

Curricular Framework Mathematics-Grade 6

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<p>Unit 1</p> <p>Operations and Reasoning about Ratios</p>	<ul style="list-style-type: none"> ■ 6.NS.A.1 ● 6.NS.B.2 ■ 6.RP.A.1 ■ 6.RP.A.2 ■ 6.RP.A.3* ● 6.NS.B.3 ● 6.NS.B.4 	<ul style="list-style-type: none"> • Apply and extend previous understandings of multiplication and division to divide fractions by fractions • Compute fluently with multi-digit numbers and find common factors and multiples • Understand ratio concepts and use ratio reasoning to solve problems 	<p>MP.1 Make sense of problems and persevere in solving them.</p>
<p><i>Unit 1: Suggested Open Educational Resources</i></p>	<p>6.NS.A.1 Traffic Jam 6.RP.A.1 Games at Recess 6.RP.A.2 Price per pound and pounds per dollar 6.RP.A.3 Voting for Three, Variation 1 6.RP.A.3c Shirt Sale 6.NS.B.3 Reasoning about Multiplication and Division and Place Value, Part 1 6.NS.B.4 Factors and Common Factors 6.NS.B.4 Multiples and Common Multiples</p>		<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments & critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p>
<p>Unit 2</p> <p>Expressions and 3-D Geometry</p>	<ul style="list-style-type: none"> ■ 6.EE.A.1 ■ 6.EE.A.2 ■ 6.EE.A.3 ■ 6.EE.A.4 ■ 6.EE.B.6 □ 6.G.A.2 □ 6.G.A.4 	<ul style="list-style-type: none"> • Apply and extend previous understandings of arithmetic to algebraic expressions • Reason about and solve one-variable equations and inequalities • Solve real-world and mathematical problems involving area, surface area, and volume 	<p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p>
<p><i>Unit 2: Suggested Open Educational Resources</i></p>	<p>6.EE.A.1 The Djinni's Offer 6.EE.A.2 Rectangle Perimeter 1 6.EE.A.4 Rectangle Perimeter 2 6.EE.A.4 Equivalent Expressions 6.G.A.2 Volumes with Fractional Edge Lengths 6.G.A.4 Nets for Pyramids and Prisms</p>		<p>MP.8 Look for and express regularity in repeated reasoning.</p>

Curricular Framework Mathematics-Grade 6

Overview	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice
<p><u>Unit 3</u></p> <p>Equations, The Rational Number System and 2-D Geometry</p>	<ul style="list-style-type: none"> ■ 6.EE.B.5 ■ 6.EE.B.7 ■ 6.NS.C.5 ■ 6.NS.C.6 ■ 6.NS.C.7 ■ 6.EE.B.8 ■ 6.NS.C.8* □ 6.G.A.3 □ 6.G.A.1 	<ul style="list-style-type: none"> • Reason about and solve one-variable equations and inequalities • Apply and extend previous understandings of numbers to the system of rational numbers • Solve real-world and mathematical problems involving area, surface area, and volume 	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p>
<p><i>Unit 3: Suggested Open Educational Resources</i></p>	<p>6.EE.B.5 Make Use of Structure 6.EE.B.7 Morning Walk 6.NS.C.5 Warmer in Miami 6.NS.C.6 Mile High 6.NS.C.7 Jumping Flea 6.NS.C.7a Fractions on the Number Line 6.NS.C.7b Comparing Temperatures 6.EE.B.8 Fishing Adventures 1 6.NS.C.8 Nome, Alaska 6.G.A.1, 6.G.A.3 Polygons in the Coordinate Plane</p>		<p>MP.3 Construct viable arguments & critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p>
<p><u>Unit 4</u></p> <p>Variability, Distributions, and Relationships between Quantities</p>	<ul style="list-style-type: none"> ■ 6.EE.C.9 ● 6.SP.A.1 ● 6.SP.A.2 ● 6.SP.A.3 ● 6.SP.B.4 ● 6.SP.B.5 ■ 6.RP.A.3* ■ 6.NS.C.8* 	<ul style="list-style-type: none"> • Represent and analyze quantitative relationships between dependent and independent variables • Develop understanding of statistical variability • Summarize and describe distributions • Understand ratio concepts and use ratio reasoning to solve problems • Apply and extend previous understandings of numbers to the system of rational numbers 	<p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p>
<p><i>Unit 4: Suggested Open Educational Resources</i></p>	<p>6.EE.C.9 Families of Triangles 6.SP.A.1 Identifying Statistical Questions 6.SP.A.2, 6.SP.B.4 Puppy Weights 6.SP.A.3 Is It Center or Is It Variability? 6.SP.B.5c Number of Siblings 6.SP.B.5d Mean or Median?</p>		

Curricular Framework Mathematics-Grade 6

Unit 1 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>■ 6.NS.A.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$-cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?</i></p>	MP.4 Model with mathematics.	<p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> • divide a fraction by a fraction. • represent division of fractions using visual models. • interpret quotients of fractions in the context of the problem. • compute quotients of fractions in order to solve word problems. • write equations to solve word problems involving division of fraction by a fraction. • use the relationship between multiplication and division to explain division of fractions. <p>Learning Goal 1: Compute quotients of fractions. Learning Goal 2: Construct visual fraction models to represent quotients of fractions and use the relationship between multiplication and division to explain division of fractions. Learning Goal 3: Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.</p>
<p>● 6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.</p>		<p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> • use the standard algorithm to divide multi-digit numbers with speed and accuracy. <p>Learning Goal 4: Fluently divide multi-digit numbers using the standard algorithms.</p>
<p>■ 6.RP.A.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."</i></p>	MP.2 Reason abstractly and quantitatively.	<p>Concept(s):</p> <ul style="list-style-type: none"> • A ratio shows relative sizes or values of two quantities. <p>Students are able to:</p> <ul style="list-style-type: none"> • describe a ratio relationship between two quantities using ratio language. <p>Learning Goal 5: Explain the relationship of two quantities in given ratio using ratio language.</p>
<p>■ 6.RP.A.2. Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language</p>	MP.2 Reason abstractly and quantitatively.	<p>Concept(s):</p> <ul style="list-style-type: none"> • A rate is a ratio comparing two different types of quantities. <p>Students will be able to:</p>

Curricular Framework Mathematics-Grade 6

Unit 1 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>in the context of a ratio relationship. <i>For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $\frac{3}{4}$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</i></p>		<ul style="list-style-type: none"> determine the unit rate given a ratio relationship. describe a unit rate relationship between two quantities using rate language. <p>Learning Goal 6: Use rate language, in the context of the ratio relationship, to describe a unit rate.</p>
<p>■ 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *(benchmarked)</p> <p>6.RP.A.3a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p> <p>6.RP.A.3b. Solve unit rate problems including those involving unit pricing and constant speed. <i>For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</i></p> <p>6.RP.A.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> use ratio and rate reasoning to create tables of equivalent ratios relating quantities with <i>whole number</i> measurements, find missing values in tables and plot pairs of values. compare ratios using tables of equivalent ratios. solve real world and mathematical problems involving unit rate (including unit price and constant speed). calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent. convert measurement units using ratio reasoning. transform units appropriately when multiplying and dividing quantities. <p>Learning Goal 7: Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.</p> <p>Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities.</p>

Curricular Framework Mathematics-Grade 6

Unit 1 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
6.RP.A.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		
● 6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.		Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> • add and subtract multi-digit decimals with accuracy and efficiency. • multiply and divide multi-digit decimals with accuracy and efficiency. Learning Goal 9: Fluently add, subtract, multiply and divide multi-digit decimals.
● 6.NS.B.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.	MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> • create lists of factors for two whole numbers less than or equal to 100; find the largest factor common to both lists. • create lists of multiples for two whole numbers less than or equal to 12; find the smallest multiple common to both lists. Learning Goal 10: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.
Unit 1 Grade 6 What This May Look Like		
District/School Formative Assessment Plan	District/School Summative Assessment Plan	
<i>Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards.</i>	<i>Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.</i>	
Focus Mathematical Concepts		
<i>Districts should consider listing prerequisites skills. Concepts that include a focus on relationships and representation might be listed as grade level appropriate.</i>		
Prerequisite skills:		
Common Misconceptions:		
District/School Tasks	District/School Primary and Supplementary Resources	

Curricular Framework Mathematics-Grade 6

<i>Exemplar tasks or illustrative models could be provided.</i>	<i>District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.</i>
Instructional Best Practices and Exemplars	
<i>This is a place to capture examples of standards integration and instructional best practices.</i>	

Unit 2 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>■ 6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents</p>	<p>MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.</p>	<p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> write numerical expressions (involving whole number exponents) from verbal descriptions. evaluate numerical expressions involving whole number exponents. <p>Learning Goal 1: Write and evaluate numerical expressions involving whole number exponents.</p>
<p>■ 6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers</p> <p>6.EE.A.2a. Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation "Subtract y from 5" as $5 - y$.</i></p> <p>6.EE.A.2b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. <i>For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms</i></p> <p>6.EE.A.2c. Evaluate expressions at specific values of their variables.</p>	<p>MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.</p>	<p>Concept(s): No new concept(s) introduced Students are able to:</p> <ul style="list-style-type: none"> write algebraic expressions from verbal descriptions. use mathematical terms (sum, term, product, factor, quotient, coefficient) to identify the parts of an expression. evaluate algebraic expressions and formulas, including those involving exponents. <p>Learning Goal 2: Use mathematical language to identify parts of an expression. Learning Goal 3: Write and evaluate algebraic expressions involving exponents (include evaluating formulas).</p>

Curricular Framework Mathematics-Grade 6

Unit 2 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). <i>For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$</i></p>		
<p>■ 6.EE.A.3. Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$</i></p> <p>■ 6.EE.A.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). <i>For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for</i></p>	<p>MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> • Properties of operations: distributive property, combining like terms <p>Students are able to:</p> <ul style="list-style-type: none"> • combine like terms to generate an equivalent expression. • factor to generate an equivalent expression. • multiply (apply the distributive property) to generate an equivalent expression. <p>Learning Goal 4: Apply properties of operations (factor, distribute, and combine like terms) to generate equivalent expressions and to identify when two expressions are equivalent.</p>
<p>■ 6.EE.B.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable</p>	<p>MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> • A variable can represent an unknown number or any number in a set of numbers. <p>Students are able to:</p> <ul style="list-style-type: none"> • write expressions for solving real-world problems.

Curricular Framework Mathematics-Grade 6

Unit 2 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.		Learning Goal 5: Use variables to represent numbers and write expressions when solving real world or mathematical problems.
■ 6.G.A.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	MP. 2 Reason abstractly and quantitatively.	Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> • pack a right rectangular prism with fractional edge lengths with unit fraction cubes. • show that the volume found by packing is the same as would be found by multiplying the edge lengths of the prism. • apply volume formulas, $V = lwh$ and $V = bh$, to right rectangular prisms with fractional edge lengths. Learning Goal 6: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes and show that the volume is the same as it would be if found by multiplying the edge lengths; apply volume formulas to right rectangular prisms with fractional edge lengths.
■ 6.G.A.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	MP.1 Make sense of problems and persevere in solving them. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically	Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> • represent three dimensional objects with nets made up of rectangles and triangles. • find surface area of three-dimensional objects using nets. • solve real world and mathematical problems involving surface area using nets. Learning Goal 7: Represent three dimensional figures objects with nets made of rectangles and triangles, and use the nets to find the surface area of the figures in order to solve real world and mathematical problems.

Unit 2 Grade 6 What This May Look Like

District/School Formative Assessment Plan	District/School Summative Assessment Plan
<i>Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards.</i>	<i>Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.</i>

Focus Mathematical Concepts

Districts should consider listing prerequisites skills. Concepts that include a focus on relationships and representation might be listed as grade level appropriate.

Prerequisite skills:

Curricular Framework Mathematics-Grade 6

Common Misconceptions:	
District/School Tasks	District/School Primary and Supplementary Resources
<i>Exemplar tasks or illustrative models could be provided.</i>	<i>District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.</i>
Instructional Best Practices and Exemplars	
<i>This is a place to capture examples of standards integration and instructional best practices.</i>	

Unit 3 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
■ 6.EE.B.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): <ul style="list-style-type: none"> • Solving an equation or inequality is a process of answering the question: determine which values from a specified set, if any, make the equation or inequality true. Students are able to: <ul style="list-style-type: none"> • substitute a number into an equation to determine whether it makes an equation true. • substitute a number into an inequality to determine whether it makes the inequality true. Learning Goal 1: Use substitution to determine whether a given number makes an equation or inequality true.
■ 6.EE.B.7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): <ul style="list-style-type: none"> • An equation is defined by two expressions that are equivalent to one another. Students will be able to: <ul style="list-style-type: none"> • solve real world problems by writing and solving equations of the form $x + p = q$ (p, q, and x are non-negative and rational). • solve real world problems by writing and solving equations of the form $px = q$ (p, q, and x are non-negative and rational). Learning Goal 2: Solve real world problems by writing and solving equations of the form $x + p = q$ and $px = q$ (p , q , and x are non-negative rational numbers).
■ 6.NS.C.5. Understand that positive	MP.2 Reason abstractly and	Concept(s):

Curricular Framework Mathematics-Grade 6

Unit 3 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	quantitatively. MP.5 Use appropriate tools strategically	<ul style="list-style-type: none"> Positive and negative numbers, used together, describe quantities having opposite directions or opposite values. Students are able to: <ul style="list-style-type: none"> represent quantities with positive and negative numbers in real-world contexts. interpret positive and negative numbers in real-world contexts. explain the meaning of zero, in context, in each real-world situation. Learning Goal 3: Use positive and negative numbers to represent quantities in real-world situations, explaining the meaning of zero in the context of the real-world situation.
<p>■ 6.NS.C.6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.</p> <p>6.NS.C.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.</p> <p>6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.</p> <p>6.NS.C.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and</p>	MP.5 Use appropriate tools strategically. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): <ul style="list-style-type: none"> Opposite signs of numbers indicate locations on opposite sides of 0 on the number line. The opposite of the opposite of a number is the number itself (e.g. the opposite of three is -3. The opposite of the opposite of three, $-(-3)$, is equal to the original number, 3). Signs of numbers in ordered pairs indicate their locations in quadrants of the coordinate plane. When two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. Students are able to: <ul style="list-style-type: none"> position rational numbers on horizontal and vertical number lines. position pairs of rational numbers on a coordinate plane. explain the conditions for which pairs of points are reflections across an axes in the coordinate plane. locate numbers and their opposites on the number line and explain their relation to 0. Learning Goal 4: Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero. Learning Goal 5: Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes.

Curricular Framework Mathematics-Grade 6

Unit 3 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
position pairs of integers and other rational numbers on a coordinate plane.		
<p>■ 6.NS.C.7. Understand ordering and absolute value of rational numbers.</p> <p>6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. <i>For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.</i></p> <p>6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i></p> <p>6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i></p> <p>6.NS.C.7d. Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</i></p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.5 Use appropriate tools strategically</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> The absolute value of a rational number is its distance from 0 on the number line. <p>Students are able to:</p> <ul style="list-style-type: none"> given an inequality, determine the position of one rational number relative to another. write a inequality and explain statements of order for rational numbers in real world situations. <p>Learning Goal 6: Use statements of inequality to determine relative positions of two rational numbers on a number line; write and explain statements of order for rational numbers in real-world contexts.</p> <p>Learning Goal 7: Explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.</p>
<p>■ 6.EE.B.8. Write an inequality of the form $x > c$ or $x < c$ to represent a</p>	<p>MP.2 Reason abstractly and quantitatively.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> An inequality may represent a constraint (or a condition) in a real-world problem.

Curricular Framework Mathematics-Grade 6

Unit 3 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams	MP.6 Attend to precision. MP.7 Look for and make use of structure.	<ul style="list-style-type: none"> Infinity ($x > c$ and $x < c$ have an infinite number of solutions). Students are able to: <ul style="list-style-type: none"> represent real-world constraint or condition by writing an inequality of the form $x > c$ or $x < c$. graph inequalities of the form $x > c$ or $x < c$ on number lines. Learning Goal 8: Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real world or mathematical problem and represent them on a number line.
■ 6.NS.C.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. *(benchmarked) □ 6.G.A.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems. draw polygons in the coordinate plane. use absolute value to find distances between points with the same first coordinate or the same second coordinate. use coordinates to solve real-world distance, perimeter, and area problems. Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.
□ 6.G.A.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure.	Concept(s): No new concept(s) introduced Students are able to: <ul style="list-style-type: none"> compose rectangles in order to find the area of triangles, special quadrilaterals and polygons. decompose triangles, special quadrilaterals, and polygons into triangles and other shapes in order to find their area. compose rectangles and decompose into triangles in order to solve real-world problems. Learning Goal 10: Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles

Curricular Framework Mathematics-Grade 6

Unit 3 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
		and other shapes to solve real world or mathematical problems.
Unit 3 Grade 6 What This May Look Like		
District/School Formative Assessment Plan	District/School Summative Assessment Plan	
<i>Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards.</i>	<i>Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.</i>	
Focus Mathematical Concepts		
<p><i>Districts should consider listing prerequisites skills. Concepts that include a focus on relationships and representation might be listed as grade level appropriate.</i></p> <p>Prerequisite skills:</p> <p>Common Misconceptions:</p>		
District/School Tasks	District/School Primary and Supplementary Resources	
<i>Exemplar tasks or illustrative models could be provided.</i>	<i>District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.</i>	
Instructional Best Practices and Exemplars		
<i>This is a place to capture examples of standards integration and instructional best practices.</i>		

Unit 4 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
■ 6.EE.C.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): <ul style="list-style-type: none"> • Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values. Students are able to: <ul style="list-style-type: none"> • represent two quantities that related to one another, with variables. • write an equation in two variables. • distinguish the dependent variable from the independent variable. • analyze a given graph and table of values, and relate them to the equation.

Curricular Framework Mathematics-Grade 6

Unit 4 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. <i>For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.</i></p>		<p>Learning Goal 1: Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real world problem.</p> <p>Learning Goal 2: Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values.</p>
<p>● 6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. <i>For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.</i></p>	<p>MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> • Variability/Variation • A statistical question is one that anticipates variability in the data that is related to the question. <p>Students are able to:</p> <ul style="list-style-type: none"> • distinguish questions that are statistical (anticipate variability in data) from those that are not. <p>Learning Goal 3: Distinguish questions that are statistical (anticipate variability in data) from those that are not.</p>
<p>● 6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.</p> <p>● 6.SP.A.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.</p> <p>● 6.SP.B.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p>	<p>MP.4 Model with mathematics.</p>	<p>Concept(s):</p> <ul style="list-style-type: none"> • A data set has a distribution which can be described by its center, spread, and overall shape. • A measure of center summarizes, with a single number, the values of an entire data set. • A measure of variation describes, with a single number, how the values of a data set vary. <p>Students are able to:</p> <ul style="list-style-type: none"> • distinguish center from variation. • display numerical data in dot plots on a number line. • display numerical data in histograms on a number line. • display numerical data in box plots on a number line. <p>Learning Goal 4: Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context.</p>
<p>● 6.SP.B.5. Summarize numerical data</p>	<p>MP.2 Reason abstractly and</p>	<p>Concept(s): No new concept(s) introduced</p>

Curricular Framework Mathematics-Grade 6

Unit 4 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>sets in relation to their context, such as by:</p> <p>6.SP.B.5a. Reporting the number of observations.</p> <p>6.SP.B.5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</p> <p>6.SP.B.5c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.</p> <p>6.SP.B.5d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.</p>	<p>quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p>	<p>Students are able to:</p> <ul style="list-style-type: none"> • determine the number of observations of a data set. • describe the data in context, including how it was measured and the units of measurement. • calculate measures of center, mean and median. • calculate measures of spread, interquartile range and mean absolute deviation. • describe the overall shape of a distribution (skewed left, skewed right, etc). • identify striking deviations (outliers). • choose measures of center and variability appropriate to the shape of the distribution and context. <p>Learning Goal 5: Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured.</p> <p>Learning Goal 6: Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context.</p>
<p>■ 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.</p> <p>*(benchmarked)</p> <p>6.RP.A.3a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p>	<p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> • use ratio and rate reasoning to create tables of equivalent ratios relating quantities with <i>whole number</i> measurements, find missing values in tables and plot pairs of values. • compare ratios using tables of equivalent ratios. • solve real world and mathematical problems involving unit rate (including unit price and constant speed). • calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent. • convert measurement units using ratio reasoning. • transform units appropriately when multiplying and dividing quantities. <p>Learning Goal 7: Create and complete tables of equivalent ratios to solve real world and mathematical problems using ratio and rate reasoning that include</p>

Curricular Framework Mathematics-Grade 6

Unit 4 Grade 6		
Content Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills
<p>6.RP.A.3b. Solve unit rate problems including those involving unit pricing and constant speed. <i>For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?</i></p> <p>6.RP.A.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.</p> <p>6.RP.A.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p>		<p>making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.</p> <p>Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities.</p>
<p>■ 6.NS.C.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>	<p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.5 Use appropriate tools strategically.</p>	<p>Concept(s): No new concept(s) introduced</p> <p>Students are able to:</p> <ul style="list-style-type: none"> • graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems. • draw polygons in the coordinate plane. • use absolute value to find distances between points with the same first coordinate or the same second coordinate. • use coordinates to solve real-world distance, perimeter, and area problems. <p>Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane; use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.</p>
Unit 4 Grade 6 What This May Look Like		
District/School Formative Assessment Plan	District/School Summative Assessment Plan	

Curricular Framework Mathematics-Grade 6

<p><i>Formative assessment informs instruction and is ongoing throughout a unit to determine how students are progressing against the standards.</i></p>	<p><i>Summative assessment is an opportunity for students to demonstrate mastery of the skills taught during a particular unit.</i></p>
Focus Mathematical Concepts	
<p><i>Districts should consider listing prerequisites skills. Concepts that include a focus on relationships and representation might be listed as grade level appropriate.</i></p> <p>Prerequisite skills:</p> <p>Common Misconceptions:</p>	
District/School Tasks	District/School Primary and Supplementary Resources
<p><i>Exemplar tasks or illustrative models could be provided.</i></p>	<p><i>District/school resources and supplementary resources that are texts as well as digital resources used to support the instruction.</i></p>
Instructional Best Practices and Exemplars	
<p><i>This is a place to capture examples of standards integration and instructional best practices.</i></p>	