

First Grade Math Standards and Benchmarks

Standard #1: Number and Operations

Definition: Students will understand numerical concepts and mathematical operations.

<p><u>Benchmark #1:</u></p> <p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Demonstrate an understanding of the place-value structure of the base-ten number system:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Read, write, model, and sequence whole numbers up to 100 (including filling in missing numbers in a sequence). <input type="checkbox"/> Count with understanding and recognize “how many” in sets of objects up to 50 <input type="checkbox"/> Count orally by 2s to 20 and by 5s and 10s to 100 <input type="checkbox"/> Count orally backward from 100 <input type="checkbox"/> Compare and order numbers up to 100 <input type="checkbox"/> Decompose and recombine numbers using manipulatives (e.g., by breaking numbers apart and recombining) to create and construct equivalent representations for the same number e.g., $10 = 3 + 7$ or $1 + 2 + 7$ or $3 + 2 + 5$. <input type="checkbox"/> Group objects by 10s and 1s to explore place value (e.g., 24 equals two tens and four ones). <input type="checkbox"/> Use ordinal numbers (e.g., what position?) and cardinal numbers (e.g., how many?) appropriately <input type="checkbox"/> Connect number words and numbers to the quantities they represent
<p><u>Benchmark #2:</u></p> <p>Understand the meaning of operations and how they relate to each other</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Use a variety of models to demonstrate an understanding of addition and subtraction of whole numbers.</p>
	<p>Performance Objective 2</p>	<p><input type="checkbox"/> Solve addition and subtraction problems with one- and two-digit numbers (e.g., $5 + 58 = 1$).</p>
	<p>Performance Objective 3</p>	<p><input type="checkbox"/> Find the sum of three one-digit numbers to the sum of 15.</p>
	<p>Performance Objective 4</p>	<p><input type="checkbox"/> Understand and use the inverse relationship between addition and subtraction to solve problems and check solutions (e.g., $8 + 6 = 14$ is related to $14 - 6 = 8$).</p>
	<p>Performance Objective 5</p>	<p><input type="checkbox"/> Use concrete materials to investigate situations that relate to multiplication and division (e.g., equal grouping of objects, sharing equally).</p>
	<p>Performance Objective 6</p>	<p>Given simple story problems, explain verbally how to select and use appropriate operations.</p>
<p><u>Benchmark #3:</u></p> <p>Compute fluently and make reasonable estimates</p>	<p>Performance Objective 1</p>	<p><input type="checkbox"/> Use strategies for whole-number computation, with a focus on addition and subtraction (e.g., counting on or counting back, doubles, sums that make 10, direct modeling with pictures or objects, numerical reasoning based on number combinations and relationships).</p>
	<p>Performance Objective 2</p>	<p><input type="checkbox"/> Demonstrate a variety of methods to compute (e.g., objects, mental computation, paper and pencil, and estimation).</p>
	<p>Performance Objective 3</p>	<p><input type="checkbox"/> Perform addition and subtraction with whole number combinations.</p>
	<p>Performance Objective 4</p>	<p><input type="checkbox"/> Use and explain estimation strategies to determine the reasonableness of answers involving addition and subtraction.</p>

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"/> Recognize, reproduce, describe, extend, and create repeating patterns (e.g., color, shape, size, sound, movement, simple numbers) and translate from one representation to another (e.g., red, red, blue, blue to step, step, clap, clap).
	Performance Objective 2	<input type="checkbox"/> Skip-count on a hundreds chart (e.g., by 2s up to 20 and 5s and 10s up to 100) to identify, describe, and predict number patterns.
	Performance Objective 3	<input type="checkbox"/> Identify number patterns on the hundreds chart.
<u>Benchmark #2:</u> Represent and analyze mathematical situations and structures using algebraic symbols	Performance Objective 1	<input type="checkbox"/> Write number sentences that use concrete objects, pictorial, and verbal representations to express mathematical situations using invented and conventional symbols (e.g., +, -, =).
	Performance Objective 2	<input type="checkbox"/> Demonstrate and describe the concept of equal (e.g., using objects, balance scales).
	Performance Objective 3	<input type="checkbox"/> Solve open number sentences that have variables representing numbers up to 10 (e.g., $10 = 2 + \square$).
<u>Benchmark #3:</u> Use mathematical models to represent and understand quantitative relationships	Performance Objective 1	<input type="checkbox"/> Represent equivalent forms of the same number through the use of physical models, diagrams, and number expressions to 20 (e.g., $3 + 5 = 8$, $2 + 6 = 8$).
	Performance Objective 2	<input type="checkbox"/> Describe situations that involve addition and subtraction of whole numbers including objects, pictures, and symbols (e.g., Robert has four apples, Maria has five more).
<u>Benchmark #4:</u> Analyze changes in various contexts	Performance Objective 1	<input type="checkbox"/> Describe qualitative change (e.g., a student growing taller, trees getting bigger, ice melting).

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 common geometric figures and classify them by common attributes <input type="checkbox"/> Recognize, name, build, and draw both polygonal (up to six sides) and curved shapes <input type="checkbox"/> Sort two- and three-dimensional shapes into categories based on common attributes <input type="checkbox"/> Use the attributes of shapes to analyze and identify examples and non-examples of geometric shapes <input type="checkbox"/> Participate in discussions comparing, identifying, and analyzing attributes to develop the vocabulary needed to describe two- and three-dimensional geometric shapes and their attributes (e.g., sides, corners, edges, faces).
<u>Benchmark #2:</u> Specify locations and describe spatial relationships using coordinate geometry and other representational systems	Performance Objective 1	<input type="checkbox"/> Participate in group and individual activities based on the concepts of space and location: <input type="checkbox"/> Describe direction, location, space, and shape (e.g., left, right, over, under, near, far, between) <input type="checkbox"/> Visualize, describe, and record directions for navigating from one location to another to develop the vocabulary needed to describe direction, distance, location, and representation <input type="checkbox"/> Use materials to create representations of the surrounding environment (e.g., three-dimensional models, maps of the classroom) <input type="checkbox"/> Develop estimates and measure distances using nonstandard measurements.
<u>Benchmark #3:</u> Apply transformations and use symmetry to analyze mathematical situations	Performance Objective 1	<input type="checkbox"/> Predict the results of changing a shape's position or orientation by using rotation (i.e., turns), reflection (i.e., flips), and translations (i.e., slides).
	Performance Objective 2	<input type="checkbox"/> Create simple symmetrical shapes and pictures.
	Performance Objective 3	<input type="checkbox"/> Recognize and describe the symmetric characteristics of design (e.g., geometric designs made with pattern blocks).
<u>Benchmark #4:</u> Use visualization, spatial reasoning, and geometric modeling to solve problems	Performance Objective 1	<input type="checkbox"/> Use combinations of shapes to make a new shape to demonstrate relationships between shapes (e.g., a hexagon can be made from six triangles).
	Performance Objective 2	<input type="checkbox"/> Create three-dimensional shapes based on two-dimensional representations.
	Performance Objective 3	<input type="checkbox"/> Participate in activities to develop mental visualization and spatial memory (e.g., "quick image" activities that require students to recall or reproduce a configuration of dots on a card or to determine the number of dots without counting).
	Performance Objective 4	<input type="checkbox"/> Describe how to get from one location to another by visualizing the landmarks along the route.
	Performance Objective 5	<input type="checkbox"/> Identify structures from different views or match views of the same structure portrayed from different perspectives.

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"/> Develop an understanding of measurable properties (e.g., length, volume, weight, area, and time) using appropriate concepts and vocabulary: <input type="checkbox"/> Length by measuring and estimating (e.g., longer, shorter, meter, centimeter, inch, yard) <input type="checkbox"/> Weight by measuring estimating and weighting (e.g., heavy [-ier], light [-er]). <input type="checkbox"/> Volume by measuring, estimating, and weighing (e.g., full, empty) <input type="checkbox"/> Area by measuring and estimating (e.g., (e.g., perimeter rectangles, squares) <input type="checkbox"/> Time by estimating (e.g., minutes, hours, days, weeks)
	Performance Objective 2	<input type="checkbox"/> Use digital and analog (face) clocks to tell time to the half hour.
<u>Benchmark #2:</u> Apply appropriate techniques, tools, and formulas to determine measurements	Performance Objective 1	<input type="checkbox"/> Measure with multiple copies of units the same size (e.g., paper clips).
	Performance Objective 2	<input type="checkbox"/> Use repetition of a single unit to measure something larger than the unit (e.g., a yardstick/meterstick to measure a room).

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, organize, represent, and compare data by category on graphs and charts to answer simple questions <input type="checkbox"/> Answer questions about “how” data can be gathered <input type="checkbox"/> Gather data by interviewing, surveying, and making observations <input type="checkbox"/> Organize data into appropriate categories by sorting based on shared properties <input type="checkbox"/> Participate in discussions about selecting an appropriate way to display the data <input type="checkbox"/> Represent data using objects, pictures, tables, and simple bar graphs
	Performance Objective 1	<input type="checkbox"/> Analyze simple data: <input type="checkbox"/> Interpret what the graph or other representation shows <input type="checkbox"/> Determine whether or not the data gathered helps answer the specific question that was posed <input type="checkbox"/> Compare parts of the data (e.g., “How many students in the class have lost only two teeth”) to make statements about the data as a whole (e.g., “Most students in the class have lost only two teeth”)
<u>Benchmark #2:</u> Select and use appropriate statistical methods to analyze data	Performance Objective 1	<input type="checkbox"/> Make conclusions based on data (e.g., whether or not other groups would reach similar conclusions based on the same data).
<u>Benchmark #3:</u> Develop and evaluate inferences and predictions that are based on data	Performance Objective 1	<input type="checkbox"/> Discuss the likelihood of events (based on student experiences or from books) using terminology such as “more likely”, “less likely”, “possible”, or “certain”.
<u>Benchmark #4:</u> Understand and apply basic concepts of probability	Performance Objective 1	<input type="checkbox"/> Discuss the likelihood of events (based on student experiences or from books) using terminology such as “more likely”, “less likely”, “possible”, or “certain”.
	Performance Objective 2	<input type="checkbox"/> Observe, explore, and discuss whether some events occur more often than others (e.g., tossing two die and recording the sum after each toss to explore whether or not certain sums occur more frequently than others).