillsborough County) had average scores higher than the national public school average, while students in three urban districts had scores that were not measurably different from the national public school average. However, students in the remaining 14 urban districts had average scores lower than the national public school average. At grade 8, average urban district scores for public school students in participating districts in 2015 ranged from 244 to 286. The average mathematics score of 8th-grade public school students in large cities (274) was lower than the national public school average score (281). Eighth-grade students in Austin and Charlotte had average scores that were higher than the national public school average, and 8th-grade students in Boston and San Diego had average scores that were not measurably

different from the national public school average. However, students in the remaining 17 urban districts had scores lower than the national public school average.

Of the 20 urban districts that participated in the Trial Urban District Assessment in both 2013 and 2015, average mathematics scores at 4th and 8th grade in some urban districts changed over time. The average scores for 4th-grade students in Dallas, the District of Columbia, and Miami-Dade were higher in 2015 than in 2013. The average scores for 4th-grade students in 10 participating urban districts were not measurably different between 2013 and 2015. However, the average scores for 4th-grade students in the remaining seven urban districts were lower in 2015 than in 2013. At grade 8, students in Chicago had higher average scores in 2015 than did their peers in 2013. Average mathematics scores for 8th-grade students in 16 participating urban districts were not measurably different during this same period. However, 8th-grade students in the remaining three districts (Dallas, Hillsborough County, and Houston) scored lower in 2015 on average than in 2013.

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#### Endnotes:

<sup>1</sup> The 2005 mathematics framework for grade 12 introduced changes from the previous framework in order to reflect adjustments in curricular emphases and to ensure an appropriate balance of content. Consequently, the 12th-grade mathematics results in 2005 and subsequent years could not be compared to previous assessments, and a new trend line was established beginning in 2005.

<sup>2</sup> In the mid- to late-1990s, NAEP began a transition to include accommodations for ELL students and other students with special needs. Thus, 2015 data for ELL students are compared with data for 1996 instead of 1990 as in the remainder of the indicator.

<sup>3</sup> High-poverty schools are defined as schools where more than 76 percent of the students are eligible for free or reduced-price

lunch (FRPL). Mid-high poverty schools are those schools where 51 to 75 percent of the students are eligible for FRPL, and mid-low poverty schools are those schools where 26 to 50 percent of the students are eligible for FRPL. Low-poverty schools are defined as schools where 25 percent or less of the students are eligible for FRPL.

<sup>4</sup> A comparison between the two most recent assessment periods is not possible for Pacific Islander students because reporting standards were not met for these students in 2015.

<sup>5</sup> Large cities include students from all cities in the nation with populations of 250,000 or more, including the participating districts.

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**Reference tables:** *Digest of Education Statistics 2015*, tables 222.10, 222.12, 222.50, 222.60, and 222.80

**Related indicators and resources:** Reading Performance; Science Performance; Technology and Engineering Literacy; International Comparisons: U.S. 4th-, 8th-, and 12th-Graders' Mathematics and Science Achievement; International Comparisons: Science, Reading, and Mathematics Literacy of 15-Year-Old Students; Reading and Mathematics Score Trends [*web-only*]

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**Glossary:** Achievement gap; Achievement levels, NAEP; English language learner (ELL); Public school or institution; Racial/ethnic group