

Background Information

- NAEP provides national and state achievement results of elementary and secondary students in the United States for 4th and 8th grade math every 2 years.
- NAEP was established in 1969 and is a project of the National Center for Education Statistics (NCES) under the U.S. Department of Education.
- The assessments are not designed to provide individual student, school, or district results with the exception of districts participating in NAEP's Trial Urban District Assessment (TUDA) program.
- It is the only federal nationally representative assessment of what young students know and can do in key subject areas. Commonly referred to as the "Nation's Report Card," it is used to provide a point of reference for comparisons between states and to provide an accurate and representative picture of student performance over time.
- NAEP results are used in setting education policy at a National level. States are neither rewarded nor sanctioned based on their results. The Nation's Report Card is produced by the U.S. Department of Education and has generated more than 600 reports in its history.
- The NAEP 2022 math assessment was administered to a representative sample of fourth and eighth graders at the national level and at the state level.
- In 2022, the NAEP mathematics assessment was administered as a digitally based assessment (DBA) at grades 4 and 8; prior to 2017, paper-based assessments (PBA) were administered.
- The results from the 2022 assessment can be compared to those from previous years, showing how students' performance in mathematics has changed over time.
- The student survey is no longer administered in Colorado.
- Including transition time, and directions, it takes approximately 90 minutes for students to complete the math assessment.
- The NAEP math assessment window for Colorado students was January 24, 2022, through March 18, 2022.

Participation

All 50 states, the District of Columbia and Department of Defense schools participated.

Nationwide

- Nationwide: 115,400 public school fourth- grade students in 5,550 schools participated.
- Nationwide: 108,000 public school eighth-grade students in 5,010 schools participated.

Colorado

- Colorado: 2,600 public school fourth- grade students in 120 schools participated.
- Colorado: 2,400 public school eighth-grade students in 110 schools participated.

Frameworks

- For grades 4 and 8, the mathematics framework for the 2022 assessment is similar to earlier versions that guided the 1990, 1992, 1996, 2000, 2003, 2005, 2007, 2009, 2011, 2013, 2015 and 2017 mathematics assessments allowing students' performance in 2022 to be compared with previous years.
- Link to Frameworks (standards): <https://www.nagb.gov/naep-frameworks/mathematics.html>
- The 2022 mathematics framework classifies assessment questions in two dimensions, content area and mathematical complexity

Content

- **Number properties and operations** measures students' understanding of ways to represent, calculate, and estimate with numbers.
- **Measurement** assesses students' knowledge of measurement for such attributes as capacity, length, area, volume, time, angles, and rates.
- **Geometry** measures students' knowledge and understanding of shapes in two and three dimensions and relationships between shapes such as symmetry and transformations.
- **Data analysis, statistics, and probability** measures students' understanding of data representation, characteristics of data sets, experiments and samples, and probability.
- **Algebra** measures students' understanding of patterns, using variables, algebraic representation, and functions.

Mathematical Complexity

- **Low complexity** questions typically specify what a student is to do, which is often to carry out a routine mathematical procedure.
- **Moderate** complexity questions involve more flexibility of thinking and often require a response with multiple steps.
- **High complexity** questions make heavier demands and often require abstract reasoning or analysis in a novel situation.

Scoring

Scale Scores

- Both the NAEP grade 4 and 8 math scales range from 0 to 500.
- The assessments are not designed to provide individual student, school, or district results.

Math Achievement Levels

	Grade 4	Grade 8
Below Basic	0–213	0–261
Basic	214–248	262–298
Proficient	249–281	299–332
Advanced	282–500	333–500

- At or above Basic includes Basic, Proficient, and Advanced. At or above Proficient includes Proficient and Advanced.
- NAEP scores are only reported as “higher” or “lower” if the difference is statistically significant ($p < 0.05$).

Key Findings for Colorado NAEP 2019 Mathematics

Overall Key Findings for Grade Four Math

- In 2022, the average mathematics scale score for fourth-grade students in Colorado was 236. This was not significantly different from that for the nation's public schools (235).
- The average scale score for students in Colorado in 2022 (236) was higher than that in 1992 (221) and was lower than that in 2019 (242).
- In 2022, the percentage of students in Colorado who performed at or above *NAEP Proficient* was 36 percent. This was not significantly different from that for the nation's public schools (35 percent).
- The percentage of students in Colorado who performed at or above *NAEP Proficient* in 2022 (36 percent) was greater than that in 1992 (17 percent) and was smaller than that in 2019 (44 percent).
- In 2022, the percentage of students in Colorado who performed at or above *NAEP Basic* was 75 percent. This was not significantly different from that for the nation's public schools (74 percent).
- The percentage of students in Colorado who performed at or above *NAEP Basic* in 2022 (75 percent) was greater than that in 1992 (61 percent) and was smaller than that in 2019 (80 percent).

Overall Key Findings for Grade Eight Math

- In 2022, the average mathematics scale score for eighth-grade students in Colorado was 275. This was not significantly different from that for the nation's public schools (273).
- The average scale score for students in Colorado in 2022 (275) was higher than that in 1990 (267) and was lower than that in 2019 (285).
- In 2022, the percentage of students in Colorado who performed at or above *NAEP Proficient* was 28 percent. This was not significantly different from that for the nation's public schools (26 percent).
- The percentage of students in Colorado who performed at or above *NAEP Proficient* in 2022 (28 percent) was greater than that in 1990 (17 percent) and was smaller than that in 2019 (37 percent).
- In 2022, the percentage of students in Colorado who performed at or above *NAEP Basic* was 63 percent. This was not significantly different from that for the nation's public schools (60 percent).
- The percentage of students in Colorado who performed at or above *NAEP Basic* in 2022 (63 percent) was greater than that in 1990 (57 percent) and was smaller than that in 2019 (73 percent).

National Math Trend Results

- In 2022, students had an average score in mathematics of 236 points at grade 4 and 274 points at grade 8 on separate 0- 500 point scales.
- In grade 4, there was a five-point significant decrease in the average math scores from 2019 to 2022. In grade 8, there was a significant eight-point decrease in the average math score in 2022 compared to 2019.
- In 2022, fourth-grade mathematics scores declined at all five selected percentiles (10th and 25th percentiles), middle- (50th percentile), and higher- (75th and 90th percentiles) for the first time since the initial mathematics assessment in 1990
- In 2022, average fourth-grade mathematics scores decreased across most racial/ethnic groups; scores declined for male and female students.
- In 2022, average mathematics scores at eighth grade declined. Average scale scores were lower in 51 states/jurisdictions and not significantly different in 2.
- In 2022, eighth-grade mathematics scores declined at all five selected percentiles (10th and 25th percentiles), middle- (50th percentile), and higher- (75th and 90th percentiles) for the first time since the initial mathematics assessment in 1990
- In 2022, average eighth-grade mathematics scores decreased across most racial/ethnic groups; scores declined for male and female students.

Colorado Grade Four Math Trend Results

Race/Ethnicity

- In 2022, White students in Colorado had an average scale score that was higher than the average scale scores of Black and Hispanic students, but was not significantly different from the average scale score of Asian/Pacific Islander students.
- In 2022, the average scale score of White students in Colorado was higher than their respective scores in 1992 and 1996, but lower than their respective scores in 2009, 2011, 2013, 2015, and 2019, and not significantly different from their respective scores in 2003, 2005, 2007, and 2017.
- In 2022, the average scale scores of Black and Asian/Pacific Islander students in Colorado were higher than their respective scores in 1992 and 1996, but not significantly different from their respective scores in 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, and 2019.
- In 2022, the average scale score of Hispanic students in Colorado was higher than their respective scores in 1992 and 1996, but lower than their respective scores in 2009, 2011, 2013, 2015, 2017, and 2019, and not significantly different from their respective scores in 2003, 2005, and 2007.
- In 2022, Black students in Colorado had an average scale score that was lower than that of White students by 23 points. In 1992, the average scale score for Black students was lower than that of White students by 28 points.
- In 2022, Hispanic students in Colorado had an average scale score that was lower than that of White students by 28 points. This performance gap was wider than that of 1992 (23 points).

Gender

- In 2022, male students in Colorado had an average scale score in mathematics (239) that was higher than that of female students (233). In 1992, male students in Colorado had an average scale score in mathematics (222) that was not significantly different from that of female students (220).
- In 2022, male students in Colorado had an average scale score in mathematics (239) that was not significantly different from that of male students in public schools across the nation (238). Similarly, female students in Colorado had an average scale score (233) that was not significantly different from that of female students across the nation (232).

Student Eligibility for the National School Lunch Program

- In 2022, students in Colorado eligible for free/reduced-price school lunch had an average mathematics scale score of 220. This was lower than that of students in Colorado not eligible for this program (247).
- In 2022, students in Colorado who were eligible for free/reduced-price school lunch had an average scale score that was lower than that of students who were not eligible by 26 points. In 1996, the average scale score for students in Colorado who were eligible for free/reduced-price school lunch was lower than the score of those not eligible by 23 points.
- Students in Colorado eligible for free/reduced-price school lunch had an average scale score (220) in 2022 that was not significantly different from that of students in the nation who were eligible (223).

Students with Disabilities

- In 2022, students with disabilities in Colorado had a lower average score (208) than the average score of students without disabilities (240) by 37 points. Colorado's 32-point students with disabilities – non-disabled students score gap was larger than the national 30 point score gap.

English Language Learners

- In 2022, English language learners in Colorado had a lower average score (209) than the average score of non-English language learners (241) by 33 points. Colorado's 33-point English language learners – non-English language learners score gap was larger than the national 23 point score gap.

Colorado Grade Eight Math Trend Results

Race/Ethnicity

- In 2022, White students in Colorado had an average scale score that was higher than the average scale scores of Black and Hispanic students, but was not significantly different from the average scale score of Asian/Pacific Islander students.
- In 2022, the average scale score of White students in Colorado was higher than their respective scores in 1990, 1992, and 1996, but lower than their respective scores in 2007, 2009, 2011, 2013, 2015, 2017, and 2019, and not significantly different from their respective scores in 2003 and 2005.
- In 2022, the average scale score of Black students in Colorado was higher than their respective score in 1990, but lower than their respective scores in 2007 and 2011, and not significantly different from their respective scores in 1992, 1996, 2003, 2005, 2009, 2013, 2015, 2017, and 2019.
- In 2022, the average scale score of Hispanic students in Colorado was higher than their respective score in 1990, but lower than their respective scores in 2007, 2009, 2011, 2013, 2015, 2017, and 2019, and not significantly different from their respective scores in 1992, 1996, 2003, and 2005.
- In 2022, the average scale score of Asian/Pacific Islander students in Colorado was not significantly different from their respective scores in 1996, 2003, 2007, 2009, 2011, 2013, 2015, 2017, and 2019.
- In 2022, Black students in Colorado had an average scale score that was lower than that of White students by 34 points. In 1990, the average scale score for Black students was lower than that of White students by 36 points.
- In 2022, Hispanic students in Colorado had an average scale score that was lower than that of White students by 34 points. This performance gap was wider than that of 1990 (27 points).

Gender

- In 2022, male students in Colorado had an average scale score in mathematics (276) that was not significantly different from that of female students (274). In 1990, male students in Colorado had an average scale score in mathematics (269) that was higher than that of female students (266).
- In 2022, male students in Colorado had an average scale score in mathematics (276) that was not significantly different from that of male students in public schools across the nation (274). Similarly, female students in Colorado had an average scale score (274) that was not significantly different from that of female students across the nation (272).

Student Eligibility for the National School Lunch Program

- In 2022, students in Colorado eligible for free/reduced-price school lunch had an average mathematics scale score of 254. This was lower than that of students in Colorado not eligible for this program (287).
- In 2022, students in Colorado who were eligible for free/reduced-price school lunch had an average scale score that was lower than that of students who were not eligible by 33 points. This performance gap was wider than that of 1996 (23 points).
- Students in Colorado eligible for free/reduced-price school lunch had an average scale score (254) in 2022 that was lower than that of students in the nation who were eligible (260).

Students with Disabilities

- In 2022, students with disabilities in Colorado had a lower average score (230) than the average score of students without disabilities (280) by 50 points. Colorado's 50-point students with disabilities – non-disabled students score gap is not significantly different from the national 41-point score gap.

English Language Learners

- In 2022, English language learners in Colorado had a lower average score (230) than the average score of non-English language learners (280) by 50 points. Colorado's 50-point students who are English language learner – not English language learner score gap was larger than the national 36-point score gap.

Links

- NAEP website: <http://nces.ed.gov/nationsreportcard/mathematics>



- Links to individual snapshot reports for each participating state and other jurisdictions: <http://nces.ed.gov/nationsreportcard/states/>
- Link to The NAEP Data Explorer interactive database: <http://nces.ed.gov/nationsreportcard/naepdata/>
- NAEP 101 Video: http://youtu.be/J6Zml8b_EKI