2024 National Assessment of Educational Progress (NAEP)

Colorado Summary of Facts Math Grades 4 and 8

COLORADO Department of Education

The Nation's Report Card

National Assessment of Educational Progress

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.
- The NAEP 2024 reading assessment was administered to a representative sample of fourth and eighth-graders at the national level and at the state level.
- In 2024, 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 2024 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 reading assessment window for Colorado students was January 29, 2024, through March 8, 2024.

Participation

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

Nationwide

- Nationwide: 112,200 public school fourth-grade students in 5,750 public schools participated.
- Nationwide: 118,000 public school eighth-grade students in 5,150 public schools participated.

Colorado

- Colorado: 2,400 public school fourth-grade students in 120 schools participated.
- Colorado: 2,300 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)
- The 2024 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 ($p < 0.05$).

Performance descriptors of fourth-grade NAEP achievement levels for 2024 NAEP mathematics assessment

NAEP Basic Level (214)

Fourth-grade students performing at the NAEP Basic level should show some evidence of understanding the mathematical concepts and procedures in the five NAEP content areas

Fourth-graders performing at the *NAEP Basic* level should be able to estimate and use basic facts to perform simple computations with whole numbers, show some understanding of fractions and decimals, and solve some simple real-world problems in NAEP content areas. Students at this level should be able to use—although not always accurately—four-function calculators, rulers, and geometric shapes. Their written responses are often minimal and presented without supporting information.

NAEP Proficient Level (249)

Fourth-grade students performing at the NAEP Proficient level should consistently apply integrated procedural knowledge and conceptual understanding to problem solving in the five NAEP content areas.

Fourth-graders performing at the NAEP Proficient level should be able to use whole numbers to estimate, compute, and determine whether results are reasonable. They should have a conceptual understanding of fractions and decimals, be able to solve real-world problems in NAEP content areas, and use four-function calculators, rulers, and geometric shapes appropriately. Students performing at the NAEP Proficient level should employ problem-solving strategies such as identifying and using appropriate information. Their written solutions should be organized and presented both with supporting information and explanations of how they were achieved.

NAEP Advanced Level (282)

Fourth-grade students performing at the NAEP Advanced level should apply integrated procedural knowledge and conceptual understanding to complex and nonroutine real-world problem solving in the five NAEP content areas.

Fourth-graders performing at the NAEP Advanced level should be able to solve complex and nonroutine real-world problems in all NAEP content areas. They should display mastery in the use of four-function calculators, rulers, and geometric shapes. These students are expected to draw logical conclusions and justify answers and solution processes by explaining why, as well as how, they were achieved. They should go beyond the obvious in their interpretations and be able to communicate their thoughts clearly and concisely.

Performance descriptors of eighth-grade NAEP achievement levels for 2024 NAEP mathematics assessment

NAEP Basic Level (262)

Eighth-grade students performing at the NAEP Basic level should exhibit evidence of conceptual and procedural understanding in the five NAEP content areas. This level of performance signifies an understanding of arithmetic operations—including estimation—on whole numbers, decimals, fractions, and percents.

Eighth-graders performing at the *NAEP Basic* level should complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. They should be able to solve problems in NAEP content areas through the appropriate selection and use of strategies and technological tools—including calculators, computers, and geometric shapes. Students at this level also should be able to use fundamental algebraic and informal geometric concepts in problem solving.

As they approach the *NAEP Proficient* level, students at the *NAEP Basic* level should be able to determine which of the available data are necessary and sufficient for correct solutions and use them in problem solving. However, these eighth-graders show limited skill in communicating mathematically.

NAEP Proficient Level (299)

Eighth-grade students performing at the NAEP Proficient level should apply mathematical concepts and procedures consistently to complex problems in the five NAEP content areas.

Eighth-graders performing at the NAEP Proficient level should be able to conjecture, defend their ideas, and give supporting examples. They should understand the connections among fractions, percents, decimals, and other mathematical topics such as algebra and functions. Students at this level are expected to have a thorough understanding of NAEP Basic level arithmetic operations—an understanding sufficient for problem solving in practical situations.

Quantity and spatial relationships in problem solving and reasoning should be familiar to them, and they should be able to convey underlying reasoning skills beyond the level of arithmetic. They should be able to compare and contrast mathematical ideas and generate their own examples. These students should make inferences from data and graphs, apply properties of informal geometry, and accurately use the tools of technology. Students at this level should understand the process of gathering and organizing data and be able to calculate, evaluate, and communicate results within the domain of statistics and probability.

NAEP Advanced Level (333)

Eighth-grade students performing at the NAEP Advanced level should be able to reach beyond the recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles in the five NAEP content areas.

Eighth-graders performing at the NAEP Advanced level should be able to probe examples and counterexamples in order to shape generalizations from which they can develop models. Eighth-graders performing at the NAEP Advanced level should use number sense and geometric awareness to consider the reasonableness of an answer. They are expected to use abstract thinking to create unique problem-solving techniques and explain the reasoning processes underlying their conclusions.

Key Findings for Colorado NAEP 2024 Mathematics

Overall Key Findings for Grade Four Math

- In 2024, the average mathematics scale score for fourth-grade students in Colorado was 239. This was not significantly different from that for the nation's public schools (237).
- The average scale score for students in Colorado in 2024 (239) was higher than that in 1992 (221) and was not significantly different from that in 2022 (236).
- In 2024, the percentage of students in Colorado who performed at or above NAEP Proficient was 42 percent. This was not significantly different from that for the nation's public schools (39 percent).
- The percentage of students in Colorado who performed at or above NAEP Proficient in 2024 (42 percent) was greater than that in 1992 (17 percent) and in 2022 (36 percent).
- In 2024, the percentage of students in Colorado who performed at or above NAEP Basic was 77 percent. This was not significantly different from that for the nation's public schools (76 percent).
- The percentage of students in Colorado who performed at or above NAEP Basic in 2024 (77 percent) was greater than that in 1992 (61 percent) and was not significantly different from that in 2022 (75 percent).

Overall Key Findings for Grade Eight Math

- In 2024, the average mathematics scale score for eighth-grade students in Colorado was 278. This was higher than that for the nation's public schools (272).
- The average scale score for students in Colorado in 2024 (278) was higher than that in 1990 (267) and was not significantly different from that in 2022 (275).
- In 2024, the percentage of students in Colorado who performed at or above NAEP Proficient was 32 percent. This was greater than that for the nation's public schools (27 percent).
- The percentage of students in Colorado who performed at or above NAEP Proficient in 2024 (32 percent) was greater than that in 1990 (17 percent) and was not significantly different from that in 2022 (28 percent).
- In 2024, the percentage of students in Colorado who performed at or above NAEP Basic was 65 percent. This was greater than that for the nation's public schools (59 percent).
- The percentage of students in Colorado who performed at or above NAEP Basic in 2024 (65 percent) was greater than that in 1990 (57 percent) and was not significantly different from that in 2022 (63 percent).

National Math Trend Results

Key Findings for Grade Four Math

- Most states/jurisdictions and all urban districts with average score changes in 2024 had score increases compared to 2022, while compared to 2019 most states and all districts with average score changes in 2024 had declines. Most student groups with average score increases in 2024 also increased at the 75th percentile.
- Student absenteeism lower compared to 2022 but higher than the pre-pandemic rate in 2019.

Key Findings for Grade Eight Math

- Few states/jurisdictions and several urban districts had average score declines compared to 2022 while most states/jurisdictions and urban districts had declines compared to 2019.
- Student groups with average score declines also declined at the 25th percentile.
- Student absenteeism lower compared to 2022 but higher than the pre-pandemic rate in 2019.

Colorado Grade Four Math Trend Results

Race/Ethnicity

Average Scale Score Results

- In 2024, White students in Colorado had an average scale score that was higher than the average scale scores of Asian/Pacific Islander, Black, and Hispanic students.
- In 2024, Black students in Colorado had an average scale score that was lower than that of White students by 25 points. In 1992, the average scale score for Black students was lower than that of White students by 28 points.
- In 2024, Hispanic students in Colorado had an average scale score that was lower than that of White students by 28 points. In 1992, the average scale score for Hispanic students was lower than that of White students by 23 points.

Achievement-Level Results

- In 2024 in Colorado, the percentage of White students performing at or above NAEP Proficient was greater than the corresponding percentages of Asian/Pacific Islander, Black, and Hispanic students.
- In 2024, the percentage of Asian/Pacific Islander students in Colorado performing at or above NAEP Proficient was smaller than the percentages of their respective peers in 2013 and 2022, but not significantly different from the percentages of their respective peers in 1992, 1996, 2003, 2005, 2007, 2009, 2011, 2015, 2017, and 2019.
- In 2024, the percentage of Black students in Colorado performing at or above NAEP Proficient was greater than the percentages of their respective peers in 1992, 1996, and 2003, but not significantly different from the percentages of their respective peers in 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, and 2022.
- In 2024, the percentage of Hispanic students in Colorado performing at or above NAEP Proficient was greater than the percentages of their respective peers in 1992, 1996, 2003, and 2022, but smaller than the percentage in 2013, and not significantly different from the percentages of their respective peers in 2005, 2007, 2009, 2011, 2015, 2017, and 2019.
- In 2024, the percentage of White students in Colorado performing at or above NAEP Proficient was greater than the percentages of their respective peers in 1992, 1996, 2003, 2005, and 2022, but not significantly different from the percentages of their respective peers in 2007, 2009, 2011, 2013, 2015, 2017, and 2019.

Gender

Average Scale Score Results

- In 2024, male students in Colorado had an average scale score in mathematics (244) that was higher than that of female students (234). This performance gap was wider than that of 1992 (2 points).
- In 2024, male students in Colorado had an average scale score in mathematics (244) that was higher than that of male students in public schools across the nation (240). However, female students in Colorado had an average scale score (234) that was not significantly different from that of female students across the nation (235).

Achievement-Level Results

- In the 2024 assessment, 48 percent of male students and 35 percent of female students performed at or above NAEP Proficient in Colorado. The difference between these percentages was statistically significant.
- The percentage of male students in Colorado's public schools who were at or above NAEP Proficient in 2024 (48 percent) was greater than that of male students in the nation (43 percent).
- The percentage of female students in Colorado's public schools who were at or above NAEP Proficient in 2024 (35 percent) was not significantly different from that of female students in the nation (36 percent).

Student Eligibility for the National School Lunch Program

Average Scale Score Results

- In 2024, students in Colorado identified as economically disadvantaged had an average mathematics scale score of 224. This was lower than that of students in Colorado identified as not economically disadvantaged for this program (253).
- In 2024, students in Colorado who were identified as economically disadvantaged had an average scale score that was lower than that of students who were identified as not economically disadvantaged by 29 points. This performance gap was wider than that of 1996 (23 points).
- Students in Colorado identified as economically disadvantaged had an average scale score (224) in 2024 that was not significantly different from that of students in the nation who were identified as economically disadvantaged (226).
- In Colorado, students identified as economically disadvantaged had an average mathematics scale score in 2024 that was higher than that of identified as economically disadvantaged students in 1996, 2003, and 2022, but lower than that of identified as economically disadvantaged students in 2011, 2013, and 2015, and not significantly different from that of identified as economically disadvantaged students in 2005, 2007, 2009, 2017, and 2019.

Achievement-Level Results

- In Colorado, 24 percent of students who were identified as economically disadvantaged and 58 percent of those who were identified as not economically disadvantaged for this program performed at or above NAEP Proficient in 2024. These percentages were significantly different from one another.
- For students in Colorado in 2024 who were identified as economically disadvantaged, the percentage at or above NAEP Proficient (24 percent) was not significantly different from the corresponding percentage for their counterparts around the nation (25 percent).
- In Colorado, the percentage of students identified as economically disadvantaged who performed at or above NAEP Proficient in 2024 was greater than the corresponding percentages in 1996, 2003, and 2022, but smaller than the percentage in 2013, and not significantly different from the corresponding percentages in 2005, 2007, 2009, 2011, 2015, 2017, and 2019.

Students with Disabilities

- In 2024, students with disabilities in Colorado had a lower average score (213) than the average score of students without disabilities (244) by 31points. Colorado's 31-point students with disabilities – non-disabled students score gap was the same as the national 31 point score gap.

Multilingual Learners

- In 2024, Multilingual Learners in Colorado had a lower average score (208) than the average score of non-Multilingual Learners (245) by 37 points. Colorado's 37-point Multilingual Learners – non-Multilingual Learners score gap was larger than the national 25-point score gap.

Colorado Grade Eight Math Trend Results

Race/Ethnicity

Average Scale Score Results

- In 2024, White students in Colorado had an average scale score that was higher than the average scale scores of Black and Hispanic students, but was lower than the average scale score of Asian/Pacific Islander students.
- In 2024, the average scale score of Asian/Pacific Islander students in Colorado was higher than their respective score in 1996, but not significantly different from their respective scores in 2003, 2007, 2009, 2011, 2013, 2015, 2017, 2019, and 2022.
- In 2024, Black students in Colorado had an average scale score that was lower than that of White students by 37 points. In 1990, the average scale score for Black students was lower than that of White students by 36 points.
- In 2024, Hispanic students in Colorado had an average scale score that was lower than that of White students by 29 points. In 1990, the average scale score for Hispanic students was lower than that of White students by 27 points.

Achievement-Level Results

- In 2024 in Colorado, the percentage of White students performing at or above NAEP Proficient was greater than the corresponding percentages of Black and Hispanic students, but was not significantly different from the percentage of Asian/Pacific Islander students.
- In 2024, the percentage of Asian/Pacific Islander students in Colorado performing at or above NAEP Proficient was not significantly different from the percentages of their respective peers in 1996, 2003, 2007, 2009, 2011, 2013, 2015, 2017, 2019, and 2022.

Gender

Average Scale Score Results

- In 2024, male students in Colorado had an average scale score in mathematics (281) that was higher than that of female students (275). In 1990, male students in Colorado had an average scale score in mathematics (269) that was higher than that of female students (266).
- In 2024, male students in Colorado had an average scale score in mathematics (281) that was higher than that of male students in public schools across the nation (274). Similarly, female students in Colorado had an average scale score (275) that was higher than that of female students across the nation (270).

Achievement-Level Results

- In the 2024 assessment, 35 percent of male students and 30 percent of female students performed at or above NAEP Proficient in Colorado. The difference between these percentages was not statistically significant.
- The percentage of male students in Colorado's public schools who were at or above NAEP Proficient in 2024 (35 percent) was greater than that of male students in the nation (29 percent).
- The percentage of female students in Colorado's public schools who were at or above NAEP Proficient in 2024 (30 percent) was greater than that of female students in the nation (24 percent).

Student Eligibility for the National School Lunch Program

Average Scale Score Results

- In 2024, students in Colorado identified as economically disadvantaged had an average mathematics scale score of 259. This was lower than that of students in Colorado identified as not economically disadvantaged for this program (292).
- In 2024, students in Colorado who were identified as economically disadvantaged had an average scale score that was lower than that of students who were identified as not economically disadvantaged by 33 points. This performance gap was wider than that of 1996 (23 points).
- Students in Colorado identified as economically disadvantaged had an average scale score (259) in 2024 that was not significantly different from that of students in the nation who were identified as economically disadvantaged (257).
- In Colorado, students identified as economically disadvantaged had an average mathematics scale score in 2024 that was lower than that of identified as economically disadvantaged students in 2007, 2009, 2011, 2013, 2015, 2017, and 2019, but not significantly different from that of identified as economically disadvantaged students in 1996, 2003, 2005, and 2022.

Achievement-Level Results

- In Colorado, 15 percent of students who were identified as economically disadvantaged and 45 percent of those who were identified as not economically disadvantaged for this program performed at or above NAEP Proficient in 2024. These percentages were significantly different from one another.
- For students in Colorado in 2024 who were identified as economically disadvantaged, the percentage at or above NAEP Proficient (15 percent) was not significantly different from the corresponding percentage for their counterparts around the nation (14 percent).
- In Colorado, the percentage of students identified as economically disadvantaged who performed at or above NAEP Proficient in 2024 was greater than the percentage in 2022, but smaller than the corresponding percentages in 2011 and 2013, and not significantly different from the corresponding percentages in 1996, 2003, 2005, 2007, 2009, 2015, 2017, and 2019.

Students with Disabilities

- In 2024, students with disabilities in Colorado had a lower average score (239) than the average score of students without disabilities (283) by 44 points. Colorado's 44-point students with disabilities – non-disabled students score gap is larger than the national 40-point score gap.

Multilingual Learners

- In 2024, Multilingual Learners in Colorado had a lower average score (226) than the average score of non-Multilingual Learners (283) by 57 points. Colorado's 57-point students who are English language learner – not English language learner score gap was larger than the national 39-point score gap.

Links

- NAEP website
- Links to individual snapshot reports for each participating state and other jurisdictions
- Link to the NAEP Data Explorer interactive database
- NAEP 101 Video