

## ALPHA BORO PUBLIC SCHOOL

<b>CONTENT AREA:</b> Mathematics	<b>GRADE:</b> 6	<b>UNIT #:</b> 1	<b>UNIT NAME:</b> Operations and Statistical Variability
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#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Compute quotients of fractions.	<b>6.NS.1</b>
2	Construct visual fraction models to represent quotients and explain the relationship between multiplication and division of fractions.	<b>6.NS.1</b>
3	Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.	<b>6.NS.1</b>
4	Fluently add, subtract, multiply and divide multi-digit decimals and whole numbers using standard algorithms.	<b>6.NS.2; 6.NS.3</b>
5	Use positive and negative numbers to describe quantities in real-world situations.	<b>6.NS.5</b>
6	Calculate, compare, and interpret measures of center and variability in a data set to answer a statistical question. (Including median, mean, interquartile range, mean absolute deviation and overall pattern).	<b>6.SP.1; 6.SP.2; 6.SP.3; 6.SP.5c,d</b>

**Major Content Supporting Content:** **Additional Content** (Identified by PARCC Model Content Frameworks).

**Bold type indicates grade level fluency requirements.** (Identified by PARCC Model Content Frameworks).

### Selected Opportunities for Connections to Mathematical Practices

1. **Make sense of problems and persevere in solving them.**  
SLO #3 Involve problems that include several givens or those that must be carefully deconstructed before they can be solved.
2. **Reason abstractly and quantitatively.**
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**  
SLO #2 Visual fraction models are required.

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5. **Use appropriate tools strategically.**  
SLO #2 Tools will include diagrams, words, and equations.
  6. **Attend to precision.**  
SLO #6 The use of precise language is needed when answering statistical questions.
  7. Look for and make use of structure.
  8. Look for and express regularity in repeated reasoning.
- All content presented at this grade level has connections to the standards for mathematical practices.*

***Bold type identifies possible starting points for connections to the SLOs in this unit.***

<b>CODE #</b>	<b>Common Core State Standards</b>
<b>6.NS.1</b>	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 <math>(2/3) \div (3/4)</math> and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that <math>(2/3) \div (3/4) = 8/9</math> because <math>3/4</math> of <math>8/9</math> is <math>2/3</math>. In general, <math>(a/b) \div (c/d) = (ad/bc)</math> How much chocolate will each person get if 3 people share <math>1/2</math> lb of chocolate equally? How many <math>3/4</math>-cup servings are in <math>2/3</math> of a cup of yogurt? How wide is a rectangular strip of land with length <math>3/4</math> mi and area <math>1/2</math> square mi.?</i>
<b>6.NS.2</b>	Fluently divide multi-digit numbers using the standard algorithm.
<b>6.NS.3</b>	Fluently add, subtract, multiply, and divide multi-digit decimals using the standards algorithm for each operation.
<b>6.NS.5</b>	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below, 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.
<b>6.SP.1</b>	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>
<b>6.SP.2</b>	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.
<b>6.SP.3</b>	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of

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	<p>variation describes how its values vary with a single number.</p> <p>Summarize numerical data sets in relation to their context, such as by:</p> <ul style="list-style-type: none"> <li>c. 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 deviation from the overall pattern with reference to the context in which the data were gathered.</li> <li>d. 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.</li> </ul>
<b>6.SP.5</b>	

**Major Content Supporting Content Additional Content** (Identified by PARCC Model Content Frameworks).  
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CONTENT AREA: Mathematics

GRADE: 6

UNIT #2

UNIT NAME: Rational Numbers

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Locate positive and negative rational numbers on the number line and explain the meaning of absolute value of a rational number as indicating locations on opposite sides of zero on the number line and as magnitude for a positive OR negative quantity in a real-world situation.	6.NS.6 6.NS.7
2	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.	6.NS.7
3	Plot ordered pairs in all four quadrants on the coordinate plane and describe their reflections.	6.NS.6
4	Solve real world problems mathematically 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.NS.8
5	Explain the relationship of two quantities or measures of a given ratio and use ratio language to describe the relationship between the two quantities. 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."	6.RP.1
6	Use rate language in the context of a ratio relationship to describe a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$ . For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."	6.RP.2
7	Use ratio and rate reasoning to solve real world and mathematical problems that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.	6.RP.3
8	Use ratio and rate reasoning to convert measurement units (manipulate and transform units appropriately when multiplying or dividing quantities).	6.RP.3

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**CONTENT AREA:** Mathematics

**GRADE:** 6

**UNIT #2**

**UNIT NAME:** Rational Numbers

**Major Content Supporting Content**

(Identified by PARCC Model Content Frameworks).

**Additional Content** (Identified by PARCC Model Content Frameworks).  
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### Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
- SLO #2 Use inequality symbols to make comparisons.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
- SLO #6 Represent polygons on a coordinate plane.
5. Use appropriate tools strategically.
- SLO #7 Use spreadsheets when working with data sets with a large quantity of data points.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

*All of the content presented at this grade level has connections to the standards for mathematical practices.*

*Bold type identifies possible starting points for connections to the SLOs in this unit.*

Code #	Common Core State Standards
<b>6.NS.6</b>	<p>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>a. 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., <math>-(-3) = 3</math>, and that 0 is its own opposite.</p>

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**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #2**

**UNIT NAME: Rational Numbers**

	<p>b. 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>c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</p>
	<p>Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret <math>-3 &gt; -7</math> as a statement that <math>-3</math> is located to the right of <math>-7</math> on a number line oriented from left to right.</p> <p>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write <math>3^{\circ}\text{C} &gt; -7^{\circ}\text{C}</math> to express the fact that <math>-3^{\circ}\text{C}</math> is warmer than <math>-7^{\circ}\text{C}</math>.</p> <p>c. 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. For example, for an account balance of <math>-30</math> dollars, write <math> -30  = 30</math> to describe the size of the debt in dollars.</p> <p>d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than <math>-30</math> dollars represents a debt greater than 30 dollars.</p>
<p><b>6.NS.8</b></p>	<p>Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>
<p><b>6.RP.1</b></p>	<p>Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. 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."</p>
<p><b>6.RP.2</b></p>	<p>Understand the concept of a unit rate <math>a/b</math> associated with a ratio <math>a:b</math> with <math>b \neq 0</math>, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is <math>3/4</math> cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</p>
<p><b>6.RP.3</b></p>	<p>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>a. 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>

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	<p>b. 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>c. 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>d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.</p>
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**Major Content Supporting Content** Additional Content (Identified by PARCC Model Content Frameworks).

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## ALPHA BORO PUBLIC SCHOOL

**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #3**

**UNIT NAME: Expressions**

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Use mathematical language to identify parts of an expression.	6.EE.2
2	Write and evaluate numerical expressions involving whole number exponents.	6.EE.1
3	Read, write, and evaluate expressions in which letters stand for numbers (including formulas that arise from real-world contexts).	6.EE.2
4	Apply the properties of operations to generate equivalent expressions (including the distributive property; for example, <i>express <math>36 + 8</math> as <math>4(9 + 2)</math> and <math>y + y + y = 3y</math>.</i>	6.EE.3, 6.NS.4
5	Identify when two expressions are equivalent; for example, <i>Are the two expressions equal? <math>81 + 18</math> and <math>9(9 + 2)</math>.</i>	6.EE.4
6	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.	6.NS.4

**Major Content Supporting Content** (Identified by PARCC Model Content Frameworks). **Additional Content** (Identified by PARCC Model Content Frameworks).

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### Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. **Construct viable arguments and critique the reasoning of others.**  
SLO 5 Listen to arguments of others about the equivalence of two expressions and decide if they make sense. Ask useful questions to clarify.
4. **Model with mathematics.**  
SLOs 1, 2, and 3 Use expressions that arise from real-world context
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. **Look for and express regularity in repeated reasoning.**



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**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #3**

**UNIT NAME: Expressions**

SLO 4 Generate equivalent expressions using properties of operations.

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***Bold type identifies possible starting points for connections to the SLOs in this unit.***

**Code #**

### Common Core State Standards

<b>6.EE.1</b>	Write and evaluate numerical expressions involving whole number exponents. Read, write, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. <i>For example, express the calculation "Subtract y from 5" as <math>5 - y</math>.</i> b. 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 <math>2(8 + 7)</math> as a product of two factors; view <math>(8 + 7)</math> as both a single entity and a sum of two terms.</i> c. Evaluate expressions at specific values of their variables. 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 <math>V = s^3</math> and <math>A = 6s^2</math> to find the volume and surface area of a cube with sides of length <math>s = \frac{1}{2}</math>.</i>
<b>6.EE.3</b>	Apply the properties of operations to generate equivalent expressions. <i>For example, apply the distributive property to the expression <math>3(2 + x)</math> to produce the equivalent expression <math>6 + 3x</math>; apply the distributive property to the expression <math>24x + 18y</math> to produce the equivalent expression <math>6(4x + 3y)</math>; apply properties of operations to <math>y + y + y</math> to produce the equivalent expression <math>3y</math>.</i>
<b>6.EE.4</b>	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 <math>y + y + y</math> and <math>3y</math> are equivalent because they name the same number regardless of which number <math>y</math> stands for.</i>
<b>6.NS.4</b>	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. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. <i>For example, express <math>36 + 8</math> as <math>4(9 + 2)</math>.</i>

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UNIT #3

UNIT NAME: Expressions

**Major Content Supporting Content**

**Additional Content** (Identified by PARCC Model Content Frameworks).

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## ALPHA BORO PUBLIC SCHOOL

**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #4**

**UNIT NAME: Rational Numbers**

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Locate positive and negative rational numbers on the number line and explain the meaning of absolute value of a rational number as indicating locations on opposite sides of zero on the number line.	6.NS.6 6.NS.7
2	Write and compare rational numbers using inequality signs.	6.NS.7
3	Plot ordered pairs in all four quadrants on the coordinate plane and describe their reflections.	6.NS.6
4	Interpret and explain absolute value as magnitude for a positive or negative quantity in a real-world situation.	6.NS.7
5	Solve real world problems mathematically 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.NS.8
6	Draw polygons in the coordinate plane given the coordinates of the vertices and use the coordinates to solve real world distance, perimeter, and area problems.	6.G.3
7	Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context.	6.SP.4 6.SP.5a,b

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## ALPHA BORO PUBLIC SCHOOL

**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #4**

**UNIT NAME: Rational Numbers**

### Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
  2. Reason abstractly and quantitatively.  
SLO #2 Use inequality symbols to make comparisons.
  3. Construct viable arguments and critique the reasoning of others.
  4. Model with mathematics.  
SLO #6 Represent polygons on a coordinate plane.
  5. Use appropriate tools strategically.  
SLO #7 Use spreadsheets when working with data sets with a large quantity of data points.
  6. Attend to precision.
  7. Look for and make use of structure.
  8. Look for and express regularity in repeated reasoning.
- All of the content presented at this grade level has connections to the standards for mathematical practices.*

***Bold type identifies possible starting points for connections to the SLOs in this unit.***

Code #	Common Core State Standards
<b>6NS6</b>	<p>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> <ol style="list-style-type: none"> <li>a. 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., <math>-(-3) = 3</math>, and that 0 is its own opposite.</li> <li>b. 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.</li> <li>c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.</li> </ol>
<b>6NS7</b>	<p>Understand ordering and absolute value of rational numbers.</p> <ol style="list-style-type: none"> <li>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line</li> </ol>

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<b>CONTENT AREA:</b> Mathematics	<b>GRADE:</b> 6	<b>UNIT #4</b>	<b>UNIT NAME:</b> Rational Numbers
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	<p>diagram. For example, interpret <math>-3 &gt; -7</math> as a statement that <math>-3</math> is located to the right of <math>-7</math> on a number line oriented from left to right.</p> <p>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write <math>3^{\circ}\text{C} &gt; -7^{\circ}\text{C}</math> to express the fact that <math>-3^{\circ}\text{C}</math> is warmer than <math>-7^{\circ}\text{C}</math>.</p> <p>c. 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. For example, for an account balance of <math>-30</math> dollars, write <math> -30  = 30</math> to describe the size of the debt in dollars.</p> <p>d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than <math>-30</math> dollars represents a debt greater than 30 dollars.</p>
<b>6.NS.8</b>	<p>Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.</p>
<b>6.G.3</b>	<p>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.</p>
<b>6.SP.4</b>	<p>Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p>
<b>6.SP.5</b>	<p>Summarize numerical data sets in relation to their context, such as by:</p> <ol style="list-style-type: none"> <li>a. Reporting the number of observations.</li> <li>b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</li> </ol>

**Major Content Supporting Content Additional Content** (Identified by PARCC Model Content Frameworks).

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## ALPHA BORO PUBLIC SCHOOL

**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #5**

**UNIT NAME: Ratio and Proportion**

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING CCSS
1	Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles and other shapes to solve real world or mathematical problems.	<b>6.G.1</b>
2	Represent three dimensional figures using nets made of rectangles and triangles, and use the nets to find the surface area of the figures in the context of solving real world and mathematical problems.	<b>6.G.4</b>
3	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes. Show that the volume is the same as it would be if found by multiplying the edge lengths.	<b>6.G.2</b>
4	Draw polygons in the coordinate plane given the coordinates of the vertices and use the coordinates to solve real-world distance, perimeter, and area problems.	<b>6.G.3</b>
5	Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context.	6.SP.4 6.SP.5a,b

**Major Content Supporting Content**

**Additional Content** (Identified by PARCC Model Content Frameworks).

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### Selected Opportunities for Connections to Mathematical Practices

<ol style="list-style-type: none"> <li>1. <b>Make sense of problems and persevere in solving them.</b> SLO #5 Relating variables to real world context.</li> <li>2. <b>Reason abstractly and quantitatively.</b></li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. <b>Model with mathematics.</b> SLO #6 Use graphs and tables to represent a dependent/independent relationship.</li> <li>5. Use appropriate tools strategically.</li> <li>6. <b>Attend to precision.</b> SLO #4 Converting measures.</li> </ol>
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## ALPHA BORO PUBLIC SCHOOL

**CONTENT AREA: Mathematics**

**GRADE: 6**

**UNIT #5**

**UNIT NAME: Ratio and Proportion**

7. Look for and make use of structure.
  8. Look for and express regularity in repeated reasoning.
- All of the content presented at this grade level has connections to the standards for mathematical practices.*

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<b>Common Core State Standards</b>	
<b>Code #</b>	
<b>6.G.1</b>	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.
<b>6.G.2</b>	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.
<b>6.G.3</b>	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.
<b>6.G.4</b>	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.
<b>6.SP.4</b>	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
<b>6.SP.5</b>	Summarize numerical data sets in relation to their context, such as by: <ol style="list-style-type: none"> <li>a. Reporting the number of observations.</li> <li>b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.</li> </ol>

**Major Content Supporting Content** (Identified by PARCC Model Content Frameworks):

**Additional Content** (Identified by PARCC Model Content Frameworks):

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