

Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Operations and Algebraic Thinking</b> Focus is on multiplication and division strategies and then solving problems involving the four operations.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>performs multiplication within 100 using repeated addition only.</li> <li>creates an expression to represent a verbal description of a mathematical situation.</li> <li>recognizes that repeated addition corresponds to multiplication.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>represents word problems using expressions and equations involving single-step multiplication and division with whole numbers within 100.</li> <li>performs division with no remainder within 100 using "fair-sharing" only.</li> <li>translates a contextual description into an expression or equation that may be used to answer questions in the context.</li> <li>recognizes that repeated subtraction corresponds to division.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>extracts the relevant information to solve a multi-step contextual problem involving multiplication and division of numbers within 100.</li> <li>fluently multiplies and divides within 100.</li> <li>makes sense of a problem presented in a context and looks for entry points to a solution.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>recognizes a contextual situation that matches an expression or equation.</li> <li>represents contextual situation with equations or expressions involving operations with whole numbers within 100.</li> <li>explains the properties of operations, including closure for subsets of the set of whole numbers.</li> <li>explains and/or uses the relationship between multiplication and division to solve division problems within 100.</li> <li>selects the relevant information in a given contextual situation and explains the correspondence between expressions and equations and the context.</li> </ul>
<b>Number and Operations in Base Ten</b> Focus is on place-value arithmetic.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses place value understanding to round whole numbers to the nearest 10.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses place value understanding to round whole numbers to the nearest 100.</li> <li>uses a number line model to determine relative location of a number with respect to two benchmark numbers. Example: is 59 closer to 0 or 100?...closer to 50 or 60?</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses place value understanding to add and subtract multiples of 10 or 100 to whole numbers within 1,000.</li> <li>solves problems that involve using place value understanding to multiply one-digit numbers by multiples of 10.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>fluently adds or subtracts within 1,000.</li> </ul>
<b>Number and Operations—Fractions</b> Focus is on unit fractions and understanding fractions as numbers.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>recognizes a fraction model of a fraction written as <math>a/b</math>.</li> <li>recognizes that a number of objects that are in part of a group can be represented as a fraction of the total number of objects in the whole group.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>identifies a fraction that can be used to represent a ratio described in a context.</li> <li>plots a fraction <math>a/b</math> on a number line that has <math>b</math> divisions per unit.</li> <li>makes sense of quantities that are represented by fractions as part of a total number of objects.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>writes a fraction to represent a ratio from a verbal description of a real-world situation.</li> <li>plots a fraction <math>a/b</math> on a number line that has other than <math>b</math> divisions per unit.</li> <li>decontextualizes rational quantities from a situation and considers the meaning of the parts of a fraction.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>solves multi-step problems involving parts of a whole quantity with fractions as solutions.</li> <li>compares two or more fractional values, including by using a number line to identify the position of each fraction.</li> <li>uses quantitative reasoning to conceptualize a fraction <math>a/b</math> as a parts of size <math>1/b</math>, with <math>a</math> and <math>b</math> both whole numbers.</li> </ul>
<b>Measurement and Data</b> Focus is on area with the aim of connecting it to addition and multiplication, and then looking at measurements and representing measurements in charts.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>recognizes that calculations of elapsed time require a different procedure than calculations with base ten numbers.</li> <li>performs direct measurements of time and length accurately, using standard units (seconds, minutes, hours, inches, feet, yards, centimeters, meters), within appropriate tolerances.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses appropriate types of units of measure for a given situation (e.g., yards and not kilograms for distance).</li> <li>finds the area or perimeter of a square or rectangle.</li> <li>measures times, lengths, or liquid volumes (milliliters, liters) and draws a picture or bar graph to organize the findings.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>solves problems involving metric linear measures of polygons, including perimeters.</li> <li>recognizes area as a measurable attribute of rectangles and squares that is measured in square units.</li> <li>solves problems involving time.</li> <li>determines appropriate units and tools needed to perform several direct measurements of lengths, areas, or liquid volumes, and organizes the findings in a data table or plots with an appropriate degree of precision.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>solves word problems involving calculations of time and can identify and explain an error in an elapsed time calculation, including using an analog clock.</li> <li>is thoughtful about the units of measure they choose, clearly communicates their mathematical thinking, and presents results of measurement problems in a line plot with accurately scaled units on the axes.</li> <li>uses error analysis to critique the work of others.</li> </ul>
<b>Geometry</b> Focus is on 2-dimensional shapes.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>identifies rhombuses, rectangles, and squares as quadrilaterals.</li> <li>students sketch common quadrilaterals to represent and solve problems and justify solution pathways.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>identifies the fraction of a rectangle that is shaded.</li> <li>uses operational definitions to describe geometric relationships.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>constructs and partitions a shape to represent a given fraction.</li> <li>uses appropriate vocabulary to describe attributes of 2- and 3- dimensional shapes.</li> <li>creates a symbolic representation of a fractional value.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>decomposes composite shapes into basic, easily defined shapes.</li> <li>recognizes that a symmetric shape can be partitioned into parts of the same shape and size.</li> </ul>
<b>Modeling</b> Producing, interpreting, understanding, evaluating, and improving mathematical models.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>creates a model to represent a quantity.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>recognizes an equation that can be used to represent a problem presented in a real-world context.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>creates an expression or equation to represent and solve a real-world problem.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>represents real-world problems with expressions, equations, or graphs and can create a context to represent a given equation.</li> </ul>
<b>Justification and Explanation</b> Giving reasons, explaining "Why?"	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>provides a partial explanation for grade level problems addressing number sense, measurement and geometric concepts.</li> <li>provides an example, computation, or one or more steps in a procedure.</li> <li>states a property, definition, or relationships between two or more objects.</li> <li>uses a single statement to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>explains a pattern using words, numeric expressions, and operations.</li> <li>generates a sequence from a rule.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>uses a pattern or sequence to support an argument.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>solves grade-level problems and provides a more complete explanation of their reasoning.</li> <li>draws conclusions using both specific and general evidentiary statements.</li> <li>provides general support for a claim in order to reach a conclusion.</li> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> <li>uses conditional statements.</li> <li>provides a counterexample.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, using more than one arithmetic model, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>

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<p><b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>• adds and subtracts within 20 in real-world situations.</li> <li>• skip-counts by 5s, 10s, 100s, and their multiples, starting at 0.</li> <li>• adds and subtracts within 100.</li> <li>• identifies the numerals in various place values.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>• solves problems (precisely and using estimations) that address measurement and geometry concepts from the prior grades and provides partial explanations of their reasoning.</li> <li>• understands place value through hundreds using models.</li> <li>• skip-counts by 5s, 10s, 100s, and their multiples, starting at any multiple of 5.</li> <li>• measures and estimates lengths in standard units.</li> <li>• relates addition and subtraction to length.</li> <li>• recognizes and names a particular quadrilateral and explains in terms of the specific attributes of the quadrilateral.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>• uses base-ten number concepts from the previous grade to correctly solve problems and to provide more complete explanations to support their findings for problems addressing measurement and geometry from prior grades.</li> <li>• understands place value through hundreds.</li> <li>• skip-counts by 5s, 10s, 100s, and their multiples, starting at any number.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>• solves multi-step problems addressing number, operations, and algebraic thinking from the previous grade and gives complete explanations for those solutions and for problems addressing relationships between geometric figures.</li> <li>• uses place values concepts to solve real-world situations.</li> <li>• describes patterns of the numbers in a skip-count list and describes the relationship between skip-counting and multiplication or division.</li> </ul>
<p><b>Mathematical Practices</b> Collected PLDs that focus on mathematical practices.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>• creates an expression to represent a verbal description of a mathematical situation.</li> <li>• recognizes that repeated addition corresponds to multiplication.</li> <li>• recognizes that a number of objects that are in part of a group can be represented as a fraction of the total number of objects in the whole group.</li> <li>• performs direct measurements of time and length accurately, using standard units (seconds, minutes, hours, inches, feet, yards, centimeters, meters), within appropriate tolerances.</li> <li>• sketches common quadrilaterals to represent and solve problems and justify solution pathways.</li> <li>• creates a model to represent a quantity.</li> <li>• provides a partial explanation for grade level problems addressing number sense, measurement and geometric concepts.</li> <li>• provides an example, computation, or one or more steps in a procedure.</li> <li>• states a property, definition, or relationships between two or more objects.</li> <li>• uses a single statement to draw a conclusion.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>• translates a contextual description into an expression or equation that may be used to answer questions in context.</li> <li>• recognizes that repeated subtraction corresponds to division.</li> <li>• uses a number line model to determine relative location of a number with respect to two benchmark numbers. Example: is 59 closer to 0 or 100?...closer to 50 or 60?</li> <li>• makes sense of quantities that are represented by fractions as part of a total number of objects.</li> <li>• measures times, lengths, or liquid volumes (milliliters, liters) and draws a picture or bar graph to organize the findings.</li> <li>• uses operational definitions to describe geometric relationships.</li> <li>• recognizes a numeric equation that can be used to represent a problem presented in a real-world context.</li> <li>• explains a pattern using words, numeric expressions, and operations.</li> <li>• generates a sequence from a rule.</li> <li>• draws and labels relevant visual representations.</li> <li>• explains steps of a procedure.</li> <li>• uses a pattern or sequence to support an argument.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>• makes sense of a problem presented in a context and looks for entry points to a solution.</li> <li>• decontextualizes rational quantities from a situation and consider the meaning of the parts of a fraction.</li> <li>• determines the appropriate units and tools needed to perform several direct measurements of lengths, areas, or liquid volumes, and organizes the findings in a data table or plots with an appropriate degree of precision.</li> <li>• uses appropriate vocabulary to describe attributes of 2- and 3-dimensional shapes.</li> <li>• creates a symbolic representation of a fractional value.</li> <li>• creates an expression or equation to represent and solve a real-world problem.</li> <li>• solves grade-level problems and provides a more complete explanation of their reasoning.</li> <li>• draws conclusions using both specific and general evidentiary statements.</li> <li>• provides general support for a claim in order to reach a conclusion.</li> <li>• uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>• justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> <li>• uses conditional statements.</li> <li>• provides a counterexample.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>• selects the relevant information in a given contextual situation and explains the correspondence between expressions and equations and the context.</li> <li>• uses quantitative reasoning to conceptualize a fraction, <math>a/b</math>, as <math>a</math> parts of size <math>1/b</math>, with <math>a</math> and <math>b</math> both whole numbers.</li> <li>• is thoughtful about the units of measure they choose, clearly communicates their mathematical thinking, and presents results of measurement problems in a line plot with accurately scaled units on the axes.</li> <li>• decomposes composite shapes into basic, easily defined shapes.</li> <li>• recognizes that a symmetric shape can be partitioned into parts of the same shape and size.</li> <li>• represents real-world problems with expressions, equations, or graphs and can create a context to represent a given equation.</li> <li>• provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>• provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, using more than one arithmetic model, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>

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<b>Operations and Algebraic Thinking</b> Focus is on developing deeper understanding of operations and thinking about rules that give patterns.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>solves two-step number sentences.</li> <li>identifies, describes, and expands shape patterns.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>recognizes and differentiates between prime and composite numbers.</li> <li>identifies, describes, and expands number patterns.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>solves problems involving prime numbers, factors, and multiples.</li> <li>extends a number pattern that is presented in a context to solve a problem.</li> <li>makes sense of multi-step problems involving all four operations with whole numbers.</li> <li>attends to the meaning of quantities.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>answers questions and solves problems involving prime numbers, factors, and multiples and explains their reasoning.</li> <li>solves multi-step word problems with whole numbers and having whole-number answers.</li> <li>finds a point of entry to solve problems involving whole numbers, fractions, and decimals.</li> <li>contextualizes and decontextualizes real-world situations.</li> </ul>
<b>Number and Operations in Base Ten</b> Focus is on multi-digit whole numbers and developing fluency using place-value thinking.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses place value understanding and a given model to round whole numbers within 100,000.</li> <li>multiplies a one-digit whole number by a two-digit whole number.</li> <li>converts visual representations of multi-digit whole numbers to base-ten numerals.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>converts number names for multi-digit whole numbers to base-ten numerals.</li> <li>multiplies a one-digit whole number by a three-digit whole number.</li> <li>uses place value for recognizing the value of digits within 100,000.</li> <li>converts multi-digit whole numbers between word form and base-ten numerals.</li> <li>recognizes how repeated addition and subtraction relate to multiplication and division.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>multiplies a one-digit whole number by a four-digit whole number; multiplies two two-digit whole numbers.</li> <li>uses place value to understand the value of whole numbers within 100,000.</li> <li>writes a multi-digit whole number in expanded form using addition. Example: <math>328 = 300 + 20 + 8</math></li> <li>uses the distributive property to decompose and recompose numbers.</li> <li>estimates to check the result of a calculation.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>solves multi-step real-world problems involving operations with multi-digit numbers.</li> <li>writes a multi-digit whole number in expanded form using addition and multiplication. Example: <math>328 = 3 \cdot 100 + 2 \cdot 10 + 8</math></li> </ul>
<b>Number and Operations—Fractions</b> Focus is on fraction equivalence and on strategies for comparing and adding fractions with unlike denominators. Students multiply fractions by whole numbers, and decimals are introduced.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>adds and subtracts fractions with common denominators.</li> <li>compares decimals to the hundredths using a given model (number lines, visual models, etc.).</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>solves mathematical or real-world problems involving addition and subtraction of fractions referring to the same whole with equal denominators.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>compares decimals between 0 and 1 to hundredths.</li> <li>solves mathematical or real-world problems involving addition and subtraction of mixed numbers referring to the same whole with like common denominators.</li> <li>recognizes and generates equivalent fractions using visual fraction models.</li> <li>uses the mathematical symbols <math>&lt;</math>, <math>=</math>, <math>&gt;</math> appropriately.</li> <li>decomposes and recomposes mixed numbers.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>compares two fractions with different numerators and different denominators by creating common denominators and explains how they know their comparison is correct.</li> <li>compares decimals to hundredths when presented in a real-world context.</li> <li>uses decimal notation for fractions with denominators of 10 or 100.</li> </ul>
<b>Measurement and Data</b> Focus is on understanding measurement units and equivalent measurements in different units. Angle measure is explored.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>answers basic questions about a simple line plot.</li> <li>selects the appropriate tool to use in a situation.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>applies geometric properties, and the relationships between angles in a two-dimensional figure, to solve problems involving quadrilaterals.</li> <li>recognizes the correct line plot to represent measurement data.</li> <li>constructs a line plot with whole number data.</li> <li>attends to precision when using a ruler and measures within <math>\frac{1}{2}</math> inch.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses a protractor to measure and compare angles.</li> <li>converts measurements in fractional amounts expressed in a measurement system's larger unit in terms of as smaller unit in real-world situations.</li> <li>constructs a line plot with tick marks that are multiples of <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, or <math>\frac{1}{8}</math> to display a data set of measurements.</li> <li>attends to precision when using a tool.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>solves problems involving length and distance, using all four operations with whole numbers, fractions, and decimals.</li> <li>performs computations based on data presented in a line plot that includes fractions.</li> <li>uses a protractor to apply the additive property of non-overlapping angles in order to explain solutions for problems involving addition and subtraction of angle measures.</li> <li>selects and uses appropriate tools to solve complex and multi-step problems.</li> <li>uses models to visualize results and compare predictions with data.</li> </ul>
<b>Geometry</b> Focus is on the idea that shapes can be categorized by their properties. Symmetry is a property of some shapes.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>identifies representations of points, lines, line segments, rays, and angles.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>identifies representations of perpendicular and parallel lines.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>classifies two-dimensional figures based on the presence of parallel sides.</li> <li>identifies angles in a diagram or drawing of two-dimensional figures as right, acute, or obtuse.</li> <li>understands that a line of symmetry for a two-dimensional figure is a line across the figure such that the figure would be divided into matching parts if it were folded on the line.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>classifies two-dimensional figures based on the presence or absence of parallel or perpendicular lines.</li> <li>identifies multiple lines of symmetry for a two-dimensional figure.</li> </ul>
<b>Modeling</b> Producing, interpreting, understanding, evaluating, and improving mathematical models.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses a diagram of a 2-dimensional figure to recognize a line of symmetry.</li> <li>uses place value blocks to represent and solve questions with whole numbers.</li> <li>uses number lines to solve addition and subtraction of whole numbers.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses a diagram of a two-dimensional figure to identify a line of symmetry and analyzes the relationships between angles.</li> <li>uses a given model to solve real-world situations.</li> <li>uses place-value blocks with fractions and decimals to represent and solve questions.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>recognizes a two-dimensional figure based on a verbal description of the properties of the figure and creates and uses diagrams of two-dimensional figures to analyze relationships between quantities.</li> <li>determines an appropriate model for a given real-world situation (area and fraction models, number lines, etc.).</li> <li>uses and creates area models for multiplication.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>analyzes a representation such as a geometric model, a frequency plot, a data table, or a Venn diagram to solve a problem presented in a context.</li> <li>creates and uses an appropriate model to solve real-world situations (area and fraction models, number lines, etc.).</li> </ul>
<b>Justification and Explanation</b> Giving reasons, explaining "Why?"	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>restates the problem and supplies reasoning statements that are true but not effective.</li> <li>provides an example, computation, or one more steps in a procedure.</li> <li>states a property, definition, or relationships between two or more objects.</li> <li>uses a single statement to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>provides a partially effective explanation of their reasoning.</li> <li>explains a pattern using words, algebraic expressions, numeric operations.</li> <li>generates a sequence from a rule.</li> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to support an argument.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>draws conclusions using both specific and general evidentiary statements.</li> <li>provides general support for a claim in order to reach a conclusion.</li> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>

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<p><b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>• multiplies through <math>12 \times 12</math> with models.</li> <li>• matches the number of parts in a whole to a given a model.</li> <li>• recognizes polygons of up to 8 sides.</li> <li>• identifies a pattern.</li> <li>• identifies and gives the value of the digits in different place values with visual models.</li> <li>• recalls basic facts using the four operations.</li> <li>• uses standard measurement tools to measure objects and uses the measurements to create data.</li> <li>• selects the appropriate tool to use in a situation.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>• multiplies through <math>12 \times 12</math> without the use of models.</li> <li>• understands that the larger the denominator the smaller the pieces.</li> <li>• names and writes a unit fraction as descriptions of one part of a single whole.</li> <li>• compares fractions with the same denominator or numerator.</li> <li>• solves one-step word problems using the four operations with whole numbers and having whole number answers.</li> <li>• gives the value of a specific digit in a number.</li> <li>• builds rectangular arrays.</li> <li>• solves real-world situations using basic measurement.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>• solves multi-step real-world problems addressing concepts from the previous grade, including whole number rounding concepts; multi-digit operations with whole numbers; geometric properties.</li> <li>• explains the desired number of parts, equal sized parts, and exhausting the whole.</li> <li>• relates rectangular arrays to area, multiplication and division.</li> <li>• solves two-step word problems using the four operations with whole numbers and having whole-number answers.</li> <li>• creates numbers sentences from a given situation involving only addition and subtraction or only multiplication and division.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>• solves and explains their process and solutions for multi-step, multi-part problems addressing concepts from the previous grades, including rounding; area, perimeter, and elapsed time measurements; properties of quadrilaterals; and fraction concepts, including fraction equivalence.</li> <li>• composes and decomposes complex geometric shapes.</li> </ul>
<p><b>Mathematical Practices</b> Collected PLDs that focus on mathematical practices.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>• constructs arguments.</li> <li>• uses a diagram of a two-dimensional figure to recognize a line of symmetry.</li> <li>• uses place value blocks to represent and solve questions with whole numbers.</li> <li>• uses number lines to solve addition and subtraction of whole numbers.</li> <li>• restates the problem and supplies reasoning statements that are true but not effective.</li> <li>• provides an example, computation, or one more steps in a procedure.</li> <li>• states a property, definition, or relationships between two or more objects.</li> <li>• uses a single statement to draw a conclusion.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>• constructs arguments with minimal errors.</li> <li>• recognizes that repeated addition and subtraction relate to multiplication and division.</li> <li>• attends to precision when using a ruler and measures within <math>\frac{1}{2}</math> inch.</li> <li>• uses a diagram of a two-dimensional figure to identify a line of symmetry and analyzes the relationships between angles.</li> <li>• uses a given model to solve real-world situations.</li> <li>• uses place value blocks with fractions and decimals to represent and solve questions.</li> <li>• provides a partially effective explanation of their reasoning.</li> <li>• explains a pattern using words, algebraic expressions, numeric operations.</li> <li>• generates a sequence from a rule.</li> <li>• uses conditional statements.</li> <li>• draws and labels relevant visual representations.</li> <li>• explains steps of a procedure.</li> <li>• provides a counterexample.</li> <li>• uses a pattern or sequence to support an argument.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>• constructs viable arguments and performs simple error analysis.</li> <li>• makes sense of multi-step problems involving all four operations with whole numbers.</li> <li>• attends to the meaning of quantities.</li> <li>• uses the distributive property to decompose and recompose numbers.</li> <li>• estimates to check the result of a calculation.</li> <li>• uses the mathematical symbols <math>&lt;</math>, <math>=</math>, <math>&gt;</math> appropriately.</li> <li>• decomposes and recomposes mixed numbers.</li> <li>• attends to precision when using a tool.</li> <li>• uses appropriate vocabulary.</li> <li>• recognizes a two-dimensional figure based on a verbal description of the properties of the figure and creates and uses diagrams of two-dimensional figures to analyze relationships between quantities.</li> <li>• determines an appropriate model for a given real-world situation (area and fraction models, number lines, etc.).</li> <li>• uses and creates area models for multiplication.</li> <li>• draws conclusions using both specific and general evidentiary statements.</li> <li>• provides general support for a claim in order to reach a conclusion.</li> <li>• uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>• justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>• finds a point of entry to solve problems involving whole numbers, fractions, and decimals.</li> <li>• contextualizes and decontextualizes real-world situations.</li> <li>• selects and uses appropriate tools to solve complex and multi-step problems.</li> <li>• uses models to visualize results and compare predictions with data.</li> <li>• analyzes a geometric model, a frequency plot, a data table, or a Venn diagram to solve a problem presented in a context.</li> <li>• creates and uses an appropriate model to solve real-world situations (area and fraction models, number lines, etc.).</li> <li>• provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>• provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>



Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Operations and Algebraic Thinking</b> Focus is on numerical expressions. Students compare patterns, developing early function reasoning.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>writes simple numerical expressions composed of two operations that record calculations with numbers.</li> <li>expresses the relationship between two terms in a number sentence or pattern.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>translates verbal descriptions of up to three numerical operations to symbolic expressions, including expressions involving parentheses.</li> <li>compares two numerical patterns, describing the relationship between the corresponding terms.</li> <li>expresses the relationship between terms in a given verbal number sentence or numerical pattern.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>interprets numerical expressions without evaluating them.</li> <li>writes expressions involving parentheses, including from a real-world problem.</li> <li>plots ordered pairs in the first quadrant of a coordinate plane derived from the relationship between corresponding terms of two numerical patterns.</li> <li>makes sense of a real-world problem involving any of the four operations and writes an expression that reflects that given situation.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>writes and evaluates expressions involving multiple sets of parentheses, including from a real-world problem.</li> <li>describes the relationships between ordered pairs by using coordinates from a graph.</li> <li>makes sense of a real-world problem involving any of the four operations and writes an expression that reflects that given situation and then uses the expression to solve the problem.</li> </ul>
<b>Number and Operations in Base Ten</b> Focus is on understanding the coherence of place-value for whole numbers and decimals, and how operations with whole numbers translate to decimals.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>recognizes that in a multi-digit whole number the place value of any digit represents 10 times as much as the place value of the digit to the right.</li> <li>reads and writes decimal numbers to hundredths.</li> <li>interprets a given model representing a decimal to the hundredths place.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>recognizes and explains the patterns in the number of zeros in the product when multiplying by powers of 10.</li> <li>compares decimal numbers to hundredths.</li> <li>adds, subtracts, multiplies, or divides decimal numbers to the hundredths using models, place value, or properties of operations.</li> <li>constructs a model, such as a number line, to round decimals to the hundredths place.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>recognizes that in a multi-digit number the place value of any digit represents <math>\frac{1}{10}</math> times as much as the place value of the digit to the left.</li> <li>recognizes and explains patterns in placement of the decimal point when multiplying or dividing by powers of 10.</li> <li>uses and explains a standard algorithm to multiply multi-digit whole numbers.</li> <li>rounds decimal numbers to the hundredths place.</li> <li>uses place-value understanding to rewrite decimal numbers in expanded form.</li> <li>calculates accurately when using the standard algorithms to multiply multi-digit whole numbers and decimals to hundredths, and rounds as appropriate.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>compares numbers written in expanded or standard form.</li> <li>solves multi-step problems involving all four operations with decimals to hundredths and division of whole numbers with up to four-digit dividends and two-digit divisors.</li> <li>rounds decimal numbers to any place value.</li> <li>solves multi-step problems involving decimals to hundredths accurately and efficiently.</li> </ul>
<b>Number and Operations—Fractions</b> Focus is on deepening understanding of fraction multiplication and division, and on developing fluency with fraction addition and subtraction through equivalent fractions.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses a model to multiply a fraction by a fraction.</li> <li>uses a model, such as fraction bars or an area model, to represent problems involving addition and subtraction of fractions with common denominators or multiplication of fractions by a whole number.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>solves mathematical or real-world word problems involving addition and subtraction of fractions and mixed numbers with unlike denominators of 2, 3, 4, 5, or 10.</li> <li>divides a fraction by a whole number or a whole number by a fraction.</li> <li>understands or evaluates a model to show equivalent fractions.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>multiplies a fraction between zero and one by a whole number and explains why the result is smaller than the original whole number.</li> <li>solves mathematical or real-world problems involving addition and subtraction of fractions and mixed numbers with unlike denominators.</li> <li>makes sense of a real-world problem using addition and subtraction of fractions and mixed numbers with unlike denominators to find a solution.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>solves real-world problems involving multiplication of fractions and mixed numbers.</li> <li>solves multi-step mathematical and real-world problems involving addition and subtraction of fractions with unlike denominators.</li> <li>makes sense of multi-step problems involving several related parts of a whole.</li> </ul>
<b>Measurement and Data</b> Focus is on the concept of volume and relations to multiplication and addition. Students convert measurements to different units and continue to represent and interpret data.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>converts among the units within the metric system in order to solve basic mathematical problems.</li> <li>solves single step mathematical and real-world problems involving volume of right rectangular prisms.</li> <li>uses operations on fractions with like denominators of 2 and 4 to solve problems involving information presented in line plots.</li> <li>uses unit cubes to model the volume of a right rectangular prism.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>converts among the units within the metric system in order to solve single-step real-world or mathematical problems.</li> <li>counts unit cubes to find the volumes of composite right rectangular prisms.</li> <li>solves two-step mathematical and real-world problems involving volume of right rectangular prisms.</li> <li>uses addition and subtraction on fractions with like denominators of 2, 4, and/or 8 to solve problems involving information presented in line plots.</li> <li>finds the volume of a right rectangular prism by multiplying side lengths.</li> <li>uses a model of an irregular rectangular prism and reasons abstractly to understand the complete structure of the shape in order to find volume.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>converts among the units within a non-metric measurement system in order to solve single-step real-world or mathematical problems.</li> <li>determines and uses an appropriate system of units for a given measurement.</li> <li>solves multi-step mathematical and real-world problems involving volume of right rectangular prisms.</li> <li>uses all four operations on fractions with unlike denominators of 2, 4, and 8 referring to the same whole to solve problems involving information presented in line plots.</li> <li>makes sense of an irregular rectangular prism to find the sides lengths and then uses a volume formula to find the volume of the shape.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>converts among the units within a non-metric measurement system in order to solve multi-step real-world or mathematical problems.</li> <li>solves multi-step mathematical and real-world problems involving the volume of a composite figure composed of two or more non-overlapping right rectangular prisms.</li> <li>constructs line plots to display a data set of measurements in fractions with denominators of 2, 4, and 8.</li> <li>makes sense of quantities and units, using the units as a way to attend to the meaning of the quantities.</li> </ul>
<b>Geometry</b> Focus is on categories of 2-dimensional figures based on properties. The coordinate plane is introduced.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>identifies triangles, squares, rectangles, and trapezoids.</li> <li>reasons about the properties of triangles and quadrilaterals in order to recognize them.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>graphs the coordinates of the order pair for a given point in the first quadrant of the coordinate plane.</li> <li>classifies triangles as isosceles, equilateral, scalene, right, acute, and/or obtuse.</li> <li>classifies parallelograms, squares, rhombuses, and rectangles based on their properties.</li> <li>creates a graph model by plotting ordered pairs in the first quadrant of a coordinate plane.</li> <li>reasons about the properties of triangles and quadrilaterals in order to classify them.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>identifies the coordinates of the ordered pair for a given point in the first quadrant of the coordinate plane.</li> <li>classifies and compares triangles, squares, rectangles, rhombuses, parallelograms, kites, and trapezoids based on their properties.</li> <li>interprets a graph model by identifying coordinate pairs in the first quadrant of a coordinate plane.</li> <li>constructs a viable argument to classify and compare triangles and quadrilaterals based on their properties.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>represents real-world problems by graphing points in the first quadrant of the coordinate plane and interprets the coordinate values in the context of the situation.</li> <li>uses properties to explain and justify the classifications of polygons.</li> <li>creates a graph to model a real-world problem on a coordinate plane and then interprets a value.</li> <li>constructs a viable argument to justify the classification of polygons by using clear definitions and examples.</li> </ul>
<b>Modeling</b> Producing, interpreting, understanding, evaluating, and improving mathematical models.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses manipulatives to represent a problem or concept.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses manipulatives to interpret a problem or concept.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>evaluates a manipulative model to solve a problem or explain a concept.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>uses manipulatives to improve a model of a problem or concept.</li> </ul>

Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Justification and Explanation</b> Giving reasons, explaining “Why?”	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>explains a pattern using words, expressions, and operations, or generates a sequence from a rule.</li> <li>identifies an error in reasoning.</li> <li>uses two or more specific statements to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>identifies an error in reasoning and gives a justification of why it is an error.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>draws conclusions using both a specific and general evidentiary statement.</li> <li>provides general support for a claim in order to reach a conclusion.</li> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>
<b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>fluently adds, subtracts, and multiplies single-digit whole numbers.</li> <li>understands whole number place value.</li> <li>understands fractions as parts of a whole.</li> <li>solves mathematical or real-world problems involving addition and subtraction of fractions with like denominators.</li> <li>multiplies a whole number by a fraction using a model.</li> <li>recognizes patterns and finds the next term in a pattern.</li> <li>recognizes when angles are right, acute, or obtuse.</li> <li>understands the properties of geometric figures by using sides and angles.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>explains standard algorithms to add and subtract multi-digit whole numbers.</li> <li>uses place-value understanding to rewrite whole numbers in expanded form.</li> <li>rewrites fractions in equivalent fractional forms and uses visual models to verify the equivalence.</li> <li>understands units of measure.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>fluently divides single-digit whole numbers.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>checks when comparing fractional parts that they are fractions of the same whole.</li> </ul>
<b>Mathematical Practices</b> Collected PLDs that focus on mathematical practices.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>expresses the relationship between two terms in a number sentence or pattern.</li> <li>interprets a given model representing a decimal to the hundredths place.</li> <li>uses a model, such as fraction bars or an area model, to represent problems involving addition and subtraction of fractions with common denominators or multiplying fractions by a whole number.</li> <li>uses unit cubes to model the area of a right rectangular prism.</li> <li>reasons about the properties of triangles and quadrilaterals in order to recognize them.</li> <li>uses manipulatives to represent a problem or concept.</li> <li>explains a pattern using words, expressions, and operations or generates a sequence from a rule.</li> <li>identifies an error in reasoning.</li> <li>uses two or more specific statements to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>expresses the relationship between terms in a given verbal number sentence or numerical pattern.</li> <li>constructs a model, such as a number line, to round decimals to the hundredths place.</li> <li>understands or evaluates a model to show equivalent fractions.</li> <li>uses a model of an irregular rectangular prism and reasons abstractly to understand the complete structure of the shape in order to find volume.</li> <li>creates a graph model by plotting ordered pairs in the first quadrant of a coordinate plane.</li> <li>reasons about the properties of triangles and quadrilaterals in order to classify them.</li> <li>uses manipulatives to interpret a problem or concept.</li> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>identifies an error in reasoning and gives a justification of why it is an error.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>makes sense of a real-world problem involving any of the four operations and writes an expression that reflects that given situation.</li> <li>calculates accurately when using a standard algorithm to multiply multi-digit whole numbers and decimals to hundredths, and rounds as appropriate.</li> <li>makes sense of a real-world problem using addition and subtraction of fractions and mixed numbers with unlike denominators to find a solution.</li> <li>makes sense of an irregular rectangular prism to find the sides lengths and then uses a volume formula to find the volume of the shape.</li> <li>interprets a graph model by identifying coordinate pairs in the first quadrant of a coordinate plane.</li> <li>constructs a viable argument to classify and compare triangles and quadrilaterals based on their properties.</li> <li>evaluates a manipulative model to solve a problem or explain a concept.</li> <li>draws conclusions using both a specific and general evidentiary statement.</li> <li>provides general support for a claim in order to reach a conclusion.</li> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>makes sense of a real-world problem involving any of the four operations and writes an expression that reflects that given situation and then uses the expression to solve the problem.</li> <li>solves multi-step problems involving decimals to hundredths accurately and efficiently.</li> <li>makes sense of multi-step problems involving several related parts of a whole.</li> <li>checks when comparing fractional parts that they are fractions of the same whole.</li> <li>makes sense of quantities and units, using the units as a way to attend to the meaning of the quantities.</li> <li>creates a graph to model a real-world problem on a coordinate plane and then interprets a value.</li> <li>constructs a viable argument to justify the classification of polygons by using clear definitions and examples.</li> <li>uses manipulatives to improve a model of a problem or concept.</li> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>

Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Ratios and Proportional Relationships</b> Focus is on the concept of ratio and rate and the beginnings of developing proportional reasoning.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses a ratio of the form <math>a:b</math> to describe relationships between quantities.</li> <li>makes sense of ratios in order to describe relationships.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>determines unit rates to solve problems.</li> <li>makes sense of a given problem to determine the unit rate.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>rewrites ratios representing rates in equivalent forms in order to understand a real-world problem, including converting rates to unit rates or converting the units of measure for a given rate.</li> <li>makes sense of a real-world problems using ratios and unit rates.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>solves problems involving percentages.</li> <li>determines a rate relationship in a real-world problem and uses it to compare rates and to solve rate problems.</li> <li>makes sense and determines a rate relationship to solve a problem.</li> </ul>
<b>The Number System</b> Focus is on seeing the rational numbers as a coherent number system. Students increase their fluency with calculations.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>recognizes when a given number is a factor or multiple of another number.</li> <li>makes sense of problems in order to recognize a number as a factor or multiply by using knowledge of multiplication and division.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>adds, subtracts and multiplies multi-digit decimals in order to solve problems.</li> <li>determines absolute value when given a number line.</li> <li>graphs points in the third quadrant of the coordinate plane.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>divides multi-digit decimals as well as non-unit fractions in order to solve problems.</li> <li>recognizes common factors of numbers and uses them to determine when expressions are equivalent.</li> <li>explains how the properties of numbers extend to negative whole numbers.</li> <li>determines the absolute value of an integer.</li> <li>graphs points in all four quadrants of the coordinate plane.</li> <li>uses negative numbers to describe quantities.</li> <li>recognizes integers to represent real life situations.</li> <li>uses a number line to model positive and negative numbers and absolute value.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>compares absolute values of rational numbers.</li> <li>determines the common factors or multiples of two whole numbers.</li> <li>graphs points in all four quadrants of the coordinate plane and uses the relationship between points with the same first or second coordinate to draw conclusions.</li> <li>reasons abstractly using positive and negative numbers to solve a problem.</li> </ul>
<b>Expressions and Equations</b> Focus is on understanding algebraic expressions as analogous to numeric expressions. Students continue to develop function ideas by analyzing pairs of independent and dependent variables.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>writes and evaluates numerical expressions involving whole number exponents.</li> <li>uses repeated reasoning to solve expressions using whole number exponents.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>identifies when two expressions are equivalent.</li> <li>makes sense of equivalent expressions.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>applies the distributive property to create equivalent expressions involving whole number coefficients.</li> <li>recognizes independent and dependent variables in an equation that represents a real-life situation.</li> <li>makes use of structure by using the distributive property to make equivalent expressions.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>represents linear relationships between two quantities with equations or inequalities, evaluates linear expressions, and solves problems involving one-variable linear equations of the form <math>x + p = q</math>.</li> <li>graphs the solution set to inequalities of the form <math>x &gt; c</math> or <math>x &lt; c</math> on a number line and determines if a given value is a solution of the inequality.</li> <li>uses the language of operations to describe the structure of expressions.</li> <li>describes the structure of expressions using operational language.</li> </ul>
<b>Geometry</b> Focus is on composing and decomposing shapes, and working with shapes in 3 dimensions.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>finds the area of a right triangle when the lengths of the legs are given.</li> <li>makes sense of a problem involving right triangles when given the lengths of the legs by using the area formula.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>finds the volume of a right rectangular prism that is packed with unit cubes.</li> <li>models using unit cubes to find the volume of right rectangular prisms.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>solves real-world problems involving the area of triangles and quadrilaterals, including simple figures that are compositions of both.</li> <li>calculates surface area if given a net.</li> <li>reasons abstractly to decompose the given figure in order to find total area.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>determines the area of trapezoids by composition of rectangles and triangles in order to solve problems.</li> <li>determines the volume of rectangular prisms in order to solve problems.</li> <li>makes sense of a 3-dimensional figure in order to find the surface area of that figure.</li> </ul>
<b>Statistics and Probability</b> Focus is on the concept of statistical variability and the notion that there is some order in the apparent chaos, seen through distributions. Students develop more ways of representing data.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>finds the range of a univariate data set.</li> <li>makes sense of a data set by finding the mean.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>recognizes histograms and box plots that represent distributions.</li> <li>makes sense of a model, such as histogram or box plot, that represents a set of data.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>determines the mean, median, and mode of a set of data.</li> <li>constructs histograms to represent distributions.</li> <li>creates a model of a histogram using a set of data.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>interprets and compares the mean and media of a univariate distribution.</li> <li>explains how additional data points would affect the center and spread of a distribution.</li> <li>analyzes and creates box plots to represent a univariate data set.</li> <li>represents and analyzes sets of data using various model representations.</li> </ul>
<b>Modeling</b> Producing, interpreting, understanding, evaluating, and improving mathematical models.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses manipulatives to represent a problem or concept.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses manipulatives to interpret a problem or concept.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>evaluates a manipulative model to solve a problem or concept.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>uses a manipulative to improve a model of a problem or concept.</li> </ul>
<b>Justification and Explanation</b> Giving reasons, explaining “Why?”	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>explains a pattern using words, algebraic expressions, number operations.</li> <li>generates a sequence from a rule.</li> <li>identifies an error in reasoning.</li> <li>uses two or more specific statements to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>draws conclusions using both a specific and general evidentiary statement.</li> <li>provides general support for a claim in order to reach a conclusion.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>

Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>• multiplies whole numbers using a model.</li> <li>• adds and subtracts fractions and mixed numbers with like denominators.</li> <li>• multiplies fractions with whole numbers</li> <li>• understands the properties of geometric figures by using sides and angles.</li> <li>• finds areas of rectangles.</li> <li>• graphs ordered pairs in the first quadrant of the coordinate plane.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>• multiplies multi-digit whole numbers fluently.</li> <li>• adds and subtracts fractions and mixed number with unlike denominators.</li> <li>• multiplies and divides fractions by whole numbers.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>• multiplies fractions and/or mixed numbers with unlike denominators.</li> <li>• classifies geometric figures by their properties.</li> <li>• writes and evaluates simple expressions without variables.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>• adds, subtracts, and multiplies fractions and/or mixed numbers with unlike denominators in multi-step problems.</li> <li>• explains classifications of geometric figures by using sides and angles.</li> <li>• writes and evaluates complex expressions without variables.</li> </ul>
<b>Mathematical Practices</b> Collected PLDs that focus on mathematical practices.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>• makes sense of ratios in order to describe relationships.</li> <li>• makes sense of problems in order to recognize a number as a factor or multiply by using knowledge of multiplication and division.</li> <li>• uses repeated reasoning to solve expressions using whole number exponents.</li> <li>• makes sense of a problem involving right triangles when given the lengths of the legs by using the area formula.</li> <li>• makes sense of a data set by finding the mean.</li> <li>• uses manipulatives to represent a problem or concept.</li> <li>• explains a pattern using words, algebraic expressions, number operations.</li> <li>• generates a sequence from a rule.</li> <li>• identifies an error in reasoning.</li> <li>• uses two or more specific statements to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>• makes sense of a given problem to determine the unit rate.</li> <li>• makes sense of equivalent expressions.</li> <li>• models using unit cubes to find the volume of rectangular prisms.</li> <li>• makes sense of a model, such as histogram or box plot, that represents a set of data.</li> <li>• uses manipulatives to interpret a problem or concept.</li> <li>• uses conditional statements.</li> <li>• draws and labels relevant visual representations.</li> <li>• explains steps of a procedure.</li> <li>• provides a counterexample.</li> <li>• uses a pattern or sequence to draw a conclusion.</li> <li>• draws conclusions using both a specific and general evidentiary statement.</li> <li>• provides general support for a claim in order to reach a conclusion.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>• makes sense of a real-world problems using ratios and unit rates.</li> <li>• uses a number line to model positive and negative numbers and absolute value.</li> <li>• makes use of structure by using the distributive property to make equivalent expressions.</li> <li>• reasons abstractly to decompose the given figure in order to find total area.</li> <li>• creates a model of a histogram using a set of data.</li> <li>• evaluates a manipulative model to solve a problem or concept.</li> <li>• uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>• justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>• makes sense and determines a rate relationship to solve a problem.</li> <li>• reasons abstractly using positive and negative numbers to solve a problem.</li> <li>• describes the structure of expressions using operational language.</li> <li>• makes sense of a figure in order to find the surface area of that figure.</li> <li>• represents and analyzes sets of data using various model representations.</li> <li>• uses a manipulative to improve a model of a problem or concept.</li> <li>• provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>• provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>



Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Ratios &amp; Proportional Relationships</b> Focus is on proportional relationships of quantities that vary together.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>recognizes that proportional relationships are relationships between two equal ratios.</li> <li>makes sense of problems to compare two quantities.</li> <li>uses calculators appropriately when comparing ratios.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>solves simple problems in context, given the equation of the proportional relationship that models the situation.</li> <li>makes sense of problems and perseveres in solving proportions accurately.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>solves multi-step problems in contexts that require creating an equation to model the situation, including those involving proportions, ratios, and percentages.</li> <li>uses the structure of ratios and proportions to calculate percentages.</li> <li>makes sense of problems and perseveres in solving multistep problems.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>uses proportional relationships to solve problems, including those involving rates, discounts, and finding percentages.</li> <li>makes sense of quantities and their relationships.</li> <li>gives results to the required level of precision.</li> <li>applies the structure of proportions to rates, percentages, and discounts.</li> </ul>
<b>The Number System</b> Focus is on completing the rational number system by extending the basic operations, and using this system to solve problems.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>identifies even and odd integers.</li> <li>uses a number line to model negative and positive numbers.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>describes real-world situations that involve positive and negative rational quantities.</li> <li>makes sense of a math concept in the real world.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>recognizes the set of integers as the whole numbers and their opposites, and for which opposite quantities combine by addition to make 0.</li> <li>applies the properties of operations to problems involving all four operations with rational numbers.</li> <li>makes sense of all operations of numbers and perseveres in solving problems requiring the use of the operations.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>uses the properties of rational numbers to explain and defend their mathematical thinking.</li> <li>solves problems involving operations with rational numbers, including those requiring the use of algebraic formulas.</li> <li>gives results to the required level of precision.</li> <li>gives an explanation demonstrating a general understanding but not generalizing to other cases.</li> </ul>
<b>Expressions and Equations</b> Focus is on understanding operations, keying in on operations that produce equivalent expressions. Students solve simple linear equations and inequalities.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>solves one-step algebraic equations posed with whole numbers.</li> <li>recognizes and uses the structure of algebraic equations to know that you can use inverse operations.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>solves one-step algebraic equations posed with fractions.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>solves multi-step algebraic equations posed with whole numbers, fractions, and decimals.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>applies the properties of addition, subtraction, and distribution to expand algebraic expressions with rational coefficients.</li> <li>uses equations and inequalities to represent and solve multi-step real-world problems, including rational numbers.</li> <li>reasons quantitatively by making sense of quantities and considering the units involved. Also decontextualizes by selecting an inequality that represents a situation symbolically.</li> <li>gives results to the required level of precision. Also identifies an inequality whose solution rounds down to the problem's solution.</li> <li>makes sense of quantities and relationships in problem situations and uses units to help solve a problem.</li> </ul>
<b>Geometry</b> Focus is on scale drawings and applying proportional reasoning. Students explore relations in geometric shapes.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>selects, sketches, or draws freehand, geometric figures with given conditions.</li> <li>finds the area of a rectangle.</li> <li>identifies right prisms.</li> <li>accurately models geometric figures.</li> <li>understands the structure of the area of a rectangle formula.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>recognizes particular quadrilaterals from a description of their characteristics.</li> <li>knows the difference between area and perimeter/circumference.</li> <li>finds the volume of a rectangular prism.</li> <li>recognizes the structure of quadrilaterals.</li> <li>makes sense of characteristics of quadrilaterals, area, circumference, and perimeter.</li> <li>understands the structure of the volume formula.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses knowledge about supplementary, complementary, vertical, and adjacent angles to solve for an unknown angle in a figure.</li> <li>solves problems involving the area and circumference of a circle and area of parallelogram, trapezoids, and triangles.</li> <li>finds the surface area of a rectangular prism.</li> <li>uses formulas to model area, circumference, surface area, and volume.</li> <li>use calculators appropriately when translating between actual length on a scale diagram and the length that it represents.</li> <li>accurately rounds to an appropriate place value when working with measurements from scale diagrams.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>uses properties of interior angles for polygons to determine unknown angle measures.</li> <li>uses the characteristics of two-dimensional figures to solve problems.</li> <li>solves real-world and word problems involving the area and circumference of a circle, and area of irregular figures composed of rectangles in a scale drawing.</li> <li>finds the surface area and volume of any right prism.</li> <li>uses the properties of a rectangular prism to determine the length of a side, given its surface area.</li> <li>solves problems involving scale.</li> <li>shows a range of ability in explaining or arguing how to find surface area and volume of any right prism.</li> <li>uses the structure of composite geometric shapes to see that they are composed of several shapes.</li> </ul>
<b>Statistics and Probability</b> Focus is on finding information through sampling, thinking about how sure they are of the conclusion. Probability is defined and used as a model.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>recognizes that the probability of a chance event is between 0 and 1, with larger numbers indicating greater likelihood.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>examines a frequency summary to determine the approximate probability of defined outcomes.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses a tree diagram to find the probability of compound events.</li> <li>understands the difference between experimental and theoretical probability.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>compares and contrasts probabilities from a frequency model with theoretical and experimental probability for the event.</li> <li>calculates probability for 2-step experiments with and without replacement/repetition of values. Example: rolling a die twice, drawing 2 cards at once.</li> <li>draws conclusions from random sampling about a population or two populations.</li> <li>uses probability models.</li> </ul>
<b>Modeling</b> Producing, interpreting, understanding, evaluating, and improving mathematical models.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>sketches a diagram to represent a relationship.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>identifies the quantities that are related in an equation or a table.</li> <li>selects a model of a geometric shape that meets given criteria when the shape is constructed from triangles, rectangles, and circles.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>identifies an equation to represent a relationship between quantities.</li> <li>selects a model of a geometric shape that meets given criteria.</li> <li>uses a provided geometric diagram or model to identify an angle measure.</li> <li>explains at a developing level an algebraic definition of even numbers but is unable to explain the algebraic definition of odd numbers.</li> <li>uses a provided table to make sense of data and solve a problem.</li> <li>visualizes a rectangular prism in terms of all 6 sides to facilitate determining the surface area.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>uses a provided geometric diagram/model to visualize how to solve a problem.</li> <li>uses a provided table to make sense of data and to help determine whether a relationship is proportional.</li> <li>uses provided formulas to convert from Kelvin to Celsius to Fahrenheit.</li> <li>translates from a contextualized problem situation to an inequality.</li> <li>visualizes or draws a model of a rectangular prism to support finding the length of a side, given a rectangular prism's surface area.</li> <li>translates from a number line diagram to a numerical expression representing the distance between 2 points.</li> <li>explains at a general level the algebraic definitions of even and odd numbers.</li> </ul>

Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Justification and Explanation</b> Giving reasons, explaining “Why?”	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>explains a pattern using words, algebraic expressions, or numerical operations.</li> <li>generates a sequence from a given rule.</li> <li>identifies an error in reasoning.</li> <li>uses two or more specific statements to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>draws conclusions using both a specific and general statement as evidence.</li> <li>provides general support for a claim in order to reach a conclusion.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>
<b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>understands the concepts of rate and ratio.</li> <li>determines the sign of a product or quotient of integers based on the number of negative signs.</li> <li>adds and subtracts fractions.</li> <li>recognize the difference between expressions and equations.</li> <li>identifies a scale factor.</li> <li>finds the area of a rectangle.</li> <li>recognizes the difference between a sample and a population.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>solves simple proportions.</li> <li>solves problems involving fractions.</li> <li>works with algebraic expressions and linear equations.</li> <li>solves problems involving scale factors.</li> <li>works with 2-dimensional shapes to solve problems involving area.</li> <li>describes characteristics of samples.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>understands and applies proportional relationships.</li> <li>understands and applies operations with rational numbers.</li> <li>understands and works with algebraic expressions and linear equations.</li> <li>solves problems that involve scale and informal geometric constructions.</li> <li>works with 3-dimensional shapes to solve problems involving surface area and volume.</li> <li>draws inferences about populations based on samples.</li> <li>calculates the appropriate angle measures to construct a circle graph.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>analyzes proportional relationships and applies them to solve multistep problems with context.</li> <li>applies and extends previous knowledge of operations with fractions to work with rational number operations.</li> <li>uses properties of operations to create equivalent numerical expressions.</li> <li>evaluates algebraic expressions or solves algebraic equations to solve problems with context.</li> <li>sketches geometric figures and describes the relationships between them.</li> <li>solves problems with context that involve angle measure, area, surface area, and volume.</li> <li>interprets a circle graph from a real-world context.</li> </ul>
<b>Mathematical Practices</b> Collected PLDs that focus on mathematical practices.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>makes sense of problems to compare two quantities.</li> <li>uses calculators appropriately when comparing ratios.</li> <li>uses a number line to model negative and positive numbers.</li> <li>recognizes and uses the structure of algebraic equations to know that you can use inverse operations.</li> <li>accurately models geometric figures.</li> <li>understands the structure of the area of a rectangle formula.</li> <li>sketches a diagram to represent a relationship.</li> <li>explains a pattern using words, algebraic expressions, or numerical operations.</li> <li>generates a sequence from a given rule.</li> <li>identifies an error in reasoning.</li> <li>uses two or more specific statements to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>makes sense of problems and perseveres in solving proportions accurately.</li> <li>makes sense of a math concept in the real world.</li> <li>recognizes the structure of quadrilaterals.</li> <li>makes sense of characteristics of quadrilaterals, area, circumference, and perimeter.</li> <li>understands the structure of the volume formula.</li> <li>identifies the quantities that are related in an equation or a table.</li> <li>selects a model of a geometric shape that meets given criteria when the shape is constructed from triangles, rectangles, and circles.</li> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>draws conclusions using both a specific and general statement as evidence.</li> <li>provides general support for a claim in order to reach a conclusion.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses the structure of ratios and proportions to calculate percentages.</li> <li>makes sense of problems and perseveres in solving multistep problems.</li> <li>makes sense of all operations of numbers and perseveres in solving problems requiring the use of the operations.</li> <li>uses formulas to model area, circumference, surface area, and volume.</li> <li>use calculators appropriately when translating between actual length on a scale diagram and the length that it represents.</li> <li>accurately rounds to an appropriate place value when working with measurements from scale diagrams.</li> <li>identifies an equation to represent a relationship between quantities.</li> <li>selects a model of a geometric shape that meets given criteria.</li> <li>uses a provided geometric diagram or model to identify an angle measure.</li> <li>explains at a developing level an algebraic definition of even numbers but is unable to explain the algebraic definition of odd numbers.</li> <li>uses a provided table to make sense of data and solve a problem.</li> <li>visualizes a rectangular prism in terms of all 6 sides to facilitate determining the surface area.</li> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>makes sense of quantities and their relationships.</li> <li>gives results to the required level of precision.</li> <li>applies the structure of proportions to rates, percentages, and discounts.</li> <li>gives results to the required level of precision.</li> <li>gives an explanation demonstrating a general understanding but not generalizing to other cases.</li> <li>reasons quantitatively by making sense of quantities and considering the units involved. Also decontextualizes by selecting an inequality that represents a situation symbolically.</li> <li>gives results to the required level of precision. Also identifies an inequality whose solution rounds down to the problem’s solution.</li> <li>makes sense of quantities and relationships in problem situations and uses units to help solve a problem.</li> <li>shows a range of ability in explaining or arguing how to find surface area and volume of any right prism.</li> <li>uses the structure of compound geometric shapes to see that they are composed of several shapes.</li> <li>uses a provided geometric diagram/model to visualize how to solve a problem.</li> <li>uses a provided table to make sense of data and to help determine whether a relationship is proportional.</li> <li>uses provided formulas to convert from Kelvin to Celsius to Fahrenheit.</li> <li>translates from a contextualized problem situation to an inequality.</li> <li>visualizes or draws a model of a rectangular prism to support finding the length of a side, given a rectangular prism’s surface area.</li> <li>translates from a number line diagram to a numerical expression representing the distance between 2 points.</li> <li>explains at a general level the algebraic definitions of even and odd numbers.</li> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>

Reporting Categories	Needs Support	Close	Ready	Exceeding
<p><b>The Number System</b> Students deepen understanding and fluency with rational numbers and learn that there are irrational numbers, which are close to rational numbers.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>approximates a multiple of <math>\pi</math> by multiplying an approximation of <math>\pi</math>.</li> <li>uses a calculator to approximate an irrational number.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>uses rational approximations of irrational numbers to compare and order rational and irrational numbers.</li> <li>finds a rational approximation of an irrational number expressed as a square root by using properties of square roots.</li> <li>recognizes the difference between rational and irrational numbers in terms of the structure of their decimal expansions.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>understands that an approximation of an irrational number to a given number of decimal places cannot be exact.</li> <li>uses the regularity of a repeating decimal to understand conversion of a repeating decimal to fraction form.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>understands and can show that if one adds two rational numbers, the result must be a rational number.</li> </ul>
<p><b>Expressions and Equations</b> Focus is on reasoning about expressions and equations, in particular linear equations. Students work with radicals and integer exponents.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>recognizes that the slope of a line can be positive, negative, zero, or undefined.</li> <li>substitutes known values for variables to solve a linear equation with whole number coefficients and results.</li> <li>recognizes that the solution to a system of linear equations in two variables is the intersection point of the lines.</li> <li>understands a number expressed in scientific notation.</li> <li>looks for and makes use of structure of a linear equation as needed to test a solution through substitution.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>finds square roots of small perfect squares.</li> <li>converts to and from scientific notation.</li> <li>finds slope as change in <math>y</math> divided by change in <math>x</math> between two points on a line.</li> <li>recognizes that the procedure for finding slope, when applied to a vertical line, requires division by zero, which is undefined and so is consistent with undefined slope for the line.</li> <li>estimates the solution to a system of linear equations by inspecting the graph.</li> <li>looks for and makes use of structure of a linear equation as needed to solve an equation with a variable on one side.</li> <li>recognizes that division by zero is undefined.</li> <li>recognizes that the solution to a linear system of equations is the intersection point of the lines on the graph.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>estimates square roots of decimals and rounds the results.</li> <li>understands that a constant rate of change indicates a linear equation.</li> <li>identifies from the graphs of linear equations whether a system has one solution, no solution, or infinitely many solutions.</li> <li>compares and orders numbers in scientific notation.</li> <li>solves a system of simple linear equations algebraically.</li> <li>looks for and makes use of structure as needed to guide the solution of a multiple step linear equation.</li> <li>recognizes through the structure of a problem when the average rate of change is constant.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>recognizes that expressions with negative integer exponents can be rewritten with whole number exponents using reciprocals.</li> <li>creates a system of simple linear equations from a context.</li> <li>creates a moderately complex linear equation from a context and solves the equation algebraically.</li> <li>performs operations on numbers written in scientific notation.</li> <li>uses the structure of expressions containing exponents to avoid errors.</li> </ul>
<p><b>Functions</b> Focus is on understanding linear functions and using them in modeling. Students think about general functions and the idea that for a valid input there is a well-defined output, contrasting with statistical variability.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>evaluates a function when given the function and the value of the independent variable.</li> <li>identifies whether the slope of a given line is positive or negative.</li> <li>makes use of structure of a function in order to identify the quantities being related.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>constructs a linear function to model the relationship between two quantities with values given in a table.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>recognizes a linear function that represents a given table of values.</li> <li>recognizes the graph of a linear function that represents a contextual situation.</li> <li>matches a linear equation to its graph.</li> <li>reasons and draws conclusions from graphical models of a function.</li> <li>uses the structure of the graph to determine the nature of the solution.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>creates an algebraic representation of a linear function to model a contextual situation.</li> </ul>
<p><b>Geometry</b> Focus is on congruence and similarity as well as the Pythagorean theorem. Students continue to solve real-world geometry problems and incorporate cylinders, cones, and spheres.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>uses the structure of congruence notation to determine corresponding parts of congruent triangles.</li> <li>recognizes that similar figures have the same shape but not necessarily the same size.</li> <li>identifies angles having the same measure and angle pairs whose measures sum to <math>180^\circ</math> for angles formed when two lines are cut by a transversal.</li> <li>recognizes when to use the Pythagorean theorem.</li> <li>identifies a cylinder along with its radius and height.</li> <li>makes use of the structure of 3-dimensional figures in identifying the figures and their components.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>finds the image of a point in the coordinate plane that has been translated by given amounts horizontally and vertically.</li> <li>finds a scale factor given similar figures.</li> <li>understands that corresponding angles of similar figures are congruent.</li> <li>finds the volume of a cylinder.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>identifies or sketches the image of a figure in the coordinate plane that has been reflected over the <math>x</math>- or <math>y</math>-axis.</li> <li>finds the measure of any angle formed by parallel lines cut by a transversal, given the measure of other angles.</li> <li>determines graphically whether two lines are parallel or perpendicular.</li> <li>uses the Pythagorean theorem to solve problems involving distances between points in the coordinate plane.</li> <li>uses proportions to find missing parts of similar figures.</li> <li>uses the volume of a cylinder in real-world application.</li> <li>uses structure to identify situations where the Pythagorean theorem might be useful.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>recognizes that in similar figures the lengths of corresponding sides are proportional.</li> <li>makes and justifies conjectures about the relationships between the angles formed by parallel lines cut by a transversal.</li> <li>reasons abstractly by applying general properties of similar and congruent figures.</li> </ul>
<p><b>Statistics and Probability</b> Focus is on association and modeling appropriate associations with linear functions.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>recognizes whether a pattern of association in a scatterplot is nearly linear.</li> <li>creates a scatterplot model given real-world data.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>distinguishes clear positive or negative association in data presented in a scatterplot.</li> <li>identifies or sketches a line that has good fit to the data on a scatterplot.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>determines approximate slope or <math>y</math>-intercept of an estimated line of best fit for a data set presented in a scatterplot.</li> <li>distinguishes clear positive or negative association in data summarized in a two-way table.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>creates and uses a linear model for a set of bivariate data to solve problems in context.</li> </ul>
<p><b>Modeling</b> Producing, interpreting, understanding, evaluating, and improving mathematical models.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>determines relationships between quantities in routine mathematical or real-world contexts, and solves related problems involving two or fewer steps.</li> <li>uses a coordinate plane and understands its parts.</li> <li>identifies the components of a given linear model.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>identifies important information, determines relationships between quantities in mathematical or real-world contexts, and provides a limited interpretation of the results in the context of the problem.</li> <li>identifies parts of a coordinate plane to include: axes, quadrants, origin, and the signs of the ordered pairs as they occur in each quadrant.</li> <li>uses a simple equation to solve problems.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>uses the relationship between two quantities to create a linear function to model the situation.</li> <li>uses a coordinate plane to model linear equations and systems.</li> <li>solves equations when that requires multiple steps.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>interprets and evaluates a linear model for effectiveness in solving a problem and, if indicated, makes adjustments to improve the model as it applies to the situation.</li> </ul>



Reporting Categories	Needs Support	Close	Ready	Exceeding
<b>Justification and Explanation</b> Giving reasons, explaining “Why?”	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>draws conclusions using both a specific and general evidentiary statement or provide general support for a claim in order to reach a conclusion.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>
<b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>identifies perfect squares.</li> <li>recognizes rational numbers in decimal form.</li> <li>creates and solves linear equations of the form <math>px = r</math> or <math>x + q = r</math>.</li> <li>graphs geometric figures in the coordinate plane.</li> <li>solves problems involving mean and range.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>creates expressions and equations including from two-variable data.</li> <li>creates and solves linear equations of the form <math>px + q = r</math> or <math>p(x + q) = r</math>.</li> <li>uses simple geometric theorems about angles.</li> <li>solves problems with measures of central tendency.</li> <li>draws inferences about a population based on the results of a random sample.</li> <li>converts among measurement units and systems.</li> <li>uses place value accurately.</li> <li>maintains accuracy in comparing and ordering numbers.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>rounds to an appropriate place value to promote proper comparing and ordering.</li> <li>graphs the solution set of an inequality of the form <math>px + q &lt; r</math> or <math>px + q &gt; r</math> on a number line.</li> <li>recognizes spread of data in terms of the range.</li> <li>computes the probability of compound events using, organized lists, tables, tree diagrams, or simulation.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>understands that random sampling tends to avoid extremely unrepresentative samples.</li> </ul>
<b>Mathematical Practices</b> Collected PLDS that focus on mathematical practices.	<i>A student performing at the Needs Support level:</i> <ul style="list-style-type: none"> <li>uses a calculator to approximate an irrational number.</li> <li>looks for and makes use of structure of a linear equation as needed to test a solution through substitution.</li> <li>makes use of structure of a function in order to identify the quantities being related.</li> <li>makes use of the structure of 3-dimensional figures in identifying the figures and their components.</li> <li>creates a scatterplot model given real-world data.</li> <li>determines relationships between quantities in routine mathematical or real-world contexts, and solves related problems involving two or fewer steps.</li> <li>uses a coordinate plane and understands its parts.</li> <li>identifies the components of a given linear model.</li> <li>uses conditional statements.</li> <li>draws and labels relevant visual representations.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> </ul>	<i>A student performing at the Close level:</i> <ul style="list-style-type: none"> <li>recognizes the difference between rational and irrational numbers in terms of the structure of their decimal expansions.</li> <li>looks for and makes use of structure of a linear equation as needed to solve an equation with a variable on one side.</li> <li>recognizes that division by zero is undefined.</li> <li>recognizes that the solution to a linear system of equations is the intersection point of the lines on the graph.</li> <li>identifies or sketches a line that has good fit to the data on a scatterplot.</li> <li>uses place value accurately.</li> <li>maintains accuracy in comparing and ordering numbers.</li> <li>identifies important information, determines relationships between quantities in mathematical or real-world contexts, and provides a limited interpretation of the results in the context of the problem.</li> <li>identifies parts of a coordinate plane to include: axes, quadrants, origin, and the signs of the ordered pairs as they occur in each quadrant.</li> <li>uses a simple equation to solve problems.</li> <li>uses and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>draws conclusions using both a specific and general evidentiary statement or provide general support for a claim in order to reach a conclusion.</li> </ul>	<i>A student performing at the Ready level:</i> <ul style="list-style-type: none"> <li>uses the regularity of a repeating decimal to understand conversion to fraction form.</li> <li>rounds to an appropriate place value to promote proper comparing and ordering.</li> <li>looks for and makes use of structure as needed to guide the solution of a multiple step linear equation.</li> <li>recognizes through the structure of a problem when the average rate of change is constant.</li> <li>reasons and draws conclusions from graphical models of a function.</li> <li>uses the structure of the graph to determine the nature of the solution.</li> <li>uses structure to identify situations where the Pythagorean theorem might be useful.</li> <li>uses the relationship between two quantities to create a linear function to model the situation.</li> <li>uses a coordinate plane to model linear equations and systems.</li> <li>solves equations when that requires multiple steps.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>	<i>A student performing at the Exceeding level:</i> <ul style="list-style-type: none"> <li>understands and can show that if one adds two rational numbers, the result must be a rational number.</li> <li>uses the structure of expressions containing exponents to avoid errors.</li> <li>reasons abstractly by applying general properties of similar and congruent figures.</li> <li>interprets and evaluates a linear model for effectiveness in solving a problem and, if indicated, makes adjustments to improve the model as it applies to the situation.</li> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> </ul>



Reporting Categories	Needs Support	Close	Ready	Exceeding
<p><b>Number and Quantity</b></p> <p>Focus is on rational exponents and developing a richer understanding of quantity including derived units.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>finds rational approximations of irrational numbers, perhaps using a calculator.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>uses rational approximations of irrational numbers to compare and order rational and irrational numbers.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>Rewrites the square root of a whole number as <math>k\sqrt{p}</math>, where <math>k</math> and <math>p</math> are whole numbers and <math>p</math> is as small as possible.</li> <li>adds or subtracts multiples of the same radical.</li> <li>multiplies or divides radicals by rational numbers.</li> <li>rewrites and evaluates expressions that involve rational exponents.</li> <li>uses units to understand and manipulate the quantities used in solving a multi-step problem.</li> <li>Classifies square roots as rational or irrational using the fact that <math>\sqrt{p}</math> is rational whenever <math>p</math> is a perfect square and irrational whenever <math>p</math> is any other whole number.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>evaluates algebraic expressions involving square roots.</li> <li>rewrites numerical radical expressions in equivalent radical forms.</li> <li>understands that measurements involve some degree of imprecision and reports results appropriately given the limitations and the context of the measurement.</li> </ul>
<p><b>Algebra</b></p> <p>Focus is on understanding structure of expressions and equations. Students use operations strategically to transform expressions and solve problems, connecting algebraic and graphical solutions.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>rewrites a linear equation to put it into slope-intercept form.</li> <li>performs operations on monomials of degree two or higher.</li> <li>creates linear equations in one variable to represent a contextual situation.</li> <li>determines whether a given number makes an absolute value inequality true.</li> <li>determines whether a given ordered pair is a solution to a system of equations.</li> <li>rewrites monomial expressions raised to a whole-number power using properties of exponents.</li> <li>evaluates square roots of perfect squares.</li> <li>evaluates cube roots of perfect cubes.</li> <li>converts numbers to and from scientific notation.</li> <li>uses algebraic properties and operations strategically to rewrite numeric expressions.</li> </ul> <p>Example: Given <math>(4)(19)(25)</math> and seeing from the structure that multiplying <math>(4)(25)</math> first will make the calculation easier.</p>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>interprets the meaning of parameters or variables used in a problem in terms of the context.</li> <li>rewrites rational expressions involving monomials in both the numerator and denominator into forms with positive exponents.</li> <li>identifies zeros of polynomials given a factorization into linear factors.</li> <li>creates the factored form of a quadratic that has two given zeros.</li> <li>understands that <math>\sqrt{p}</math> is a solution to <math>x^2 = p</math> for nonnegative <math>p</math>.</li> <li>understands that <math>\sqrt[3]{p}</math> is a solution to <math>x^3 = p</math>.</li> <li>creates a quadratic equation to represent a contextual situation involving multiplication of quantities or given an appropriate formula.</li> <li>determines whether a single-variable compound inequality true for a given number.</li> <li>rearranges a formula to highlight a specific quantity of interest when that quantity is represented by a single variable, the formula is linear in that variable, and the variable appears only once in the formula.</li> <li>approximates the solution to a system of linear equations by graphing, and verifies the solution.</li> <li>graphs the solution set of a linear inequality.</li> <li>solves a single-variable linear inequality and graphs the solution set.</li> <li>solves a system of two equations in two variables with the use of technology or provided graphs.</li> <li>finds one or two solutions to a system of linear equations that represents distinct parallel lines has no solution.</li> <li>understands that a system of linear equations where each equation represents the same line has infinitely many solutions.</li> <li>solves one-variable linear equations.</li> <li>graphs linear equations including systems of linear equations.</li> <li>uses algebraic properties and operations strategically to rewrite monomials.</li> </ul> <p>Example: Given <math>(xy^2)(xy^2)(xy^2)</math> and recognizing this as a cube.</p>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>analyzes the structure of an expression and identifies ways to rewrite it.</li> <li>sees a complicated expression as a combination of simpler expressions and interprets the expressions in terms of the quantities that they represent in a context.</li> <li>finds the sum or difference of two polynomials.</li> <li>multiplies binomials using the distributive property.</li> <li>factors quadratic expressions.</li> <li>rewrites rational expressions involving monomials in both the numerator and denominator into a single term with positive and negative exponents.</li> <li>produces a polynomial with a given list of zeros.</li> <li>creates a system of linear equations to represent a contextual situation.</li> <li>understands that <math>x = \sqrt{p}</math> and <math>x = -\sqrt{p}</math> represent all the solutions to <math>x^2 = p</math>, for nonnegative <math>p</math>.</li> <li>creates a quadratic equation from straightforward information about zeros, other points on the graph, coefficients, or the vertex.</li> <li>rearranges a formula to highlight a specific quantity of interest.</li> <li>solves and graphs the solution set of an inequality equivalent to <math> x  &lt; c</math>, <math> x  &gt; c</math>, <math> x  \leq c</math>, or <math> x  \geq c</math>.</li> <li>solves a system of linear equations.</li> <li>graphs the solution set of a system of linear inequalities.</li> <li>understands that a system of two linear equations representing lines that are not parallel always has exactly one solution.</li> <li>finds one or two solutions to a system of two linear equations that each represent the same line.</li> <li>understands that adding a real number to both sides of an equation, or multiplying both sides of an equation by a nonzero real number, does not change the solutions, and understands that property supports a method for solving all linear equations.</li> <li>performs operations on numbers written in scientific notation.</li> <li>uses algebraic properties and operations strategically to rewrite polynomials.</li> </ul> <p>Example: Given <math>(x - 4)(2x + 3)(x + 4)</math> and seeing from the structure that multiplying <math>(x - 4)(x + 4)</math> first will make the calculation easier.</p>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>uses the structure of an expression to make deductions about the expression, such as when it is zero or what its minimum value is.</li> <li>produces equivalent forms of an expression to reveal properties or quantities of interest as needed.</li> <li>applies the Remainder Theorem to determine if a polynomial has a given factor.</li> <li>rewrites rational expressions with polynomial numerator and denominator in equivalent forms, using inspection or long division.</li> <li>multiplies trinomials using the distributive property.</li> <li>produces two inequivalent polynomials, each with the same given list of zeros.</li> <li>creates a simple rational or exponential equation to represent a contextual situation.</li> <li>creates a quadratic equation to model the height of an object under the influence of gravity.</li> <li>understands that absolute value equations can often be solved through the use of cases.</li> <li>solves a system of two equations in two variables, where one equation is linear and one is quadratic.</li> <li>understands that multiplying both sides of an equation by an expression can change the solutions, but only when the expression is zero or undefined.</li> <li>understands that the only way two expressions multiplied together give a result of zero is when the value of at least one of the expressions is zero, and that this property can be used help solve some equations.</li> <li>understands that squaring both sides of an equation keeps all of the original solutions but may add extraneous solutions.</li> <li>solves problems in contextual situations with quantities written in scientific notation.</li> <li>chooses an appropriate/efficient method when solving systems of linear equations, quadratic functions, simple rational equations, and when rewriting polynomials.</li> </ul>
<p><b>Functions</b></p> <p>Focus is on linear, quadratic, and exponential functions, comparing their properties and using them to solve problems.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>identifies key features on graphs such as minimums, maximums, and intercepts.</li> <li>constructs simple functions using function notation to explicitly express a relationship between two quantities.</li> <li>recognizes situations that are well modeled with linear functions.</li> <li>constructs a linear function from a given table of values.</li> <li>constructs a linear function to model the relationship between two quantities and uses it to solve a problem.</li> <li>uses linear functions to solve problems.</li> <li>identifies whether the slope of a given line is positive or negative.</li> <li>graphs linear equations, including those in systems, when the equations are given in slope-intercept form.</li> <li>identifies key characteristics of a linear function from its graph.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>evaluates functions for a given input that is in the domain of the function.</li> <li>uses function notation to recognize the name of the function and the function's arguments.</li> <li>matches a quadratic equation to a graph.</li> <li>finds the inverse of linear functions of the form <math>f(x) = kx</math> or <math>g(x) = x + k</math>.</li> <li>recognizes situations that are well modeled with exponential functions.</li> <li>recognizes the graph of a linear function that represents a contextual situation.</li> <li>calculates slope as the change of <math>y</math> over the change of <math>x</math> for a linear function.</li> <li>identifies lines on a graph that appear to have slope that is zero or undefined.</li> <li>examines claims and makes explicit use of definitions about functions.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>calculates the average rate of change of a function over a specified interval.</li> <li>identifies from the graph of a nonlinear function whether the average rate of change over a given interval is positive, negative, or approximately zero.</li> <li>identifies the valid inputs (domain) of a function from a graph, context, or from the algebraic expression of the function as a polynomial, as the square root of a linear expression, or as a rational expression with a linear denominator.</li> <li>identifies the possible outputs (range) of a function from its graph.</li> <li>expands a geometric sequence using a formula for the <math>n</math>th term of the sequence to find a given term.</li> <li>builds a new function by combining two or more functions with arithmetic operations.</li> <li>finds the inverse of non-constant linear functions.</li> <li>understands the relation between the graph of <math>f(x)</math> and the graph of <math>f(x) + c</math> in terms of transformations.</li> <li>recognizes situations that are well modeled with quadratic functions.</li> <li>determines whether a relation is a function given a graph, equation, or table of values.</li> <li>understands that slope represents a constant rate of change.</li> <li>states the meaning of <math>f(x)</math>, <math>y = mx + b</math>, and other symbols they choose, including using the equal sign consistently and appropriately.</li> <li>is careful about specifying units of measurements and labeling axes to clarify the correspondence with quantities in a problem.</li> <li>calculates accurately and efficiently, and expresses numerical answers with a degree of precision appropriate for the problem context.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>understands the relationship between the zeros of a quadratic function and the <math>x</math>-intercepts of the function's graph.</li> <li>recognizes a function graph that represents all of the features from a given contextual situation, described in terms such as increasing, decreasing, remaining constant, with given inputs and outputs, minimum and maximum, average rates of change on intervals, and relations between these descriptors.</li> <li>identifies the valid outputs (range) of a quadratic function from its equation.</li> <li>writes arithmetic and geometric sequences as explicit or recursive formulas and uses them to model situations.</li> <li>understands the relation between the graph of <math>f(x)</math> and the graphs of <math>f(-x)</math>, <math>f(ax)</math>, <math>af(x)</math>, and <math>f(x + b)</math> in terms of transformations.</li> <li>constructs an exponential or quadratic model from a graph, contextual situation, or table of values, recognizing which of these function families is the most appropriate choice.</li> <li>understands the foundations of functions (e.g., domain and range, one on one, function notation, constant rate of change); is able to apply understanding accurately in context; and is able to communicate the understanding verbally or in writing.</li> </ul>

Reporting Categories	Needs Support	Close	Ready	Exceeding
<p><b>Geometry</b></p> <p>Focus is on geometric relationships, including relationships in the coordinate plane, distance, and transformations. Students gain understanding of volume formulas for geometric objects.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>recognizes similar triangles by angle-angle similarity.</li> <li>understands characteristics of a circle (e.g., center, radius, degrees, and constant distance from a point).</li> <li>identifies the midpoint of a line segment in the coordinate plane by its coordinates.</li> <li>recognizes that an equation in the form <math>x^2 + y^2 = b</math>, where <math>b &gt; 0</math>, is represented by a circle in the coordinate plane.</li> <li>evaluates volume of cylinders, cones, pyramids, and spheres given appropriate measurements, perhaps by identifying and using an appropriate formula.</li> <li>identifies or sketches the image of a point that has been translated in the coordinate plane.</li> <li>finds a scale factor given similar figures.</li> <li>understands that corresponding angles of similar figures are congruent.</li> <li>understands translation, reflection, rotation, and dilation as kinds of transformations that can be applied to geometric figures.</li> <li>constructs arguments using concrete referents such as objects, drawings, diagrams, and actions.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>recognizes when geometric figures are congruent using congruency theorems.</li> <li>recognizes the corresponding angles and sides of two similar triangles and uses correct notation to state that the two triangles are similar.</li> <li>recognizes that all circles can be shown to be similar by using dilation and translation, and provides the dilation/translation necessary to take one to the other.</li> <li>interprets the parameters of an equation for a circle in the form <math>x^2 + y^2 = r^2</math> and identifies the center as (0,0) and the radius as <math>r</math>, where <math>r</math> is positive.</li> <li>determines whether two lines are parallel or perpendicular when given the slopes of the lines.</li> <li>understands that a prism with base of area <math>b</math> and height <math>h</math> has volume <math>bh</math> no matter the shape of the base.</li> <li>determines the coordinates of the image for a point when it is rotated <math>180^\circ</math> about a given center point in the coordinate plane.</li> <li>identifies or sketches the image of a figure when it is reflected over the x- or y-axis in the coordinate plane.</li> <li>identifies or sketches the image of a point when it is rotated about the origin.</li> <li>finds the measure of any angle formed by parallel lines cut by a transversal given the measure of other angles.</li> <li>constructs arguments, states assumptions, and recognizes and uses counterexamples.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>determines that two figures are congruent by describing a series of transformations that will take one figure onto the other.</li> <li>performs basic geometric constructions.</li> <li>uses similarity criteria and proportional reasoning to solve for an unknown side length in two similar triangles.</li> <li>recognizes one polygon is a dilation of another if corresponding sides are proportional and corresponding angles are congruent.</li> <li>identifies, describes, and uses commonly known relationships among inscribed angles, radii, and chords (e.g., inscribed angle measures, bisector of chord passes through center, intersecting chords divided into lengths with the same product).</li> <li>graphs the equation of a circle given in the form <math>(x - h)^2 + (y - k)^2 = r^2</math>.</li> <li>uses the distance formula, congruence criteria, and similarity criteria to decide whether two figures in the coordinate plane are similar, congruent, or neither.</li> <li>finds the equation of a line through a given point and parallel or perpendicular to a given line.</li> <li>determines whether two lines are parallel, perpendicular, or neither given two points on each of the lines.</li> <li>finds the volume of prisms and pyramids with bases that are not rectangles, triangles, or circles but that can be made from triangles and sectors of circles.</li> <li>applies geometric concepts based on area and volume in modeling contextual situations.</li> <li>uses the Pythagorean theorem to determine a missing side length in a right triangle.</li> <li>makes and justifies conjectures about the relationship between the angles formed by parallel lines cut by a transversal.</li> <li>uses the Pythagorean theorem to solve problems involving distances between points in the coordinate plane.</li> <li>constructs simple arguments in the form of proofs, stating assumptions, definitions, and previously established results.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>uses the definition of congruence or congruence theorems to support assertions about geometric figures.</li> <li>proves theorems about similar triangles.</li> <li>uses similarity criteria to define the relationships between the sides of two similar right triangles, leading to definitions of trigonometric ratios for acute angles.</li> <li>finds arc lengths and areas of sectors of a circle given central angle measure and radius.</li> <li>finds the endpoint of a line segment given its midpoint and the other endpoint.</li> <li>uses geometric shapes, their measures, and their properties to describe objects and model contextual situations.</li> <li>makes plausible arguments, recognizes correct logic and reasoning, and explains why something is a flaw.</li> </ul>
<p><b>Statistics and Probability</b></p> <p>Focus is on distributions, association, and sampling. Students pay attention to the context of the data and use various statistical displays to interpret data.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>recognizes that a population parameter estimate based on sample data won't necessarily be exact.</li> <li>uses data from an experiment to informally decide whether there is a significant difference between population parameters.</li> <li>recognizes clear positive or negative association in data presented in a scatterplot.</li> <li>creates stem-and-leaf plots and scatterplots for small datasets.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>compares empirical data to a model's predicted value to judge the reasonableness of the model.</li> <li>understands that two events are independent if the occurrence of one does not affect the probability of the other.</li> <li>identifies a situation that could reasonably represent the independent and dependent variables in a data set.</li> <li>recognizes the scatterplot of a data set from a listing of the data or from a description of the data.</li> <li>estimates a linear model given a scatterplot of data with an approximately linear relationship.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>compares summary statistics given representations, perhaps in different forms, for two different sets of data.</li> <li>recognizes the purpose of and difference between sample surveys, experimental studies, and observational studies.</li> <li>critiques surveys, experiments, and observational studies to investigate research questions, identifying the population and sample, and keying in on possible bias.</li> <li>determines whether two events are independent.</li> <li>uses the multiplication rule to determine the joint probability of two independent events.</li> <li>computes conditional probability from a two-way table.</li> <li>creates and uses the equation of a linear model for data with an approximately linear relationship to solve problems in a contextual situation.</li> <li>interprets a linear model of a scatterplot in a given contextual situation.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>interprets differences in shape, center, and spread for two sets of data, including accounting for the possible effects of outliers and the context of the data.</li> <li>assesses the fit of a model informally by plotting and analyzing residuals.</li> <li>understands the purpose of both random sampling and randomly assigning to treatment groups in experimental studies.</li> <li>describes compound events in terms of other events with "and," "or," and "not" and represents these events using diagrams.</li> </ul>
<p><b>Modeling</b></p> <p>Producing, interpreting, understanding, evaluating, and improving mathematical models.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>recognizes linear equations that represent relationships presented in tables and graphs.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>recognizes linear equations that represent relationships presented in a context and interprets graphic representations of linear function models.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>recognizes systems of linear equations that represent relationships presented in a context and interprets graphic representations of function models of linear systems.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>uses graphs and diagrams to represent and interpret contextual situations, including linear systems and probability events.</li> <li>recognizes quadratic equations that represent relationships presented in a context and interprets graphic representations of quadratic function models.</li> </ul>
<p><b>Justification and Explanation</b></p> <p>Giving reasons, explaining "Why?"</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>visually analyzes and restates the given information in preparation for presenting a proof.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>utilizes and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>draws conclusions using both a specific and general evidentiary statement or provides general support for a claim in order to reach a conclusion.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> <li>examines claims and makes explicit use of definitions about functions.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>provides a coherent, logical argument or solution pathway by providing evidence to support claims.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>provides thorough justification and defends conclusions by using multiple, connected statements and incorporating justification techniques such as explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> <li>employs proof techniques such proof by cases and indirect proof.</li> </ul>

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<p><b>Integrating Essential Skills</b> Integrate and continue to grow with topics from prior grades.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>applies knowledge and skills from prior grades by solving problems including those requiring calculations with decimals and fractions, rewriting expressions with exponents, and using counting techniques.</li> <li>understands definitions for simple geometry shapes in terms of their properties.</li> <li>uses simple geometric theorems about angles.</li> <li>understands the concepts of area and volume and explains them in terms of square and cubic units.</li> <li>uses different graphical representations of data as needed.</li> <li>determines the probability of events that can be represented by a uniform probability model.</li> <li>draws inferences about a population based on the results of a random sample.</li> <li>reasons quantitatively.</li> <li>calculates measures of central tendency and graphs histograms.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>computes the probability of compound events using counting techniques, organized lists, tables, tree diagrams, or simulation results.</li> <li>converts between measurement units and systems.</li> <li>reasons quantitatively by making sense of quantities and their relationships in problem situations.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>applies knowledge and skills from prior grades by operating with rational expressions.</li> <li>interprets the spread of a distribution.</li> <li>understands why random sampling is used for surveys.</li> <li>reasons abstractly and quantitatively by making sense of quantities and their relationships in problem situations.</li> <li>creates a coherent representation of the problem at hand and attends to the meaning of the quantities—not just how to compute them.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>creates a coherent representation of the problem at hand and attends to the meaning of the quantities; not only how to compute them but also how to flexibly use different properties and methods to solve problems.</li> </ul>
<p><b>Mathematical Practices</b> Collected PLDs that focus on mathematical practices.</p>	<p><i>A student performing at the Needs Support level:</i></p> <ul style="list-style-type: none"> <li>constructs arguments using concrete referents such as objects, drawings, diagrams, and actions.</li> <li>reasons quantitatively.</li> <li>visually analyzes and restates the given information in preparation for presenting a proof.</li> <li>explains steps of a procedure.</li> <li>provides a counterexample.</li> <li>uses a pattern or sequence to draw a conclusion.</li> <li>utilizes and cites conditional statements, specific aspects of created visual representations, and/or computations or procedures to clarify an argument or draw a conclusion.</li> <li>draws conclusions using both a specific and general evidentiary statement or provide general support for a claim in order to reach a conclusion.</li> <li>recognizes linear equations that represent relationships presented in tables and graphs.</li> <li>constructs arguments using concrete referents such as objects, drawings, diagrams, and actions.</li> <li>uses algebraic properties and operations strategically to rewrite numeric expressions. Example: Given <math>(4)(19)(25)</math> and seeing from the structure that multiplying <math>(4)(25)</math> first will make the calculation easier.</li> </ul>	<p><i>A student performing at the Close level:</i></p> <ul style="list-style-type: none"> <li>constructs arguments, state assumptions, and recognize and uses counter examples.</li> <li>justifies and defends conclusions by explaining errors in reasoning or calculations, providing counterexamples, applying relevant classification schemes, and/or verifying statements or claims used to draw a conclusion.</li> <li>recognizes linear equations that represent relationships presented in a context and interprets graphic representations of function models.</li> <li>constructs arguments, state assumptions, and recognize and use counterexamples.</li> <li>examines claims and makes explicit use of definitions.</li> <li>uses algebraic properties and operations strategically to rewrite monomials. Example: Given <math>(xy^2)(xy^2)(xy^2)</math> and recognizing this as a cube.</li> </ul>	<p><i>A student performing at the Ready level:</i></p> <ul style="list-style-type: none"> <li>constructs arguments in the form of proofs to state assumptions, definitions, and previously established results.</li> <li>applies knowledge and skills from prior grades by operating with rational expressions.</li> <li>interprets the spread of a distribution.</li> <li>understands why random sampling is used for surveys.</li> <li>reasons abstractly and quantitatively by making sense of quantities and their relationships in problem situations.</li> <li>creates a coherent representation of the problem at hand and attends to the meaning of the quantities not just how to compute them.</li> <li>recognizes linear equations or systems of linear equations that represent relationships presented in a context and interprets graphic representations of function models.</li> <li>constructs simple arguments in the form of proofs, stating assumptions, definitions, and previously established results.</li> <li>states the meaning of <math>f(x)</math>, <math>y = mx + b</math>, and other symbols they choose, including using the equal sign consistently and appropriately.</li> <li>is careful about specifying units of measurements and labeling axes to clarify the correspondence with quantities in a problem.</li> <li>calculates accurately and efficiently, expresses numerical answers with a degree of precision appropriate for the problem context.</li> <li>uses algebraic properties and operations strategically to rewrite polynomials. Example: Given <math>(x - 4)(2x + 3)(x + 4)</math> and seeing from the structure that multiplying <math>(x - 4)(x + 4)</math> first will make the calculation easier.</li> </ul>	<p><i>A student performing at the Exceeding level:</i></p> <ul style="list-style-type: none"> <li>makes plausible arguments, recognizes correct logic and reasoning, identifies flaws in arguments and explains why they are flaws.</li> <li>creates a coherent representation of the problem at hand and attends to the meaning of the quantities; not only how to compute them but also how to flexibly use different properties and methods to solve problems.</li> <li>uses graphs and diagrams to represent and interpret contextual situations, including linear systems and probability events.</li> <li>recognizes linear equations or systems of linear equations, or quadratic equations that represent relationships presented in a context and interprets graphic representations of function models.</li> <li>has a thorough understanding of foundations of functions (domain and range, one on one, function notation, constant rate of change, etc.); is able to apply understanding accurately in context; and is able to communicate the understanding verbally or in writing.</li> <li>solves problems in contextual situations with quantities written in scientific notation.</li> <li>chooses an appropriate/efficient method when solving systems of linear equations, quadratic functions, simple rational equations, and when rewriting polynomials.</li> </ul>