

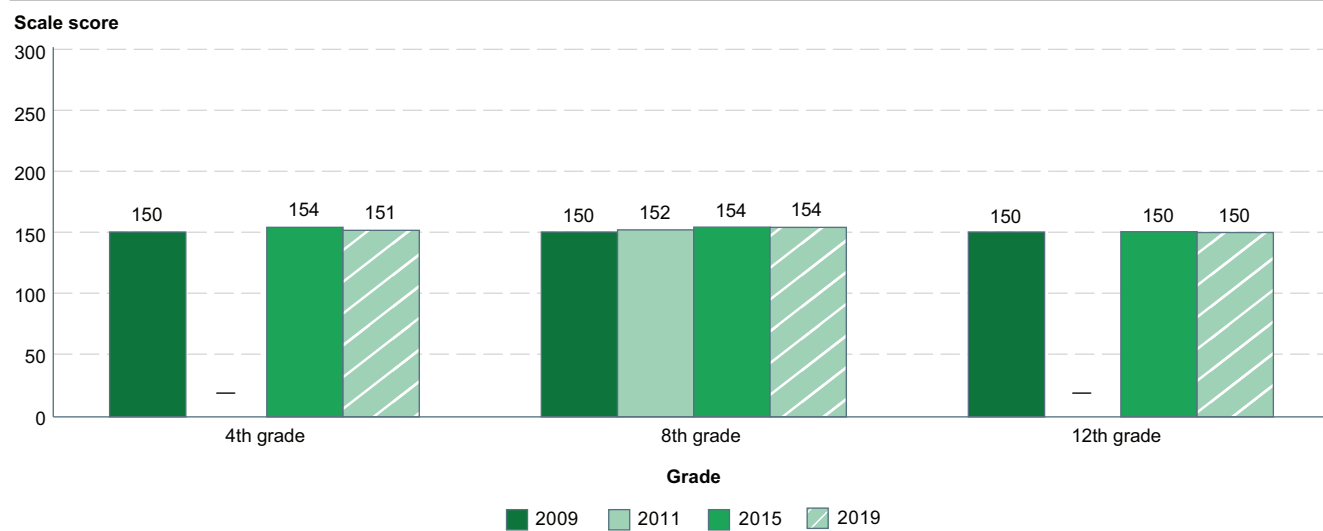
## Science Performance

The percentages of 4th- and 8th-grade students performing at or above NAEP Proficient were higher in 2019 than in 2009. However, a lower percentage of 4th-grade students performed at or above NAEP Proficient in 2019 (36 percent) compared with 2015 (38 percent). For both 4th- and 8th-grade students, those at the 10th percentile scored lower in 2019 than in 2015.

The National Assessment of Educational Progress (NAEP) assesses student performance in science at grades 4, 8, and 12 in both public and private schools across the nation. The NAEP science assessment was designed to measure students' knowledge and skills in three content areas: physical science, life science, and Earth and space sciences. NAEP science scores range from 0 to 300 for all three grades. NAEP achievement levels define what students should know and be able to do:

NAEP *Basic* indicates partial mastery of fundamental knowledge and skills, and NAEP *Proficient* indicates solid academic performance and demonstrated competency over challenging subject matter. The most recent science assessments were conducted in 2019 for grades 4, 8, and 12.<sup>1</sup> Prior to 2019, each grade was assessed in 2015 and 2009.<sup>2</sup> Grade 8 was also assessed in 2011. Grade 8 data from 2011 are shown in the figures, but the discussion focuses on years with data for all grades.

**Figure 1. Average National Assessment of Educational Progress (NAEP) science scale scores of 4th-, 8th-, and 12th-grade students: 2009, 2011, 2015, and 2019**



— Not available.

NOTE: Includes public and private schools. Scale ranges from 0 to 300 for all grades, but scores cannot be compared across grades. Assessment was not conducted for grades 4 and 12 in 2011. Although rounded numbers are displayed, the figures are based on unrounded data.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, 2015, and 2019 Science Assessment, NAEP Data Explorer. See *Digest of Education Statistics 2021*, table 223.10.

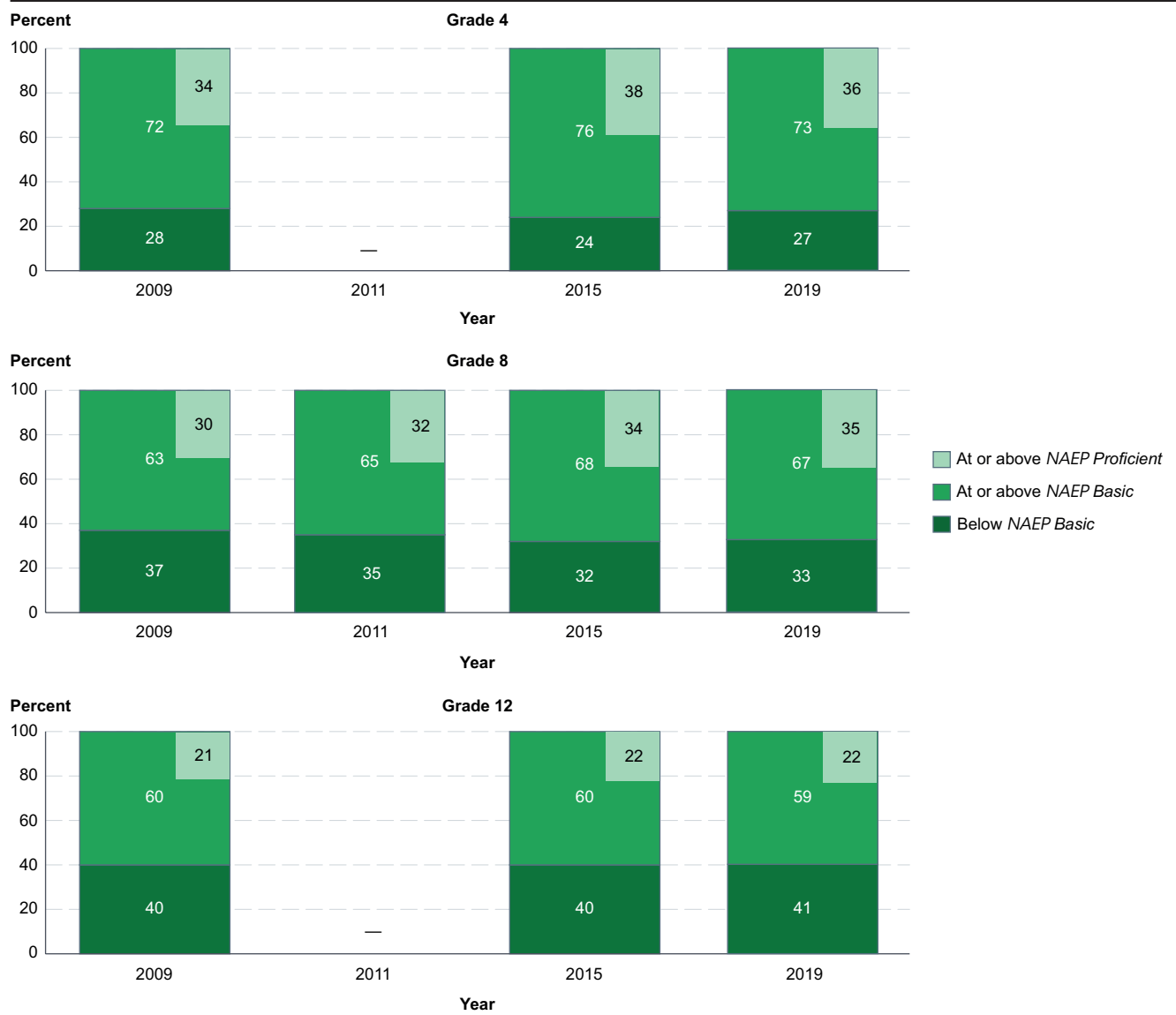
In 2019, the average 4th-grade science score (151) was higher than the score in 2009 (150) but lower than the score in 2015 (154). For higher-performing students (those at the 75th and 90th percentiles),<sup>3</sup> science scores in 2019 were higher than in 2009 by 2 points and 3 points, respectively. Among lower-performing students (those at the 10th and 25th percentiles), the 2019 scores were lower than in 2015 by 5 points and 4 points, respectively.<sup>4,5</sup>

The average 8th-grade science score in 2019 (154) was higher than the score in 2009 (150) but not measurably different from the score in 2015. Compared with 2009,

the scores in 2019 were higher for both lower-performing and higher-performing students. However, compared with 2015, the score in 2019 was 2 points lower for students at the 10th percentile.

The average 12th-grade science score in 2019 (150) was not measurably different from the score in 2009 or 2015. However, the 2019 score for students at the 10th percentile was 4 points lower than in 2009. Compared with 2015, the 2019 scores were not measurably different for either lower-performing students or higher-performing students.

**Figure 2. Percentage distribution of 4th-, 8th-, and 12th-grade students across National Assessment of Educational Progress (NAEP) science achievement levels: 2009, 2011, 2015, and 2019**



— Not available.

NOTE: Includes public and private schools. Achievement levels define what students should know and be able to do: *NAEP Basic* indicates partial mastery of fundamental knowledge and skills, and *NAEP Proficient* indicates solid academic performance and demonstrated competency over challenging subject matter. Assessment was not conducted for grades 4 and 12 in 2011. 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), 2009, 2011, 2015, and 2019, Science Assessment, NAEP Data Explorer. See *Digest of Education Statistics 2021*, table 223.10.

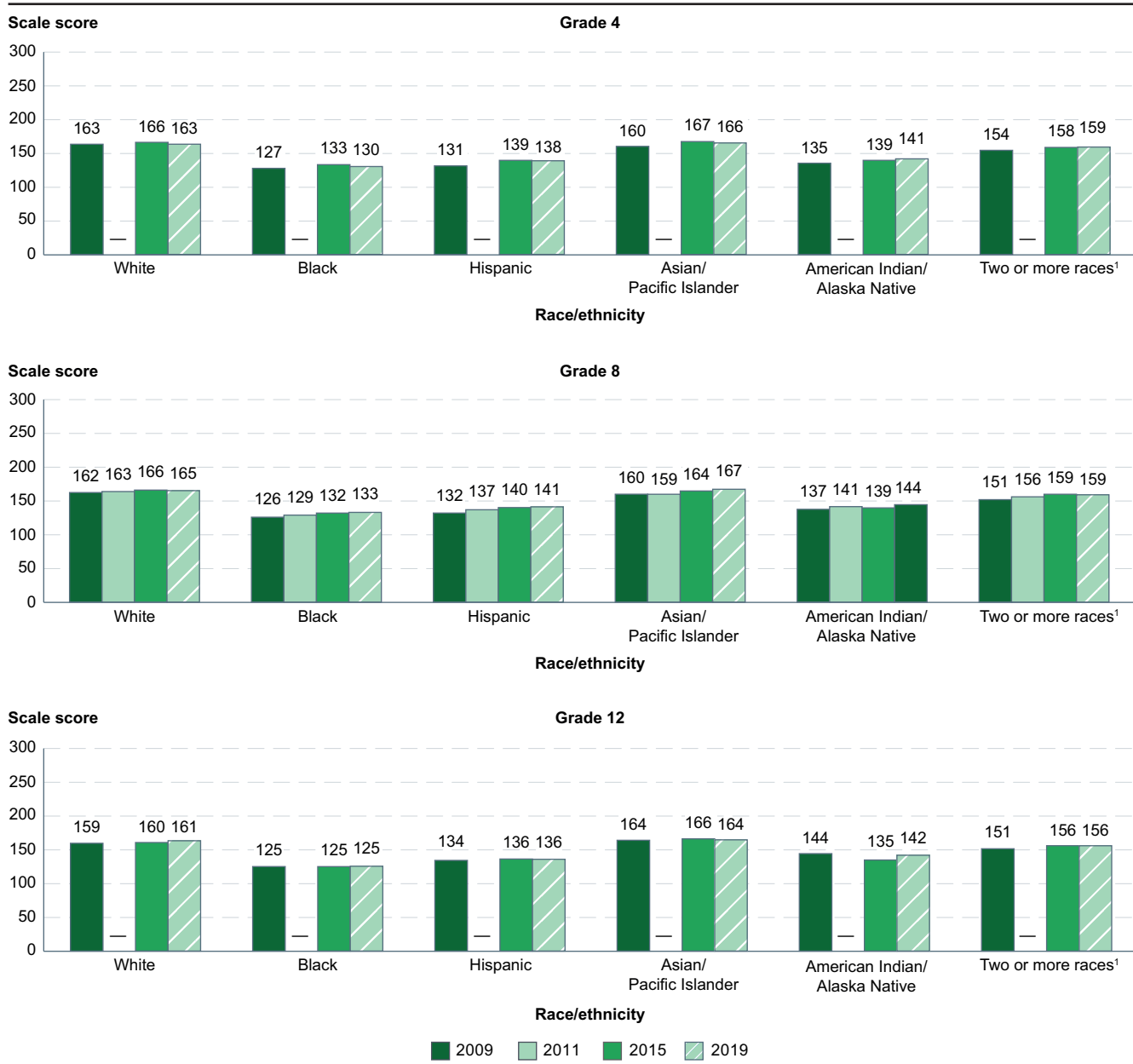
In 2019, about 73 percent of 4th-grade students performed at or above the *NAEP Basic* achievement level in science. Thirty-six percent performed at or above *NAEP Proficient* achievement level. The percentage performing at or above *NAEP Basic* in 2019 was not measurably different from the percentage in 2009 but lower than the percentage in 2015 (76 percent). The percentage performing at or above *NAEP Proficient* in 2019 was higher than in 2009 (34 percent) but lower than in 2015 (38 percent).

Among 8th-grade students in 2019, about 67 percent performed at or above *NAEP Basic* in science. Thirty-five percent performed at or above *NAEP Proficient*. The percentage performing at or above *NAEP Basic* in 2019

was higher than the percentage in 2009 (63 percent) but not measurably different from the percentage in 2015. Similarly, the percentage performing at or above *NAEP Proficient* in 2019 was higher than the percentage in 2009 (30 percent) but not measurably different from the percentage in 2015.

Among 12th-grade students in 2019, about 59 percent performed at or above *NAEP Basic* in science. Twenty-two percent performed at or above *NAEP Proficient*. The percentages of 12th-grade students in 2019 performing at these levels were not measurably different from the corresponding percentages in 2009 or 2015.

**Figure 3. Average National Assessment of Educational Progress (NAEP) science scale scores of 4th-, 8th-, and 12th-grade students, by race/ethnicity: 2009, 2011, 2015, and 2019**



— Not available.

<sup>1</sup> Students who identified with two or more race categories (e.g., White and Black) were classified as “other” and reported as part of the “unclassified” category prior to 2011; from 2011 on, they have been classified as “Two or more races.”

NOTE: Includes public and private schools. Scale ranges from 0 to 300 for all grades, but scores cannot be compared across grades. Race categories exclude persons of Hispanic ethnicity. Assessment was not conducted for grades 4 and 12 in 2011. Although rounded numbers are displayed, the figures are based on unrounded data.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, 2015, and 2019, Science Assessment, NAEP Data Explorer. See *Digest of Education Statistics 2021*, table 223.10.

At grade 4 in 2019, the average science score was highest for Asian/Pacific Islander (166) and White (163) students. It was lowest for Black students (130). In between, the scores were 159 for students of Two or more races,<sup>6</sup> 141 for American Indian/Alaska Native students, and 138 for Hispanic students. Compared with the 2009 average scores, the 2019 scores were higher for students across all

reported racial/ethnic groups except for White students. Starting in 2015, separate data for Asian and Pacific Islander students were collected for all grade levels.<sup>7</sup> In 2019, the average score was 168 for Asian students and 142 for Pacific Islander students. Compared with the 2015 average scores, the 2019 scores were lower for White and Black students.

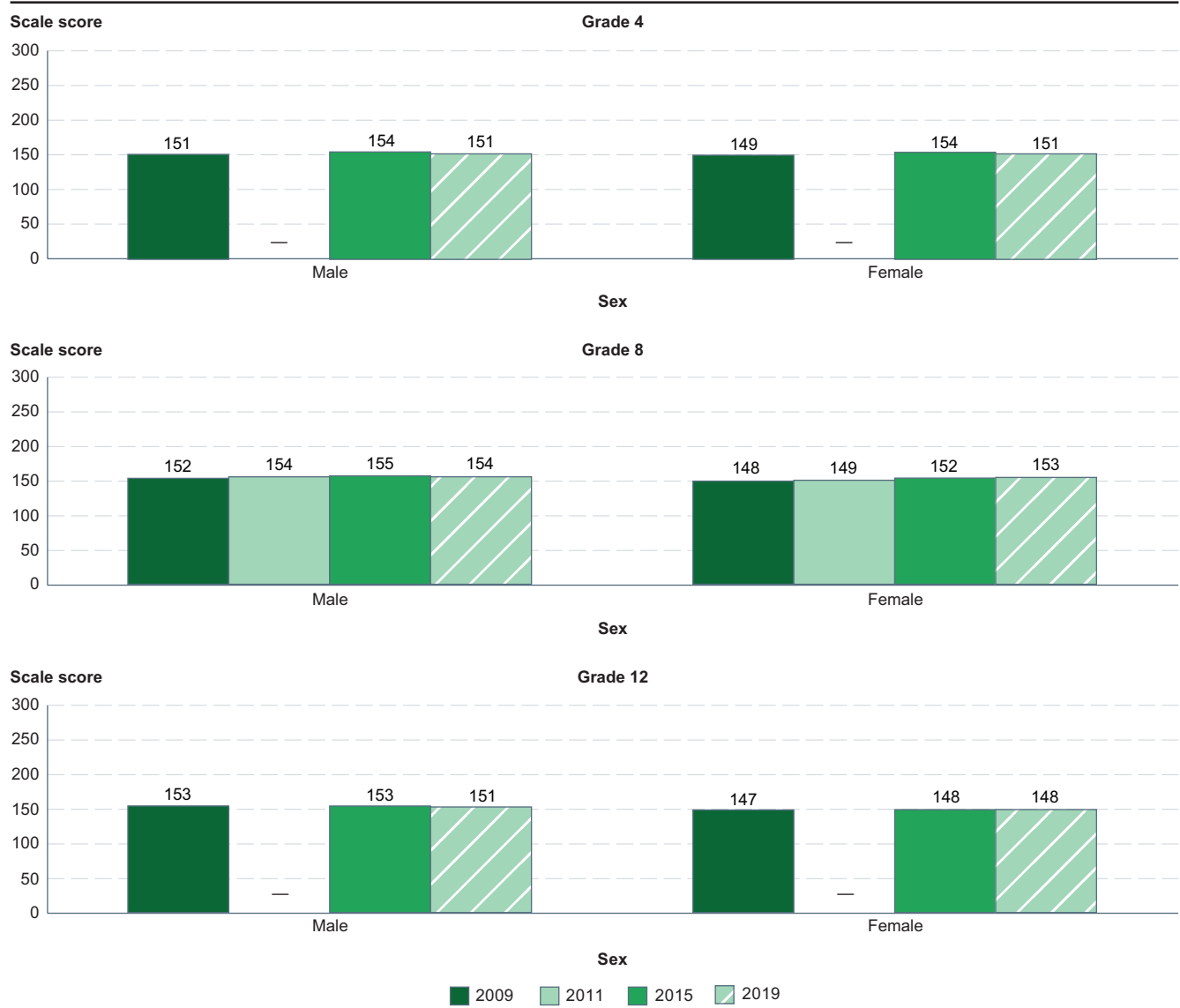
At grade 8 in 2019, the average science score was highest for Asian/Pacific Islander (167) and White (165) students. It was lowest for Black students (133). In between, the scores were 159 for students of Two or more races, 144 for American Indian/Alaska Native students, and 141 for Hispanic students. The average score was 168 for Asian students and 139 for Pacific Islander students in 2019. Compared with 2009, average scores in 2019 were higher for students across all reported racial/ethnic groups. However, there were no measurable differences in average scores between 2015 and 2019 for students of any reported racial/ethnic group.

Similar to grades 4 and 8, the average science score at grade 12 in 2019 was highest for Asian/Pacific Islander (164) and White (161) students. It was lowest for Black students (125). In between, the scores were 156 for students of Two or more races, 142 for American Indian/Alaska Native students, and 136 for Hispanic students. The average score was 166 for Asian students and 137 for Pacific Islander students in 2019. Compared with 2009 and 2015, average

scores in 2019 were not measurably different for students of any reported racial/ethnic group.

While the average science scores for White 4th- and 8th-grade students remained higher than those of their Black and Hispanic peers in 2019, racial/ethnic achievement gaps in 2019 were smaller than in 2009. At grade 4, the White-Black achievement gap was 33 points in 2019, compared with 36 points in 2009. The White-Hispanic achievement gap was 24 points in 2019, compared with 32 points in 2009. At grade 8, the White-Black achievement gap was 32 points in 2019, compared with 36 points in 2009. The White-Hispanic achievement gap was 24 points in 2019, compared with 30 points in 2009. The average science scores for White 12th-grade students remained higher than those of their Black and Hispanic peers in 2019. At grade 12, the White-Black achievement gap (35 points) and the White-Hispanic gap (25 points) in 2019 were not measurably different from the corresponding gaps in 2009.

**Figure 4. Average National Assessment of Educational Progress (NAEP) science scale scores of 4th-, 8th-, and 12th-grade students, by sex: 2009, 2011, 2015, and 2019**



— Not available.

NOTE: Includes public and private schools. Scale ranges from 0 to 300 for all grades, but scores cannot be compared across grades. Assessment was not conducted for grades 4 and 12 in 2011. Although rounded numbers are displayed, the figures are based on unrounded data.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, 2015, and 2019 Science Assessment, NAEP Data Explorer. See *Digest of Education Statistics 2021*, table 223.10.

The average science score for male 4th-grade students in 2019 (151) was not measurably different from the score in 2009 but lower than the score in 2015 (154). The average score for female 4th-grade students in 2019 (151) was higher than in 2009 (149) but lower than in 2015 (154). While there was a 1-point gap between male and female 4th-grade students in 2009, there was no measurable gender gap in 2015 or 2019.

The average science score for male 8th-grade students in 2019 (154) was higher than the score in 2009 (152) but was not measurably different from the score in 2015. Similarly, for female 8th-grade students, the average score in 2019 (153) was higher than the score in 2009 (148) but was not measurably different from the score in 2015. In 2019, there was no measurable gender gap. In comparison, the gap between male and female 8th-grade students was larger in 2009 (4 points) and in 2015 (3 points).

The average science scores for male (151) and female (148) 12th-grade students in 2019 were not measurably different from the corresponding scores in 2009 or 2015.

In addition, there was no measurable difference in the gender gap across these years for 12th-grade students.

Since 2009, the average science scores for English learner (EL) students were lower than the scores of their non-EL peers. At grade 4, the 2019 achievement gap between non-EL and EL students (34 points) was smaller than the gap in 2009 (39 points). At grade 8, the 2019 achievement gap (46 points) was not measurably different from the gap in 2009. At grade 12, the 2019 achievement gap (53 points) was larger than the gap in 2009 (47 points).

In 2019, students in high-poverty schools had lower average science scores than students in mid-high poverty, mid-low poverty, and low-poverty schools.<sup>8</sup> For example, at grade 4, the average science score for students in high-poverty schools (136) was lower than the scores for students in mid-high poverty schools (147), mid-low poverty schools (159), and low-poverty schools (170). This translates to an achievement gap of 33 points between high- and low-poverty schools at grade 4. This gap was 34 points at grade 8 and 35 points at grade 12.

---

#### Endnotes:

<sup>1</sup> Results from these assessments can only be reported at the national level and not for states and select large urban districts.

<sup>2</sup> In 2009, a new science framework was introduced at all grade levels. A variety of factors made it necessary to create this new framework: the publication of *National Science Education Standards* (1996) and *Benchmarks for Scientific Literacy* (1993); advances in both science and cognitive research; the growth in national and international science assessments; advances in innovative assessment approaches; and the need to incorporate accommodations so that the widest possible range of students can be fairly assessed. Consequently, the science results in 2009 and subsequent years cannot be compared to the results of previous assessments, and a new trend line was established beginning in 2009.

<sup>3</sup> NAEP scores are reported at five selected percentiles to show the progress made by lower-performing (10th and 25th percentiles), middle-performing (50th percentile), and higher-performing (75th and 90th percentiles) students.

<sup>4</sup> Throughout this indicator, details may not sum to totals because of rounding.

<sup>5</sup> In addition, the science score in 2019 was lower than in 2015 by 2 points for middle-performing students (those at the 50th percentile).

<sup>6</sup> Students who identified with two or more race categories (e.g., White and Black) were classified as “other” and reported as part of the “unclassified” category prior to 2011; from 2011 on, they have been classified as “Two or more races.”

<sup>7</sup> In 2011, NAEP began reporting separate data for Asian students, Pacific Islander students, and students of Two or more races. However, the 2011 NAEP science assessment only collected data for grade 8.

<sup>8</sup> High-poverty schools are defined as schools where 76 to 100 percent of the students are eligible for free or reduced-price lunch (FRPL); mid-high poverty schools are schools where 51 to 75 percent of the students are eligible for FRPL; mid-low poverty schools are schools where 26 to 50 percent of the students are eligible for FRPL; and low-poverty schools are schools where 25 percent or less of the students are eligible for FRPL.

---

**Reference tables:** *Digest of Education Statistics 2021*, table 223.10

**Related indicators and resources:** [International Comparisons: Reading, Mathematics, and Science Literacy of 15-Year-Old Students](#); [International Comparisons: Mathematics and Science Achievement at Grades 4 and 8](#); [Mathematics Performance](#); [Reading Performance](#); [Technology and Engineering Literacy](#) [*web-only*]

---

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