

Mathematical Processes Standard

Students use mathematical processes and knowledge to solve problems. They apply the mathematical processes as they learn content from the other mathematical standards.

	Kindergarten Indicators	Grade 1 Indicators
	<p><u>Problem Solving</u></p> <p>1. Apply and adapt a variety of appropriate strategies to solve problems:</p> <ul style="list-style-type: none"> • create a mathematical model • draw a picture • act it out • look for a pattern <p><u>Reasoning and Proof</u></p> <p>1. Use models and logic to make conclusions. 2. Reason inductively by identifying patterns.</p> <p><u>Communication</u></p> <p>1. Use developmentally appropriate mathematical vocabulary. 2. Respond to instructions orally, and visually as appropriate; e.g., tell, share, describe, demonstrate.</p> <p><u>Connections</u></p> <p>1. Use learning from one area of mathematics to understand another. 2. Relate new and prior knowledge to make sense of new concepts being learned.</p> <p><u>Representation</u></p> <p>1. Select an appropriate representation of a mathematical idea or situation:</p> <ul style="list-style-type: none"> • physical model/manipulative • picture/drawing • numerical • geometric 	<p><u>Problem Solving</u></p> <p>1. Apply and adapt a variety of appropriate strategies to solve problems: draw a picture</p> <ul style="list-style-type: none"> • create a mathematical model • draw a picture • act it out • look for a pattern • guess and check <p><u>Reasoning and Proof</u></p> <p>1. Use models and logic to make conclusions. 2. Adjust models as needed. 3. Reason inductively by identifying patterns.</p> <p><u>Communication</u></p> <p>1. Use developmentally appropriate mathematical vocabulary. 2. Respond to instructions orally, and visually as appropriate; e.g., tell, share, describe, demonstrate, compare. 3. Respond clearly with sufficient detail so that Thinking can be understood.</p> <p><u>Connections</u></p> <p>1. Use learning from one area of mathematics to understand another. 2. Relate new and prior knowledge to make sense of new concepts being learned. 3. Make connections between mathematics and everyday life.</p> <p><u>Representation</u></p> <p>1. Select an appropriate representation of a mathematical idea or situation:</p> <ul style="list-style-type: none"> • physical model/manipulative • picture/drawing • numerical • geometric

	Kindergarten Indicators	Grade 1 Indicators
	<p><u>Reflection</u></p> <p>1. Reflect on mathematical concepts that have been learned using drawings, pictures and/or words: e.g., as a class group discussion and activity, create a simple classroom chart to show what has been learned.</p>	<ul style="list-style-type: none"> • graphical <p>2. Understand that more than one representation can be used to appropriately represent the same mathematical idea or situation.</p> <p><u>Reflection</u></p> <p>1. Reflect on mathematical concepts that have been learned using drawings, pictures and/or words: e.g., as a class group discussion and activity, create a simple classroom chart to show what has been learned.</p> <p>2. In a math journal reflect on mathematical concepts that have been learned using drawings, pictures and/or words given writing prompts such as:</p> <ul style="list-style-type: none"> • What did you do in math today? • What did you learn in math today? • What are some of the math words you used today?

Numbers, Number Sense and Operations Standard

Students demonstrate number sense, including an understanding of number systems and operations and how they relate to one another. Students compute fluently and make reasonable estimates using paper and pencil, technology-supported and mental methods.

	Grade K Indicators	Grade 1 Indicators
	<ol style="list-style-type: none"> 1. Represent whole numbers 0 - 20 using physical models; e.g. base 10 blocks, dice, playing cards, dominos, straws, any common objects. 2. Count <u>forward</u> and <u>backward</u> 0 - 20. 3. Read and write <u>numerals</u> 0 - 20. 4. Count the number of objects in sets of 20 or fewer using one-to-one correspondence. 5. <u>Compare</u> the number of objects in two given sets as <u>more</u> or <u>less</u>. 6. Compare and <u>order</u> numbers 0 - 20 7. Use <u>ordinal numbers</u> to identify and order objects up to 10 items. 8. Classify numbers as <u>odd</u> or <u>even</u> by determining if a set of objects can be <u>shared equally</u> between two people (1 - 10). 9. Model, represent and explain <u>addition</u> as <u>counting on</u> and <u>combining sets</u> using manipulatives, a number line, and drawing pictures. 10. Model and use commutative properties for addition using manipulatives. 11. Represent and use numbers in flexible ways, including relating, composing, and decomposing numbers; e.g., 5 marbles can be 2 red and 3 green or 1 red and 4 green. 12. Model, represent and explain <u>subtraction</u> as <u>take-away</u> using manipulatives, a number line and drawing pictures. 	<ol style="list-style-type: none"> 1. Represent whole numbers 0-100 and describe their <u>place value</u> using physical <u>models</u>, <u>numerals</u>, <u>words</u>, and <u>expanded notation</u>. 2. Count forward and backward from 0 - 100, and count forward or backward starting at any number between 1 and 100. (Write numbers that come <u>before</u>, <u>after</u> or <u>in between</u> two given numbers) 3. Read and write <u>numerals</u> 0 - 100. 4. <u>Compare</u> and order numerals 0 -100, using mathematical language: <u>greater than</u>, <u>less than</u>, <u>equal to</u>. 5. Identify <u>patterns</u> on a 100's chart and orally <u>skip count</u> by 10's, 5's and 2's, starting from 0 up to 100. 6. Use <u>ordinal numbers</u> to identify and order objects up to 30 items. 7. Recognize and classify numbers as <u>even</u> or <u>odd</u> by determining if a set of objects can be <u>shared equally</u> between two people (0 - 20). 8. Model, represent and explain <u>addition</u> as <u>counting on</u> and <u>combining sets</u> using manipulatives, a number line, drawing pictures and a calculator. 9. Use <u>strategies</u> for learning the basic addition facts for <u>sums</u> to 12; e.g., counting on, adding one more, adding two more, <u>doubles</u>, doubles plus or minus 1, making 10, adding zero, and missing <u>addends</u>. 10. Model and use the commutative property for addition using manipulatives. 11. Model, represent and explain <u>subtraction</u> as <u>comparison</u> and <u>take-away</u> using manipulatives, a number line, drawing pictures and a calculator.

	Grade K Indicators	Grade 1 Indicators
	<p>13. <u>Estimate</u> and solve meaningful problems involving addition and subtraction through the use of manipulatives, pictures and drawings.</p> <p>14. Use a variety of methods and tools to compute; e.g., objects, mental computation, estimation, paper and pencil, and calculators.</p> <p>15. Explore <u>fact family</u> relationships for addition and subtraction sums to 10.</p> <p>16. Construct multiple sets of objects each containing the same number of objects.</p> <p>17. Demonstrate <u>joining</u> multiple groups of objects, each containing the same number of objects; e.g., combining 3 bags of candy, each containing 2 pieces.</p> <p>18. Demonstrate division by sharing a small set of objects into groups of equal size; e.g., sharing 6 stickers <u>equally</u> among 3 children.</p> <p>19. Represent commonly used <u>fractions</u> physical models and pictures: $1/2$, $1/3$, $1/4$</p> <p>20. Identify and state the value of a <u>penny</u>, <u>nickel</u>, <u>dime</u>, and <u>quarter</u>.</p> <p>21. Show different coin exchanges for the same amount using pennies, nickels, and dimes; e.g., show \$.10 as 10 pennies, 2 nickels, or a dime.</p>	<p>12. Use strategies for learning the basic subtraction facts for sums to 12; e.g., counting back, counting up from the number being subtracted, one less, two less.</p> <p>13. Explain the relationship between operations such as subtraction is the inverse of addition; e.g., <u>fact families</u> to 12.</p> <p>14. Add and subtract <u>2-digit numbers</u> - no regrouping; e.g., using base 10 blocks, dimes and pennies, paper and pencil.</p> <p>15. <u>Estimate</u> and solve problems involving addition and subtraction through the use manipulatives, pictures, drawings, and conventional <u>symbols</u>.</p> <p>16. Model, and represent multiplication as combining <u>equal groups</u>.</p> <p>17. Model and represent division as <u>sharing equally</u>.</p> <p>18. Use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators.</p> <p>19. Represent commonly used <u>fractions</u> using physical models, pictures and words: <u>halves</u> ($1/2$, $2/2$), <u>thirds</u> ($1/3$, $2/3$, $3/3$), <u>fourths</u> ($1/4$, $2/4$, $3/4$, $4/4$).</p> <p>20. Compare halves, thirds, and fourths, using physical models.</p> <p>21. Identify and state the value of a <u>penny</u>, <u>nickel</u>, <u>dime</u>, <u>quarter</u>, <u>half dollar</u>, and <u>dollar</u>.</p> <p>22. Count coin sets with values up to \$1.00 using 1 or 2 different types of coins, consisting of pennies, nickels, dimes or quarters.</p> <p>23. Show different coin exchanges for the same amount; e.g., show \$.35 as a quarter and a dime, 3 dimes and 1 nickel, or 7 nickels.</p>

Measurement Standard

Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

	Grade K Indicators	Grade 1
	<ol style="list-style-type: none"> 1. Understand and use non-standard <u>units</u> to measure length; e.g., hand spans, paper clips 2. Understand and use standard units to measure length; <u>inches</u> and <u>centimeters</u>. 3. Explain the need for standard units of measure. 4. Recognize the attributes of <u>length</u>, <u>capacity</u>, <u>weight</u>, and <u>time</u>. 5. Explore measuring length, weight, and capacity using uniform objects; e.g., paper clips for length, small cups to fill a large container with rice, beans or sand, blocks of a uniform size to balance an object on a scale. 6. Select an appropriate unit and tool for the attribute being measured. 7. Compare and order objects of different lengths, areas, weights and capacities; and use relative terms, such as <u>longer</u>, <u>shorter</u>, <u>bigger</u>, <u>smaller</u>, <u>heavier</u>, <u>lighter</u>, <u>more</u> and <u>less</u>. 8. Order events based on time; e.g., activities that take a long or short time; what we do first, next, last, what we did or plan to do <u>yesterday</u>, <u>today</u>, <u>tomorrow</u>. 9. Identify units of time (day, week, month, and year) and compare <u>calendar</u> elements; e.g., weeks are longer than days. 10. Tell time to the <u>hour</u> using digital and analog clocks. 	<ol style="list-style-type: none"> 1. Estimate and measure <u>length</u> using non-standard <u>units</u>; e.g., student foot, paper clips. 2. Estimate and measure length using standard units; e.g., <u>inches</u>, <u>feet</u>, <u>centimeters</u>. 3. Recognize and explain the need for standard units and tools for measuring length and weight; e.g., <u>rulers</u> and <u>balance scales</u>. 4. Recognize the attributes of <u>length</u>, <u>capacity</u>, <u>weight</u>, and <u>time</u>. 5. Estimate and measure weight using non-standard units; e.g., blocks of uniform size, a book. 6. Estimate and measure capacity using non-standard units; e.g., small paper cups, 7. Select an appropriate unit and tool for the attribute being measured. 8. Relate the number of units required to the size of units; e.g., a smaller unit requires more, a larger unit requires less. 9. Recognize the reasonableness of a measurement. 10. Order a <u>sequence</u> of events with respect to time; e.g., seasons of the year; morning, afternoon and night. 11. Tell time to the <u>hour</u> and <u>half-hour</u> using digital and analog clocks.

Geometry and Spatial Sense Standard

Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects, and transformations to analyze mathematical situations and solve problems.

	Grade K Indicators	Grade 1
	<ol style="list-style-type: none"> 1. Identify and draw geometric <u>shapes</u>; e.g. <u>circle square, rectangle, and triangle</u>. 2. Cover <u>two-dimensional</u> pictures or figures using paper shapes or tangrams. 3. Identify objects that are <u>solid shapes</u>; e.g., <u>cylinders, cones, spheres, rectangular prisms</u>. 4. Build <u>three-dimensional</u> objects using blocks. 5. <u>Compare and sort two-dimensional shapes</u> according to their attributes, then explain reasoning for the groupings and comparisons. 6. Name, describe, and demonstrate the relative <u>position of objects</u> as: <u>over, under, inside, outside, on, beside, between, above, below, on top of, upside-down, behind, in back of, in front of</u>. 7. Investigate and predict the results of putting together and taking apart two-dimensional shapes. 	<ol style="list-style-type: none"> 1. Recognize <u>two-dimensional</u> geometric <u>shapes</u> in the environment; <u>circle, square, rectangle, triangles, or parallelogram</u>. 2. Recognize <u>three-dimensional</u> structures in the environment; e.g., <u>cylinders, cones, spheres, cubes, rectangular prisms</u>. 3. Copy figures and draw simple two-dimensional shapes from memory. 4. Cover two-dimensional pictures or figures using paper shapes or <u>tangrams</u>. 5. Describe two-dimensional shapes using attributes such as number of <u>sides</u> and number of <u>corners</u>. 6. Build three-dimensional objects using blocks. 7. Compare and sort two and three-dimensional shapes according to their <u>attributes</u>, then explain reasoning for the groupings and comparisons. 8. Create new shapes by combining or cutting apart existing shapes. 9. Identify the shapes of the <u>faces</u> of three-dimensional objects. 10. Extend and use <u>location words</u> to include distance (<u>near, far, close to</u>) and <u>directional words</u> (<u>left, right</u>).

Patterns, Functions and Algebra Standard

Students use patterns, relations and functions to model, represent and analyze problem situations that involve variable quantities, Students analyze, model and solve problems using various representations such as tables, graphs and equations.

	Grade K Indicators	Grade 1
	<ol style="list-style-type: none"> 1. Identify, extend and copy <u>sequences</u> of sounds, shapes, motions and simple number patterns. 2. Describe orally the <u>pattern</u> of a given sequence. 3. Identify what <u>attribute</u> was used to sort a group of items already sorted; e.g., buttons, stickers, seashells. 4. Model problem situations using objects, or pictures. 	<ol style="list-style-type: none"> 1. Analyze, describe, and extend sequences of sounds, shapes or simple number patterns; e.g., AABBBabAABB...; □□◇◇◇□□◇... (Pattern blocks, attribute shapes); 1,3,1,3,... 2. Describe orally the basic unit or general plan of a <u>repeating</u> or <u>growing pattern</u>. 3. <u>Sort</u>, <u>classify</u>, and <u>order</u> objects by shape, size, number, and other properties and describe the <u>attributes</u> used; e.g., buttons, stickers, seashells. 4. Identify and write a short sentence to describe the attribute that was used to sort a group of items that have already been sorted. 5. Solve open sentences by representing an expression in more than one way using the commutative property; e.g., $4 + 5 = 5 + 4$ or the number of blue blocks plus red blocks is the same as the number of red blocks plus the number of blue blocks ($r + b = b + r$). 6. Describe orally and model a problem situation using objects, pictures, or number sentences.

Data Analysis and Probability Standard

Students pose questions and collect, organize, represent, interpret and analyze data to answer those questions. Students develop and evaluate inferences, predictions and arguments that are based on data.

	Grade K Indicators	Grade 1
	<p>1. Collect and sort <u>data</u> about everyday situations and familiar objects; e.g., data collected from simple <u>surveys</u> (favorite colors, cookies, holidays, holidays), and data collected over a period of time (daily weather).</p> <p>2. Represent data in a floor or table graph using objects and pictures; e.g., <u>bar graphs</u> and <u>picture graphs</u>.</p> <p>3. <u>Sort</u> and <u>classify</u> objects by <u>attributes</u> such as size, color or shape and organize data into categories in a simple table or chart.</p> <p>4. Read and interpret information on charts and graphs; e.g., select categories that have the <u>most</u> or <u>fewest</u> objects, identify <u>main idea</u>, draw conclusions and make predictions.</p> <p>5. Read <u>time lines</u> to displaying a <u>sequence</u> of events.</p> <p>6. Discuss the probability of events related to students' experiences as <u>likely</u> or <u>unlikely</u>; e.g., sledding during the month of July, swimming during the month of July.</p>	<p>1. Collect data about everyday situations and familiar objects and organize into <u>tables</u> and <u>charts</u> using <u>tally marks</u>; e.g., data collected from <u>surveys</u> (favorite pets, favorite foods) and data collected over a period of time.</p> <p>2. Identify <u>multiple categories</u> for sorting objects and data.</p> <p>3. Display collected data in <u>bar graphs</u> and <u>picture graphs</u> with intervals of 1.</p> <p>4. Read and interpret information on <u>charts</u> and <u>graphs</u>; e.g. answer questions about the number of objects represented in a <u>picture graph</u>, <u>bar graph</u> or <u>table</u>; how many more in a category compared to another, or how many altogether in two categories.</p> <p>5. Construct a question that can be answered by using information from a graph.</p> <p>6. Read and use <u>time lines</u> to display a <u>sequence</u> of events.</p> <p>7. Discuss and describe the likelihood of simple events as <u>possible/impossible</u> and <u>more likely/less likely</u>; e.g., when using spinners or number cubes in classroom activities.</p>