

# Third Grade Math Standards and Benchmarks

<b>Standard #1: Number and Operations</b>		
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"/> Exhibit an understanding of the place-value structure of the base-ten number system by: <input type="checkbox"/> Reading, modeling, writing, and interpreting whole number up to 10,000 <input type="checkbox"/> Comparing and ordering numbers up to 1,000 <input type="checkbox"/> Recognizing the position of a given number in the base-ten number system and its relationship to benchmark numbers such as 10, 50, 100, 500
	Performance Objective 2	<input type="checkbox"/> Use whole numbers by using a variety of contexts and models (e.g., exploring the size of 1,000 by skip-counting to 1,000 using hundred charts or strips 10 or 100 centimeters long).
	Performance Objective 3	<input type="checkbox"/> Identify some representations for some numbers and generate them by decomposing and recombining numbers (e.g., $853 = 8 \times 100 + 5 \times 10 + 3$ ; $85 \times 10 + 3 = 853$ , $853 = 900 - 50 + 3$ ).
	Performance Objective 4	<input type="checkbox"/> Identify the relationship among commonly encountered factors and multiples (e.g., factor pairs of 12 are 1 x 12 are 1 x 12, 2 x 6, 3 x 4, multiples of 12 are 12, 24, 36).
	Performance Objective 5	<input type="checkbox"/> Use visual models and other strategies to recognize and generate equivalents of commonly used fractions and mixed numbers (e.g., halves, thirds, fourths, sixths, eighths, and tenths).
	Performance Objective 6	<input type="checkbox"/> Demonstrate an understanding of fractions as parts of unit wholes, parts of a collections or set, and as locations of a number line.
	Performance Objective 7	<input type="checkbox"/> Use common fractions for measuring and money (e.g., using fractions and decimals as representations of the same concept, such as half of a dollar = 50 cents).
<b>Benchmark #2:</b>  Understand the meaning of operations and how they relate to each other	Performance Objective 1	<input type="checkbox"/> Use a variety of models to show an understanding of multiplication and division of whole numbers (e.g., charts, arrays, diagrams, and physical models [i.e., modeling multiplication with a variety of pictures, diagrams, and concrete tools to help students learn what the factors and products represent in various contexts]).
	Performance Objective 2	<input type="checkbox"/> Find the sum or difference of two whole numbers between 0 and 10,000.
	Performance Objective 3	<input type="checkbox"/> Solve simple multiplication and division problems (e.g., $135 \div 5 = \bar{1}$ ).
	Performance Objective 4	<input type="checkbox"/> Identify how the number of groups and the number of items in each group equals a product.
	Performance Objective 5	<input type="checkbox"/> Demonstrate the effects of multiplying and dividing on whole numbers (e.g., to find the total number of legs on 12 cats, 4 represents the number of each [cat] unit, so $12 \times 4 = 48$ [leg] units).
	Performance Objective 6	<input type="checkbox"/> Identify and use relationship between multiplication and division (e.g., division is the inverse of multiplication) to solve problems.
	Performance Objective 7	<input type="checkbox"/> Select and use operations (e.g., addition, multiplication, subtraction, division) to solve problems.
<b>Benchmark #3:</b>  Compute fluently and make reasonable estimates	Performance Objective 1	<input type="checkbox"/> Choose computational methods based on understanding the base-ten number system, properties of multiplication and division, and number relationships.
	Performance Objective 2	<input type="checkbox"/> Use strategies (e.g., $6 \times 8$ is double $3 \times 8$ ) to become fluent with the multiplication pairs up to $10 \times 10$ .
	Performance Objective 3	<input type="checkbox"/> Compute with basic number combinations (e.g., multiplication pairs up to $10 \times 10$ and their division counterparts).

	Performance Objective 4	<input type="checkbox"/> Demonstrate reasonable estimation strategies for measurement, computation, and problem solving.
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**Standard #2: Algebra**

Definition: Students will understand algebraic concepts and applications.

<b>Benchmark #1:</b>  Understand patterns, relations, and functions	Performance Objective 1	<input type="checkbox"/> Represent relationships of quantities in the form of mathematical expression, equations, or inequalities.
	Performance Objective 2	<input type="checkbox"/> Solve problems involving numeric equations.
	Performance Objective 3	<input type="checkbox"/> Select appropriate operational and relational symbols to make an expression true (e.g., "If $4 \cdot 12 = 3 \hat{\phantom{x}}$ , what operational symbol goes in the box?").
	Performance Objective 4	<input type="checkbox"/> Use models of feet and inches to express simple unit conversions in symbolic form (e.g., 36 inches = $\hat{\phantom{x}}$ feet $\times$ 12) that develop conceptual understanding versus procedural skills.
	Performance Objective 5	Recognize and use the commutative property of multiplication ( e.g., if $5 \times 7 = 35$ , then what is $7 \times 5$ ?).
	Performance Objective 6	Create, describe, and extend numeric and geometric patterns including multiplication patterns.
	Performance Objective 7	Represent simple functional relationships: <input type="checkbox"/> Solve simple problems involving a functional relationship between two quantities (e.g., find the total cost of multiple items given the cost per unit) <input type="checkbox"/> Extend and recognize a linear pattern by its rules (e.g., the number of legs on a given number of horses may be calculated by counting by 4s, by multiplying the number of horses by 4, or through the use of tables)
<b>Benchmark #2:</b>  Represent and analyze mathematical situations and structures using algebraic symbols	Performance Objective 1	<input type="checkbox"/> Determine the value of variables in missing part problems (e.g., $139 + 189 = \hat{\phantom{x}}$ ).
	Performance Objective 2	<input type="checkbox"/> Recognize and use the commutative and associative properties of addition and multiplication (e.g., If $5 \times 7 = 35$ , that what is $7 \times 5$ ? And if $5 \times 7 \times 3 = 105$ , then what is $7 \times 3 \times 5$ ?").
	Performance Objective 3	<input type="checkbox"/> Explore the ways that commutative, distributive, identity, and zero properties are useful in computing with numbers.
<b>Benchmark #3:</b>  Use mathematical models to represent and understand quantitative relationships	Performance Objective 1	<input type="checkbox"/> Model problem situation with objects and use representations such as pictures, graphs, tables, and equation to draw conclusions.
	Performance Objective 2	<input type="checkbox"/> Solve problems involving proportional relationships including unit pricing (e.g., four apples cost 80 cents; therefore, one apple cost 20 cents).
	Performance Objective 3	<input type="checkbox"/> Describe relationships of quantities in the form of mathematical expressions, equations, or inequalities.
	Performance Objective 4	<input type="checkbox"/> Select appropriate operational and relational symbols to make an expression true (e.g., "If $4 \cdot 12 = 3 \hat{\phantom{x}}$ , what operational symbol goes in the box?").
<b>Benchmark #4:</b>  Analyze changes in various contexts	Performance Objective 1	<input type="checkbox"/> Demonstrate how change in one variable can relate to a change in a second variable (e.g., input-output machines, data tables).

**Standard #3: Geometry**

Definition: Students will understand geometric concepts and applications.

<p><u>Benchmark #1:</u></p> <p>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Describe and compare the attributes of plane and solid geometric figures to show relationships and solve problems:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Identify, describe, and classify polygons (e.g., pentagons, hexagons, and octagons)</li> <li><input type="checkbox"/> Identify lines of symmetry in two-dimensional shapes</li> <li><input type="checkbox"/> explore attributes of quadrilaterals (e.g., parallel and perpendicular sides for the parallelogram right angles for the rectangle, equal sides and right angles for the square)</li> <li><input type="checkbox"/> Identify right angles</li> <li><input type="checkbox"/> Identify, describe, and classify common three-dimensional geometric objects (e.g., cube, rectangular solid, sphere, prism, pyramid, cone, cylinder)</li> </ul>
<p><u>Benchmark #2:</u></p> <p>Specify locations and describe spatial relationships using coordinate geometry and other representational systems.</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Describe location and movement using common language and geometric vocabulary (e.g., directions from classroom to gym).</p>
	<p>Performance Objective 2</p>	<p><input type="checkbox"/> Use ordered pairs to graph, locate specific points, create path, and measure distances within a coordinate grid system.</p>
	<p>Performance Objective 3</p>	<p><input type="checkbox"/> Use a two-dimensional grid system (e.g., a map) to locate positions representing actual places.</p>
<p><u>Benchmark #3:</u></p> <p>Apply transformations and use symmetry to analyze mathematical situations</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Predict and describe the results of sliding, flipping, and turning two-dimensional shapes.</p>
	<p>Performance Objective 2</p>	<p><input type="checkbox"/> Identify and describe the line of symmetry in two- and three-dimensional shapes.</p>
<p><u>Benchmark #4:</u></p> <p>Use visualization, spatial reasoning, and geometric modeling to solve problems</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Visualize, build, and draw geometric objects.</p>
	<p>Performance Objective 2</p>	<p><input type="checkbox"/> Create and describe mental images of objects, patterns, and paths.</p>
	<p>Performance Objective 3</p>	<p><input type="checkbox"/> Recognize geometric shapes and structures (e.g., in the environment).</p>
	<p>Performance Objective 4</p>	<p><input type="checkbox"/> Use geometric models to solve problems in other areas of mathematics (e.g., using arrays as models of multiplication or area).</p>
	<p>Performance Objective 5</p>	<p><input type="checkbox"/> Identify and build three-dimensional objects from two-dimensional representations of that object.</p>
	<p>Performance Objective 6</p>	<p><input type="checkbox"/> Investigate two-dimensional representations of three-dimensional shapes.</p>
	<p>Performance Objective 7</p>	<p><input type="checkbox"/> Explore geometric ideas and relationships as they apply to other disciplines and to problems that arise in the classroom or in everyday life.</p>

**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"/> Demonstrate understanding of the need for measuring with standard units and become familiar with standard units in the U.S. customary system.
	Performance Objective 2	<input type="checkbox"/> Choose and use the appropriate units and measurement tools to quantify the properties of objects ( e.g., length [ruler], width [ruler], or mass [balance scale]).
	Performance Objective 3	<input type="checkbox"/> Identify time to the nearest minute (elapsed time) and relate time to everyday events.
	Performance Objective 4	<input type="checkbox"/> Identify and use time intervals (e.g., hours, days, weeks, months, years).
	Performance Objective 5	<input type="checkbox"/> Identify properties (e.g., length, area, weight, volume) and select the appropriate type of unit for measuring each property.
	Performance Objective 6	<input type="checkbox"/> Demonstrate understanding that measurements are approximations, investigate differences in units and their effect on precision, and consider the degree of accuracy for different situations.
<u>Benchmark #2:</u>  Apply appropriate techniques, tools, and formulas to determine measurements	Performance Objective 1	<input type="checkbox"/> Find the area of rectangles using appropriate tools (e.g., grid paper, tiles).
	Performance Objective 2	<input type="checkbox"/> Estimate measurements.
	Performance Objective 3	<input type="checkbox"/> Use appropriate standard units and tools to estimate, measure, and solve problems (e.g., length, area, weight).
	Performance Objective 4	<input type="checkbox"/> Recognize a 90-degree angle and use it as a strategy to estimate the size of other angles.

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

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

<u>Benchmark #1:</u>  Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.	Performance Objective 1	<input type="checkbox"/> Collect and organize data using observations, measurements, surveys, or experiments.
	Performance Objective 2	<input type="checkbox"/> Represent data using tables and graphs (e.g., line plots, bar graphs, and line graphs).
	Performance Objective 3	<input type="checkbox"/> Conduct simple experiments by determining the number of possible outcomes and make simple predictions: <input type="checkbox"/> Identify whether events are certain, likely, unlikely, or impossible <input type="checkbox"/> Record the outcomes for a simple event and keep track of repetitions <input type="checkbox"/> Summarize and record the results in a clear and organized way <input type="checkbox"/> Use the results to predict future events
<u>Benchmark #2:</u>  Select and use appropriate statistical methods to analyze data.	Performance Objective 1	<input type="checkbox"/> Apply and explain the uses of sampling techniques (e.g., observations, polls, tally marks) for gathering data.
<u>Benchmark #3:</u>  Develop and evaluate inferences and predictions that are based on data.	Performance Objective 1	<input type="checkbox"/> Analyze data displayed in a variety of formats to make reasonable inferences and predictions, answer questions, and make decisions.
<u>Benchmark #4:</u>  Understand and apply basic concepts of probability.	Performance Objective 1	<input type="checkbox"/> Discuss the degree of likelihood of events and use terminology such as “certain,” “likely,” “unlikely”.
	Performance Objective 2	<input type="checkbox"/> Predict the outcomes of simple experiments (e.g., coin tossing) and test the predictions using concrete objects (e.g., coins, counters, number cubes, spinners).
	Performance Objective 3	<input type="checkbox"/> Record the probability of a specific outcome for a simple probability situation (e.g., probability is three out of seven for choosing a black ball; $3/7$ ).