

# Fifth Grade Math Standards and Benchmarks

## Standard #1: Number and Operations

Definition: Students will understand numerical concepts and mathematical operations.

<b>Benchmark #1:</b>  Understand numbers, ways of representing numbers, relationships among numbers, and number systems	Performance Objective 1	<input type="checkbox"/> Compare and order using concrete or illustrated models: <input type="checkbox"/> whole numbers (to millions) <input type="checkbox"/> common fractions (halves, thirds, fourths, eighths) <input type="checkbox"/> decimals (thousandths)
	Performance Objective 2	<input type="checkbox"/> Demonstrate understanding of the magnitude of the value of numbers from thousandths to millions, including common fractions.
	Performance Objective 3	<input type="checkbox"/> Represent place value using concrete or illustrated models up to one billion (1,000,000,000).
	Performance Objective 4	<input type="checkbox"/> Interpret percents as part of a hundred (i.e., find decimal and percent equivalents for common fractions, explain how they represent the same value, and compute a given percent of a whole number).
	Performance Objective 5	<input type="checkbox"/> Identify and represent on a number line decimals, fractions, and mixed numbers.
	Performance Objective 6	<input type="checkbox"/> Identify prime and composite numbers to 50.
<b>Benchmark #2:</b>  Understand the meaning of operations and how they relate to each other	Performance Objective 1	<input type="checkbox"/> Explain and perform whole number division and express remainders as a whole number or a fractional part as appropriate to the context of real-life problems.
	Performance Objective 2	<input type="checkbox"/> Add and subtract decimals.
	Performance Objective 3	<input type="checkbox"/> Add and subtract fractions and mixed numbers without regrouping and express answers in simplest form.
	Performance Objective 4	<input type="checkbox"/> Find the factors and multiples of whole numbers.
	Performance Objective 5	<input type="checkbox"/> Use arithmetic operations and inverse relationships to represent and solve real-world problems.
	Performance Objective 6	<input type="checkbox"/> Identify and represent on a number line decimals, fractions, and mixed numbers.
	Performance Objective 7	<input type="checkbox"/> Demonstrate proficiency with division, including one- and two-digit divisors.
	Performance Objective 8	<input type="checkbox"/> Solve simple problems involving the addition and subtraction of fractions and mixed numbers.
	Performance Objective 9	<input type="checkbox"/> Represent and use fractions and decimals in equivalent forms.
<b>Benchmark #3:</b>  Compute fluently and make reasonable estimates	Performance Objective 1	<input type="checkbox"/> Add, subtract, multiply, and divide whole numbers.
	Performance Objective 2	<input type="checkbox"/> Add and subtract decimals.
	Performance Objective 3	<input type="checkbox"/> Use estimation strategies to verify the reasonableness of calculated results.
	Performance Objective 4	<input type="checkbox"/> Explain how the estimation strategy impacts the result.
	Performance Objective 5	<input type="checkbox"/> Relate the basic arithmetic operations to one another (e.g., multiplication and division are inverse operations).
	Performance Objective 6	<input type="checkbox"/> Simplify numerical expressions using order of operations.

	Performance Objective 7	<input type="checkbox"/> Recognize and explain the differences between exact and approximate values.
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**Standard #2: Algebra**

Definition: Students will understand algebraic concepts and applications.

<u>Benchmark #1:</u>  Understand patterns, relations, and functions	Performance Objective 1	<input type="checkbox"/> Identify and graph ordered pairs in the first quadrant of the coordinate plane.
	Performance Objective 2	<input type="checkbox"/> Describe, represent, and analyze patterns and relationships.
	Performance Objective 3	<input type="checkbox"/> Identify, describe, and continue patterns presented in a variety of formats (e.g., numeric, visual, oral, written, kinesthetic, pictorial).
	Performance Objective 4	<input type="checkbox"/> Generate a pattern using a written description.
<u>Benchmark #2:</u>  Represent and analyze mathematical situations and structures using algebraic symbols	Performance Objective 1	<input type="checkbox"/> Compute the value of the expression for specific numerical values of the variable.
	Performance Objective 2	<input type="checkbox"/> Use a letter to represent an unknown number.
	Performance Objective 3	<input type="checkbox"/> Understand the differences between the symbols for “less than”, “less than or equal to”, “greater than”, and “greater than or equal to”.
<u>Benchmark #3:</u>  Use mathematical models to represent and understand quantitative relationships	Performance Objective 1	<input type="checkbox"/> Use mathematical models to represent and explain mathematical concepts and procedures.
	Performance Objective 2	<input type="checkbox"/> Understand and use mathematical models such as: <ul style="list-style-type: none"> <li><input type="checkbox"/> the number line to model the relationship between rational numbers and rational number operations</li> <li><input type="checkbox"/> pictorial representation of addition and subtraction of rational numbers with regrouping</li> <li><input type="checkbox"/> manipulatives or pictures to model computational procedures</li> <li><input type="checkbox"/> graphs, tables, and charts to describe data</li> <li><input type="checkbox"/> diagrams or pictures to model problem situations</li> </ul>
	Performance Objective 3	<input type="checkbox"/> Demonstrate how a situation can be represented in more than one way.
<u>Benchmark #4:</u>  Analyze changes in various contexts	Performance Objective 1	<input type="checkbox"/> Recognize and create patterns of change from everyday life using numerical or pictorial representations.
	Performance Objective 2	<input type="checkbox"/> Generalize patterns of change and recognize the same general patterns presented in different representations.

**Standard #3: Geometry**

Definition: Students will understand geometric concepts and applications.

<u>Benchmark #1:</u>  Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	Performance Objective 1	<input type="checkbox"/> Identify, describe, and classify two-dimensional shapes and three-dimensional figures by their properties.
	Performance Objective 2	<input type="checkbox"/> Recognize and describe properties of regular polygons having up to ten sides.
	Performance Objective 3	<input type="checkbox"/> Identify faces, edges, and bases on three-dimensional objects.
<u>Benchmark #2:</u>  Specify locations and describe spatial relationships using coordinate geometry and other representational systems	Performance Objective 1	<input type="checkbox"/> Recognize perpendicular and parallel lines.
<u>Benchmark #3:</u>  Apply transformations and use symmetry to analyze mathematical situations	Performance Objective 1	<input type="checkbox"/> Identify line of symmetry in simple geometric figures.
<u>Benchmark #4:</u>  Use visualization, spatial reasoning, and geometric modeling to solve problems	Performance Objective 1	<input type="checkbox"/> Understand and compute the perimeter of regular polygons.
	Performance Objective 2	<input type="checkbox"/> Identify and explain circumference, radius, and diameter.

**Standard #4: Measurement**

Definition: Students will understand measurement systems and applications.

<u>Benchmark #1:</u>  Understand measurable attributes of objects and the units, systems, and process of measurement	Performance Objective 1	<input type="checkbox"/> Understand properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each using both U.S. customary and metric systems.
	Performance Objective 2	<input type="checkbox"/> Select and use appropriate units and tools to measure according to the degree of accuracy required in a particular problem-solving situation.
	Performance Objective 3	<input type="checkbox"/> Solve problems involving linear measurement, weight, and capacity (e.g., measuring to the nearest sixteenth of an inch or nearest millimeter; using ounces, milliliters, or pounds and kilograms) to the appropriate degree of accuracy.
	Performance Objective 4	<input type="checkbox"/> Perform one-step conversions within a system of measurement (e.g., inches to feet, centimeters to meters).
<u>Benchmark #2:</u>  Apply appropriate techniques, tools, and formulas to determine measurements	Performance Objective 1	<input type="checkbox"/> Solve measurement problems using appropriate tools involving length, perimeter, weight, capacity, time, and temperature.
	Performance Objective 2	<input type="checkbox"/> Select and use strategies to estimate measurements including length, distance, capacity, and time.
	Performance Objective 3	<input type="checkbox"/> Apply strategies and use tools for estimating and measuring the perimeter of regular and irregular shapes.

**Standard #5: Data Analysis and Probability**

Definition: Students will understand how to formulate questions, analyze data, and determine probabilities.

<b>Benchmark #1:</b>  Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them	Performance Objective 1	<input type="checkbox"/> Construct, read, analyze, and interpret tables, charts, graphs, and data plots.
	Performance Objective 2	<input type="checkbox"/> Construct, interpret, and analyze data from graphical representations and draw simple conclusions using bar graphs, line graphs, circle graphs, frequency tables, and Venn diagrams.
	Performance Objective 3	<input type="checkbox"/> Display, analyze, compare, and interpret different data sets, including data sets of different sizes.
	Performance Objective 4	<input type="checkbox"/> Organize and display single-variable data in appropriate graphs and representations.
	Performance Objective 5	<input type="checkbox"/> Organize, read, and display numerical (quantitative) and non-numerical (qualitative) data in a clear, organized, and accurate manner including correct titles, labels, and intervals or categories including: <input type="checkbox"/> frequency tables <input type="checkbox"/> stem and leaf plots <input type="checkbox"/> bar, line, and circle graphs <input type="checkbox"/> Venn diagrams <input type="checkbox"/> pictorial displays <input type="checkbox"/> charts and tables
	Performance Objective 6	<input type="checkbox"/> Formulate questions and identify data to be collected to correctly answer a question.
<b>Benchmark #2:</b>  Select and use appropriate statistical methods to analyze data	Performance Objective 1	<input type="checkbox"/> Organize and display single-variable data in appropriate graphs and representations and determine which types of graphs are appropriate for various data sets.
	Performance Objective 2	<input type="checkbox"/> Use fractions and percentages to compare data sets of different sizes.
	Performance Objective 3	<input type="checkbox"/> Correctly rank the values of a numerical data set containing simple fractions and decimals, identify maximum and minimum data values, and calculate the range for a data set.
<b>Benchmark #3:</b>  Develop and evaluate inferences and predictions that are based on data	Performance Objective 1	<input type="checkbox"/> Make and justify valid inferences, predictions, and arguments based on statistical analysis.
	Performance Objective 2	<input type="checkbox"/> Compare a given prediction with the results of an investigation.
	Performance Objective 3	<input type="checkbox"/> Use counting strategies to determine all the possible outcomes of a particular familiar event.
	Performance Objective 4	<input type="checkbox"/> Find all possible outcome sets involving four or more sets of objects.
	Performance Objective 5	<input type="checkbox"/> Evaluate the reasonableness of inferences that are based on data in the context of the original solution.
	Performance Objective 6	<input type="checkbox"/> Identify the method used to make an inference and/or a prediction on a given data set and solve similar problems.
	Performance Objective 7	<input type="checkbox"/> Determine the accuracy of a prediction or an inference based on the accuracy of the data in a given data set.
	Performance Objective 8	<input type="checkbox"/> List all possible outcomes of simple events.
<b>Benchmark #4:</b>  Understand and apply basic concepts of probability	Performance Objective 1	<input type="checkbox"/> Determine probabilities through experiments and/or simulations and compare the results with mathematical expressions.
	Performance Objective 2	<input type="checkbox"/> Make predictions from the results of student-generated experiments of single events.

	Performance Objective 3	<input type="checkbox"/> Identify simple experiments where the probabilities of all outcomes are equal.
	Performance Objective 4	<input type="checkbox"/> Describe and predict the results of a probability experiment.
	Performance Objective 5	<input type="checkbox"/> Use fractions to describe the results of an experiment.
	Performance Objective 6	<input type="checkbox"/> Use probability to generalize from a simple pattern or set of examples and justify why the generalization is reasonable.