

# Colorado's Standards

## CSAP Mathematics Assessment Framework

### Grade 5

**ASSESSMENT FRAMEWORK**– defines what will be assessed on the State’s paper and pencil, standardized, timed assessment (CSAP). This document is organized as follows:

<b>Standard</b>	<i>Indicates the broad knowledge and skills that all students should be acquiring in Colorado schools at grade level. Each standard is assessed every year.</i>	
<b>Benchmark</b>	<i>Tactical description of the knowledge and skills students should acquire within each grade level range (i.e., K-4, 5-8, or 9-12).</i>	
Assessment Objectives	a	<i>Specific knowledge and skills measured by CSAP for each grade level assessed. Assessment Objectives are assessed on a cyclical basis.</i>

*Note: The appearance of an \* behind a word or phrase indicates it appears in the glossary of the Colorado Model Content Standards for Mathematics.*

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<b>Standard 1</b>	Students develop number sense* and use numbers and number relationships in problem-solving situations* and communicate the reasoning used in solving these problems.	
<b>Benchmark 1</b>	Demonstrate meanings for integers*, rational numbers, percents, square roots and pi ( $\pi$ ) physical materials and technology in problem-solving situations*.	
Assessment Objectives	a	Locate commonly used positive rational numbers* including terminating decimals through hundredths, fractions (halves, thirds, fourths, eighths, and tenths), mixed numbers, and percents on a number line.
	b	Using concrete materials, demonstrate the equivalence of commonly-used fractions, terminating decimals, and percents (for example, $7/10 = 0.7 = 70\%$ ).
	c	Demonstrate the meaning of square* numbers using pictorial or concrete materials.
<b>Benchmark 2</b>	Read, write and order integers, rational numbers, and common irrational numbers* such as $\sqrt{2}$ , $\sqrt{5}$ , and $\pi$ .	
Assessment Objectives	a	Read, write, and order positive rational numbers*, including commonly-used fractions and terminating decimals through hundredths.
	b	Compare commonly-used proper fractions and terminating decimals.
<b>Benchmark 3</b>	Applying number theory concepts (for example, primes, factors, multiples) to represent numbers in various ways.	
Assessment Objectives	a	Identify factors, multiples, and prime*/composite numbers.
	b	Recognize equivalent representations for the same number and generate them by decomposing and composing numbers (for example, 36 can be represented as $30+6$ , $20+16$ , $9 \times 4$ , $40-4$ , three dozen and/or the square* of 6).
	c	Describe numbers by their characteristics (for example, even, odd, prime*, square*).
<b>Benchmark 4</b>	Use the relationships among fractions, decimals, and percents, including the concepts of ratio and proportion, in	

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	problem-solving situations*.	
Assessment Objectives	a	Demonstrate the equivalent relationships among commonly used fractions, decimals, and percents using pictorial or concrete materials.
<b>Benchmark 5</b>	Develop, test, and explain conjectures* about properties of integers* and rational numbers*.	
Assessment Objectives	a	Develop, test, and explain conjectures* about properties of whole numbers and commonly-used fractions and decimals.
	b	Use number properties (commutative*, associative*, identity*) to evaluate numeric expressions and solve equations.
<b>Benchmark 6</b>	Using number sense* to estimate and justify the reasonableness of solutions to problems involving integers*, rational numbers*, and common irrational numbers* such as $\sqrt{2}$ , $\sqrt{5}$ and $\pi$ .	
Assessment Objectives	a	Use number sense* to estimate sums and differences of fractions and decimals using benchmarks (for example, $5/6 + 7/8$ must be equal to an amount less than 2, since each fraction is less than 1).
	b	Use appropriate techniques to estimate, determine, and then justify the reasonableness of solutions to problems involving whole numbers.

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<b>Standard 2</b>	Students use algebraic methods* to explore, model*, and describe patterns* and functions* involving numbers, shapes, data, and graphs in problem-solving situations* and communicate the reasoning used in solving these problems.	
<b>Benchmark 1</b>	Represent, describe, and analyze patterns* and relationships using tables, graphs, verbal rules, and standard algebraic notation.	
Assessment Objectives	a	Represent, describe, and analyze geometric and numeric patterns* (whole numbers).
	b	Recognize that a variable* is used to represent an unknown quantity.
	c	Identify such properties as commutativity, associativity, and distributivity and use them to compute with whole numbers.
<b>Benchmark 2</b>	Describe patterns* using variables*, expressions, equations, and inequalities in problem-solving situations*.	
Assessment Objectives	a	Solve problems by representing and analyzing patterns* using words, tables, and graphs.
<b>Benchmark 3</b>	Analyze functional* relationships to explain how a change in one quantity results in a change in another (for example, how the area of a circle changes as the radius increases, or how a person's height changes over time).	
Assessment Objectives	a	Describe how a change in one quantity results in a change in another quantity.
<b>Benchmark 4</b>	Distinguish between linear* and nonlinear functions* through informal investigations.	
Assessment Objectives	a	Match a description of a situation with its continuous graph.

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<b>Benchmark 5</b>	Solve simple linear* equations in problem-solving situations* using a variety of methods (informal, formal, and graphical) and a variety of tools (physical materials, calculators, and computers).	
Assessment Objectives	a	Use tables, charts, concrete objects, or pictures to solve problems involving linear* relationships and whole numbers.
<b>Standard 3</b>	Students use data collection and analysis, statistics*, and probability* in problem-solving situations* and communicate the reasoning used in solving these problems.	
<b>Benchmark 1</b>	Read and construct displays of data using appropriate techniques (for example, line graphs, circle graphs, scatter plots*, box plots*, stem-and-leaf plots*) and appropriate technology.	
Assessment Objectives	a	Differentiate between categorical* and numerical* data.
	b	Organize, construct, and interpret displays of data including tables, charts, pictographs, line plots, bar graphs, and line graphs.
	c	Read, interpret, and draw conclusions from various displays of data.
	d	From a given scenario, choose the correct graph from possible graph representations.
<b>Benchmark 2</b>	Display and use measures of central tendency*, such as mean, median and mode and measures of variability*, such as range and quartiles.	
Assessment Objectives	a	Distinguish between the median and mode of a data set.
	b	Determine the range of a set of data.

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<b>Benchmark 3</b>	Evaluate arguments that are based on statistical claims.	
Assessment Objectives	a	Analyze data and draw conclusions based on data displays such as tables, charts, line graphs, bar graphs, pictographs, and line plots.
<b>Benchmark 4</b>	Formulate hypotheses, drawing conclusions, and making convincing arguments based on data analysis.	
Assessment Objectives	a	Describe how data collection methods affect the nature of the data set.
	b	Make convincing arguments based on data analysis.
<b>Benchmark 5</b>	Determine probabilities* through experiments or simulations.	
Assessment Objectives	a	Describe events such as likely or unlikely and explain the degree of likelihood using words, such as certain, equally likely, and impossible.
	b	Use zero to represent the probability* of an impossible event and one to represent the probability* of a certain event.
	c	Use common fractions to represent the probability* of events that are neither certain nor impossible.
<b>Benchmark 6</b>	Make predictions and compare results using both experimental and theoretical probability* drawn from real-world problems*.	
Assessment Objectives	a	Using one chance device, such as a number cube or a spinner, design a fair game and an unfair game, and explain why they are fair and unfair.
	b	Make predications based on data obtained from simple probability* experiments.

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<b>Benchmark 7</b>	Use counting strategies to determine all the possible outcomes from an experiment (for example, the number of ways students can line up to have their picture taken).	
Assessment Objectives	a	Solve problems using strategies for finding all possible combinations* and/or arrangements.
<b>Standard 4</b>	Students use geometric concepts, properties, and relationships in problem-solving situations* and communicate the reasoning used in solving these problems.	
<b>Benchmark 1</b>	Construct two-and three-dimensional models* using a variety of materials and tools.	
Assessment Objectives	a	Represent a three-dimensional shape in two dimensions (for example, recognize a three dimensional figure from its net).
<b>Benchmark 2</b>	Describe, analyze and reason informally about the properties (for example, parallelism, perpendicularity, congruence*) of two- and three-dimensional figures.	
Assessment Objectives	a	Identify, compare, and analyze the attributes of two-and three-dimensional shapes and develop vocabulary to describe the attributes (for example, acute, obtuse, right angle, parallel lines, perpendicular lines, intersecting lines, and line segments).
Assessment Objectives	b	Make and test conjectures* about geometric relationships and develop logical arguments to justify conclusions.
<b>Benchmark 3</b>	Apply the concept of ratio, proportion and similarity* in problem-solving situations*.	
Assessment Objectives	<i>No objectives assessed at this level.</i>	

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<b>Benchmark 4</b>	Solve problems using coordinate geometry*.	
Assessment Objectives	a	Given a coordinate graph, read coordinate pairs in quadrant one.
	b	Choose the coordinate graph, which represents a given data set.
	c	Use maps and grids to locate points, create paths and measure distances within a coordinate system*.
<b>Benchmark 5</b>	Solving problems involving perimeter and area in two dimensions, and involving surface area and volume* in three dimensions.	
Assessment Objectives	a	Solve problems involving the perimeter of polygons.
	b	Solve problems involving the area of rectangles and squares.
<b>Benchmark 6</b>	Transforming* geometric figures using reflections*, translations*, and rotations* to explore congruence*.	
Assessment Objectives	a	Predict and describe the results of flipping, sliding, or turning a two-dimensional shape.
	b	Show lines of symmetry* for geometrical shapes.
<b>Standard 5</b>	Students use a variety of tools and techniques to measure, apply the results in problem-solving situations*, and communicate the reasoning used in solving these problems.	
<b>Benchmark 1</b>	Estimate, use and describe measures of distance, perimeter, area, volume*, capacity*, weight, mass, and angle comparison.	
Assessment Objectives	a	Determine the appropriate unit of measure (metric and US customary) when estimating distance, capacity*, and weight.



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	b	Estimate the length of common objects.
	c	Estimate the perimeter of polygons.
	d	Estimate the measures of angles (for example, $90^\circ$ , less than $90^\circ$ , more than $90^\circ$ ).
	e	Describe angles as acute, obtuse and right.
<b>Benchmark 2</b>	Estimate, make, and use direct and indirect measurements to describe and make comparisons.	
Assessment Objectives	<i>No objectives assessed at this level.</i>	
<b>Benchmark 3</b>	Read and interpret various scales including those based on number lines, graphs, and maps.	
Assessment Objectives	a	Read and interpret scales on number lines, graphs, and maps.
	b	Select the appropriate scale for a given problem (for example, using the appropriate scale when setting up a graph).
<b>Benchmark 4</b>	Develop and use formulas and procedures to solve problems involving measurement.	
Assessment Objectives	a	Find the perimeter and area of rectangles and squares, using appropriate units.
<b>Benchmark 5</b>	Describe how a change in an object's linear dimensions affects its perimeter, area, and volume*.	
Assessment Objectives	a	Demonstrate how changing one of the dimensions of a rectangle affects its perimeter (using concrete materials or graph paper).

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	b	Demonstrate how changing in one of the dimensions of a rectangle affects its area (using concrete materials or graph paper).
<b>Benchmark 6</b>	Select and use appropriate units and tools to measure to the degree of accuracy required in a particular problem-solving situation*.	
Assessment Objectives	a	Select and use the appropriate unit and tool to measure to the degree of accuracy required in a particular problem.
	b	Measure the sides of rectangles, squares, and triangles to the nearest 1/4 inch and nearest centimeter.
<b>Standard 6</b>	Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic*, paper-and-pencil, calculators, and computers, in problem-solving situations* and communicate the reasoning used in solving these problems.	
<b>Benchmark 1</b>	Use models* to explain how ratios, proportions, and percents can be used to solve real-world problems*.	
Assessment Objectives	a	Use concrete materials or pictures, determine commonly used percentages (for example, 25%, 50%) in problem-solving situations*.
<b>Benchmark 2</b>	Construct, use and explain procedures to compute and estimate with whole numbers, fractions, decimals, and integers*.	
Assessment Objectives	a	Demonstrate the conceptual meaning of the four basic* arithmetic operations (addition, subtraction, multiplication, and division).
	b	Use and explain strategies to add, subtract, multiply and divide whole numbers in problem-solving situations*.
	c	Demonstrate proficiency of addition, subtraction, multiplication and division of whole numbers in problem-solving situations*.

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	d	Use and explain strategies to add and subtract commonly-used fractions with like denominators in problem-solving situations*.
	e	Use and explain strategies to add and subtract commonly-used decimals in problem-solving situations*.
<b>Benchmark 3</b>	Develop, apply and explain a variety of different estimation strategies in problem-solving situations*, and explain why an estimate may be acceptable in place of an exact answer.	
Assessment Objectives	a	Determine from real-world problems* whether an estimated or exact answer is acceptable.
	b	Use and explain a variety of estimation techniques to solve problems.
<b>Benchmark 4</b>	Select and use appropriate <b>methods algorithms*</b> for computing with commonly used fractions and decimals, percents, and integers* in problem-solving situations* <b>from among mental arithmetic*, estimation, paper-and-pencil, calculator, and computer methods</b> , and determining whether the results are reasonable.	
Assessment Objectives	a	Determine whether information given is a problem-solving situation* is sufficient, insufficient, or extraneous.
	b	Given a real-world problem*, use an appropriate method (mental arithmetic*, estimation, paper-and-pencil, calculator) to correctly solve the problem.
	c	Given a math sentence, use any one of the four operations with whole numbers, create and illustrate a real-world problem*.
	d	In a problem-solving situation*, determine whether the results are reasonable and justify those results with correct computations.