| **Unit 1** | **Unit 2** | **Unit 3** | **Unit 4** | **Unit 5** | **Unit 6** | **Unit 7** | **Unit 8** | **Unit 9** | **Unit 10** | **Unit 11** | **Unit 12** |
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| **Ratios and Rates** | **Adding and Subtracting Decimals** | **Multiplying and Dividing Multi-Digit Numbers and Decimals** | **Dividing Fractions** | **Expressions with Whole Number Exponents** | **Area and Surface Area** | **Equations and Inequalities** | **Equivalent Expressions** | **Rational Numbers: Introduction of Negative** | **Rational Numbers and the Coordinate Plane** | **Univariate Statistics** | **Writing Equations in Two Variables** |
| **13-15 days** | **8-10 days** | **13-15 days** | **13-15 days** | **8-10 days** | **13-15 days** | **13-15 days** | **13-15 days** | **13-15 days** | **13-15 days** | **18-20 days** | **18-20 days** |
| 6.RP.A.1 | 6.NS.B.3 | 6.RP.A.3d | 6.NS.A.1 | 6.EE.A.1 | 6.G.A.1 | 6.EE.A.2a | 6.EE.A.2b | 6.NS.C.5 | 6.NS.C.6b | 6.SP.A.1 | 6.EE.C.9 |
| 6.RP.A.2 | MP.6 | 6.NS.B.2 | MP.1 | 6.EE.A.2c | 6.G.A.4 | 6.EE.B.5 | 6.EE.A.3 | 6.NS.C.6a | 6.NS.C.6c | 6.SP.A.2 | 6.RP.A.3a |
| 6.RP.A.3a | MP.7 | 6.NS.B.3 | MP.3 | 6.G.A.2 | MP.4 | 6.EE.B.6 | 6.EE.A.4 | 6.NS.C.6c | 6.NS.C.8 | 6.SP.A.3 | 6.RP.A.3b |
| 6.RP.A.3b |  | MP.6 | MP.8 | MP.4 | MP.6 | 6.EE.B.7 | 6.NS.B.4 | 6.NS.C.7 | 6.G.A.3 | 6.SP.B.4 | MP.2 |
| 6.RP.A.3c |  | MP.7 |  | MP.6 |  | 6.EE.B.8 | MP.6 | MP.2 | MP.2 | 6.SP.B.5 | MP.4 |
| MP.1 |  |  |  |  |  | MP.2 | MP.7 | MP.6 | MP.4 | MP.2 | MP.8 |
| MP.4 |  |  |  |  |  | MP.4 |  |  | MP.6 | MP.3 |  |
| MP.5 |  |  |  |  |  |  |  |  |  | MP.5 |  |
| MP.7 |  |  |  |  |  |  |  |  |  |  |  |
| **Major Clusters** | | | **Supporting Clusters** | | | **Additional Clusters** | | | **Other** | | |
| **NS** – The Number System  (1, 5, 6, 7, 8)  **EE** – Expressions and Equations  (1, 2, 3, 4, 5, 6, 7, 8, 9)  **RP** – Ratio and Proportional Reasoning  (1, 2, 3) | | | **G** – Geometry  (1, 2, 3, 4) | | | **NS** – The Number System  (2, 3, 4)  **SP –** Statistics and Probability  (1, 2, 3, 4, 5) | | | **MP** – Standards for Mathematical Practice | | |

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| **Summary of Year for Grade 6 Mathematics** |
| In grade 6, students should be engaged with rich experiences in four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.  The beginning of the year will focus on developing the concepts of ratios and rates as well as operations with decimals. Students will also extend their work in multiplying and dividing fractions to begin dividing a fraction by a fraction. Students will then apply their arithmetic skills to evaluate numerical expressions involving whole number exponents. From there the students will begin their work with algebra by writing, reading, and evaluating expressions involving variables. Students will solve one step, single-variable equations. Students will also generate equivalent expressions and factor expressions. Students then work with negative rational numbers by reasoning about their position on the number line and in the coordinate plane. Students will not perform arithmetic operations with negative numbers in this course. This course concludes with an introduction to univariate statistics and equations in two variables which will build the foundation for students’ later work in high school mathematics. |
| **Standards Clarification for Grade 6 Mathematics** |
| Some standards may be revisited several times during the course; others may be only partially addressed in different units, depending on the focus of the unit. See the Standards Clarification column for information on the repeated standards. |
| **Mathematical Practices Recommendations for Grade 6 Mathematics** |
| Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded, and unscaffolded) are an important opportunity to connect content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.   * Reading and transforming expressions involves seeing and making use of structure (MP.7). Relating expressions to situations requires making sense of problems (MP.1) and reasoning abstractly and quantitatively (MP.2). * The sequence of steps in the solution of an equation is a logical argument that students can construct and critique (MP.3). Such arguments require looking for and making use of structure (MP.7) and, over time, expressing regularity in repeated reasoning (MP.8). * Thinking about the point (1, *r*) in a graph of a proportional relationship with unit rate *r* involves reasoning abstractly and quantitatively (MP.2). The graph models with mathematics (MP.4) and uses appropriate tools strategically (MP.5). * Area, surface area, and volume present modeling opportunities (MP.4) and require students to attend to precision with the types of units involved (MP.6). * Students think with precision (MP.6) and reason quantitatively (MP.2) when they use variables to represent numbers and write expressions and equations to solve a problem (6.EE.6–7). * Working with data gives students an opportunity to use appropriate tools strategically (MP.5). For example, spreadsheets can be powerful for working with a data set with dozens or hundreds of data points. |
| **Fluency Expectations or Examples of Culminating Standards for Grade 6 Mathematics** |
| **6.NS.B.2 :** Students fluently divide multi-digit numbers using the standard algorithm. This culminates several years’ worth of work with whole number division.  **6.NS.B.3 :** Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. This is the culminating standard for several years’ worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations — Fractions.  **6.NS.A.1:** Students interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. This completes the extension of operations to fractions. |

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| **Unit 1: Ratios and Rates** | | **Possible time frame**:  13-15 days |
| The concepts of ratio, rate, unit rate, and percent will all be introduced in this unit. Students will extend their understanding of fractions to include the ratio of two quantities and will use ratio language to describe the relationship between the quantities. Students will apply their understanding of equivalent fractions to create tables of equivalent ratios, find missing values in the tables, and plot the pairs of values on the coordinate plane. Students will also focus on the rate per 1 (unit rate) and the rate per 100 (percent). The students will solve real-world problems involving unit rates and percents. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Understand ratio concepts and use ratio reasoning to solve problems.**  **6.RP.A.1** 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 or every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”*  **6.RP.A.2** Understand the concept of a unit rate *a*/*b* associated with a ratio *a:b* with *b* ≠ 0, 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 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15hamburgers, which is a rate of $5 per hamburger.”*  **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.   1. 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. 2. Solve unit rate problems including those involving unit pricing and constant speed. *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?* 3. 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. | | **6.RP.A.1** Students will continue to use the concepts of ratio as they use multiplication and division to solve real-world problems.  **6.RP.A.2** Unit rates are limited to non-complex fractions. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.1** Make sense of problems and persevere in solving them. | The content standards for this unit require that students make sense of real-world and mathematical problems (**MP.1**) by modeling relationships with ratios (**MP.4**) using a variety of tools strategically (e.g., equivalent ratios, tape diagrams, double number line diagrams, or equations) (**MP.5**). As students work with unit rates and interpret percent as a rate per 100, and as they analyze the relationships among the values, they look for and make use of structure (**MP.7**). | |
| **MP.4** Model with mathematics. |
| **MP.5** Use appropriate tools strategically. |
| **MP.7** Look for and make use of structure. |

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| **Unit 2: Adding and Subtracting Decimals** | | **Possible time frame**:  8-10 days |
| In this unit students will extend their work with decimals from previous grades to master the standard algorithm for adding and subtracting decimals and increase fluency with addition and subtraction of decimals (to any place value). Additionally, students will use addition and subtraction of decimals as they solve real-world problems. Units should be included throughout the process of problem-solving as well as in the answer. | | |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Compute fluently with multi-digit numbers and find common factors and multiples.**  **6.NS.B.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. | | **6.NS.B.3** Students will also use addition and subtraction of decimals in Unit 6 as they calculate surface area. This standard is limited to addition and subtraction in Unit 2. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.6** Attend to precision. | As students compute fluently with multi-digit decimals, they need to look for and make use of structure (**MP.7**). As they solve real-world problems, students will need to attend to the units throughout their work and in their answers (**MP.6**). | |
| **MP.7** Look for and make use of structure. |

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| **Unit 3: Multiplying and Dividing Multi-Digit Numbers and Decimals** | | **Possible time frame**:  13-15 days |
| In this unit students will extend their work with decimals in previous grades multiplying decimals (to any place value) using the standard algorithm. Additionally, students will extend their conceptual understanding of division as they learn the standard algorithm for dividing multi-digit numbers. Students will use multiplication of decimals and division of multi-digit numbers and decimals to solve real-world problems. In solving real-world problems, students will convert measurement units using ratio reasoning and will transform units appropriately when multiplying or dividing quantities. The units should be included throughout the process of solving the problems (not only included with the final answer). | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Understand ratio concepts and use ratio reasoning to solve problems.**  **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.   1. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. | | Students will continue to use the concept of ratio as they use multiplication and/or division to solve real-world problems (6.RP.A.1 from Unit 1) |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Compute fluently with multi-digit numbers and find common factors** and multiples.  **6.NS.B.2** Fluently divide multi-digit numbers using the standard algorithm.  **6.NS.B.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. | | **6.NS.B.3** Students will also use multiplication and division of decimals in Unit 6 as they calculate area. This standard is limited to multiplication and division in Unit 3. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.6** Attend to precision. | As students compute fluently with multi-digit numbers, they need to look for and make use of structure (**MP.7**). As they solve real-world problems, students will need to attend to the units throughout their work and in their answers (**MP.6**). | |
| **MP.7** Look for and make use of structure. |

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| **Unit 4: Dividing Fractions** | | **Possible time frame**:  13-15 days |
| In 5th grade students divided unit fractions by whole numbers and whole numbers by unit fractions. In this unit students will extend work to include division of a fraction by a fraction. Students will use their understanding of fractions, multiplication, and division to explain why the procedure for dividing fractions makes sense. Additionally, students will use division of fractions to represent a real-world scenario. As students continue to work with fractions they will generalize the pattern of dividing fractions to (a/b) ÷ (c/d) = ad/bc. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**  **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. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (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?*  **Understand ratio concepts and use ratio reasoning to solve problems.**  **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.   1. 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. | | **6.NS.A.1** Areas of rectangles with one fractional side length and one missing side length should be included as an application of this standard. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.1** Make sense of problems and persevere in solving them. | Students will make sense of mathematical and real-world problems which represent division of fractions (**MP.1**). Students should be given the opportunity to explain their understanding of division of fractions and critique the reasoning of others (**MP.3**). As students work with division of fractions, they will begin to generalize a pattern and develop the standard algorithm (**MP.8**). | |
| **MP.3** Construct viable arguments and critique the reasoning of others. |
| **MP.8** Look for and express regularity in repeated reasoning. |

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| **Unit 5: Expressions with Whole Number Exponents** | | **Possible time frame**:  8-10 days |
| Students will expand their understanding of exponents by writing and evaluating expressions with whole number exponents and positive rational bases. As students evaluate expressions in this unit involving exponents, they will expand their understanding of the conventional order of operations to include exponents. Additionally, students will evaluate formulas which include whole number exponents arising from real-world situations (such as area and volume formulas). Students will explore volume by packing the figure with unit cubes of the appropriate unit fraction edge length to show that the formulas for volume hold. Students should apply both the formula *V*=*lwh* and *V*=*bh* where *b* is the area of the base. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Apply and extend previous understandings of arithmetic to algebraic expressions.**  **6.EE.A.1** Write and evaluate numerical expressions involving whole-number exponents.  **6.EE.A.2** Write, read, and evaluate expressions in which letters stand for numbers.   1. 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). *For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.*   NOTE: **6.EE.A.2c** When discussing the conventional order of operations, the acronym PEMDAS tends to create the misconception in students that multiplication should be performed before division and addition before subtraction. Instead, use the meaning of exponents to expand expressions involving exponents and other operations to help students see where exponents fit into the conventional order of operations. The emphasis should be that when grouping symbols do not specify order, exponents are evaluated first, multiplication/division next (from left to right), and finally addition/subtraction (from left to right). | | **6.EE.A.1** Students will continue to write and evaluate expressions with exponents as they work with area and surface area in Unit 6.  **6.EE.A.2c** Students will continue to evaluate formulas with whole number exponents in Unit 6 as they work with surface area. |
| **Supporting Cluster Standards** | | **Standards Clarification** |
| **Solve real-world and mathematical problems involving area, surface area, and volume.**  **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 = l w h* and *V = b h* to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. | | **6.G.A.2**  Students should use volumes with fractional side lengths in a real-world context. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.4** Model with mathematics. | Students will model volume problems with equations and manipulatives as they create new understandings (**MP.4**). Students will attend to precision as they use units appropriately throughout their work and in their answer (**MP.6**). | |
| **MP.6** Attend to precision. |

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| **Unit 6: Area and Surface Area** | | **Possible time frame**:  13-15 days |
| Students will come into 6th grade with a strong conceptual understanding of area. The concept of area of rectangles is tied closely to multiplication. However, this unit will be students’ first in-depth exploration of area of other figures and surface area of three-dimensional figures. Students will use what they know about area to find the area of right triangles, other triangles, special quadrilaterals, and polygons. As students explore finding area they will discuss, develop, and justify the formulas for areas of triangles and parallelograms. Students will also use area to represent and solve real-world problems. Students will represent three-dimensional figures with nets. Nets will only be made up of rectangles and triangles and students should use surface area to solve real-world and mathematical problems. | | |
| **Supporting Cluster Standards** | | **Standards Clarification** |
| **Solve real-world and mathematical problems involving area, surface area, and volume.**  **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.  **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. | | Students will continue to write and evaluate expressions and evaluate formulas with exponents (2nd power only) as they work with area and surface area. (6.G.A.1 and 6.G.A.2c from Unit 5)  Students will continue to use addition, subtraction, multiplication, and division of decimals to calculate surface area. (6.NS.B.3 from Units 2 and 3) |
| **Focus Standards of Mathematical Practice** | | |
| **MP.4** Model with mathematics. | Students will model volume problems with equations and manipulatives as they create new understandings (**MP.4**). Students will attend to precision as they use units appropriately throughout their work and in their answer (**MP.6**). | |
| **MP.6** Attend to precision. |

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| **Unit 7: Equations and Inequalities** | | **Possible time frame**:  13-15 days |
| In this unit students will write expressions, equations, and inequalities using variables to model and solve real-world and mathematical problems. Students will also develop a conceptual understanding of 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. From there students will begin solving single-step equations (not inequalities) using any one of the four. Finally, students will use inequalities to represent constraints on the possible values of the variable for real-world and mathematical problems. This will help the students see the application of inequalities in a real-world context as well as help them develop the understanding that inequalities have an infinite number of solutions. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Apply and extend previous understandings of arithmetic to algebraic expressions.**  **6.EE.A.2** Write, read, and evaluate expressions in which letters stand for numbers.   1. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation “Subtract y from 5” as 5 – y.*   **Reason about and solve one-variable equations and inequalities.**  **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.  **6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.  **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.  **6.EE.B.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. Recognize that inequalities of the form *x* > *c* or *x* < *c* have infinitely many solutions; represent solutions of such inequalities on number line diagrams. | | Students should write equations and inequalities as well as solve equations involving fractions and decimals. (6.NS.A.1, 6.NS.A.2, 6.NS.A.3 from Unit 2, 3, 4)  **6.EE.B.8** It is not the expectation of this standard or unit for students to solve inequalities. Although the mathematical examples in the standard only show the less than and greater than signs, it is appropriate to use the less than or equal to and the greater than or equal to signs as well. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.2** Reason abstractly and quantitatively. | As students model real-world and mathematical problems with equations and solve the equations they write, they will reason about the constraints and the reasonableness of their solutions **(MP.2** and **MP.4**). | |
| **MP.4** Model with mathematics. |

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| **Unit 8: Equivalent Expressions** | | **Possible time frame**:  13-15 days |
| The focus of this unit is on recognizing and creating equivalent expressions. This will be a natural extension of the students’ work with equivalent numerical expressions and will be primarily based on students’ conceptual understanding of operations and the distributive property. Students will understand that two expressions are equivalent if they name the same number for any value substituted for the variable in the expression. Also, students should start to recognize that parts of expressions can simultaneously be described in multiple ways. As students are writing equivalent expressions, they will use the greatest common factor of coefficients and the distributive property to rewrite expressions. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Apply and extend previous understandings of arithmetic to algebraic expressions.**  **6.EE.A.2** Write, read, and evaluate expressions in which letters stand for numbers.   1. 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. *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.*   **6.EE.A.3** Apply the properties of operations to generate equivalent expressions. *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.*  **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). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.* | |  |
| **Additional Cluster Standards** | | **Standards Clarification** |
| **Compute fluently with multi-digit numbers and find common factors and multiples.**  **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. 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. *For example, express 36 + 8 as 4 (9 + 2).* | |  |
| **Focus Standards of Mathematical Practice** | | |
| **MP.6** Attend to precision. | As students talk about and work with expressions they will use accurate mathematical vocabulary to describe pieces of or entire expressions (including sum, term, product, factor, quotient, and coefficient)(**MP.6**). Students will make use of structure as they learn to view one or more parts of an expression as a single entity (**MP.7**). | |
| **MP.7** Look for and make use of structure. |

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| **Unit 9: Rational Numbers: Introduction of Negative** | | **Possible time frame**:  13-15 days |
| In this unit students will be introduced to the concepts of absolute value and negative rational numbers. While students should be exposed to a variety of rational numbers, primarily students will work with integers. Negative numbers will be introduced as a way to represent real-world quantities that can be above or below some center or neutral value (e.g. temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electrical charge). Students will use both positive and negative numbers to represent quantities in a real-world context. Students will extend their understanding of a number line diagram to locate negative numbers on the number line (both horizontal and vertical). Students will then begin to compare rational numbers (including negative numbers) and represent the comparison using inequality symbols. Students will interpret statements of inequality in terms of the context they represent. (Note: Students do not develop operations with rational numbers until the 7th grade.) | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Apply and extend previous understandings of numbers to the system of rational numbers.**  **6.NS.C.5** 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 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.  **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.   1. 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. 2. 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.   **6.NS.C.7** Understand ordering and absolute value of rational numbers.   1. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *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.* 2. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3°C > –7°C to express the fact that –3°C is warmer than –7°C.* 3. 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 –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* 4. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.* | | **6.NS.C.6c** Limited to finding positions of integers and other rational number on horizontal or vertical number lines. |
| **Focus Standards of Mathematical Practice** | | |
| **MP.2** Reason abstractly and quantitatively. | Students will reason as they determine the position of rational numbers on the number lines and describe how rational numbers relate to one another in real-world contexts (**MP.2**). Students should be encouraged to use precise language as they discuss the relationships (**MP.6**). | |
| **MP.6** Attend to precision. |

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| **Unit 10: Rational Numbers and the Coordinate Plane** | | **Possible time frame**:  13-15 days |
| After developing a conceptual understanding of negative numbers and their location on the real number line, students will extend their understanding of negative numbers to work with the coordinate plane. This will be the first time that students work in quadrants II, III, or IV since they have not been introduced to negative numbers prior to this course. Additionally students will solve real-world and mathematical problems (including geometric problems involving polygons on the coordinate plane) by graphing points in all four quadrants finding the distance between two points with the same first coordinate or the same second coordinate. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Apply and extend previous understandings of numbers to the system of rational numbers.**  **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.   1. 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. 2. 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.   **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. | | **6.NS.C.8** Students will plot ordered pairs on the coordinate plane in Unit 12 to model the relationship between two quantitative variables that change in relation to one another. |
| **Supporting Cluster Standards** | | **Standards Clarification** |
| **Solve real-world and mathematical problems involving area, surface area, and volume.**  **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. | |  |
| **Focus Standards of Mathematical Practice** | | |
| **MP.2** Reason abstractly and quantitatively. | Students will attend to precision as they plot points and reason that the order of the coordinates is important in the ordered pair (**MP.6** and **MP.2**). Students will model real-world and mathematical problems on the coordinate plane (**MP.4**). | |
| **MP.4** Model with mathematics. |
| **MP.6** Attend to precision. |

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| **Unit 11: Univariate Statistics** | **Possible time frame**:  18-20 days |
| This unit will establish students’ foundation in statistical concepts and statistical thinking which they will build upon all the way through Algebra II. Students will 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. Students will display numerical data in plots on a number line including dot plots, histograms, and box plots. Students will connect their new understanding and skills to summarize numerical data sets as it relates to the context. Students will also pay close attention to how the data were gathered and what units of measure were used. | |
| **Additional Cluster Standards** | **Standards Clarification** |
| **Develop understanding of statistical variability.**  **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. *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.*  **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.  **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.  **Summarize and describe distributions.**  **6.SP.B.4** Display numerical data in plots on a number line, including dot plots, histograms, and box plots.  **6.SP.B.5** Summarize numerical data sets in relation to their context, such as by:   1. Reporting the number of observations. 2. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. 3. 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. 4. 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. | **6.SP.B.5** Students will have a better chance of mastering this standard and leaving with a higher level of transferable knowledge if they are allowed to play an active role in collecting and analyzing the statistical data. |

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| **Focus Standards of Mathematical Practice** | |
| **MP.2** Reason abstractly and quantitatively. | As students analyze data they will engage in conversations about the measures used to describe data and reason about how these measures relate to the data collected (**MP.3** and **MP.2**). Students will use appropriate tools to both collect data and analyze the data they collect (**MP.5**). |
| **MP.3** Construct viable arguments and critique the reasoning of others. |
| **MP.5** Use appropriate tools strategically. |

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| **Unit 12: Writing Equations in Two Variables** | | **Possible time frame**:  18-20 days |
| In this unit students will model the relationship between two real-world quantities that change in relation to one another. This unit will form the foundation for students’ work with functions which is one of the major topics for high school mathematics. Students will use unit rates to write equations that model the relationship between the independent and dependent variable. Students will also analyze the relationship between the dependent and independent variables using graphs and tables and relate the graphs and tables to the equation. Students should leave this unit with a deep conceptual understanding of how the different representations (table, list, graph, equation, and verbal description) of the relationship between two quantitative variables connect to each other and be able to create the other representations given any single representation. | | |
| **Major Cluster Standards** | | **Standards Clarification** |
| **Represent and analyze quantitative relationships between dependent and independent variables.**  **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 relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *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.*  **Understand ratio concepts and use ratio reasoning to solve problems.**  **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.   1. 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. 2. Solve unit rate problems including those involving unit pricing and constant speed. *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?* | | Students will use tables and graphs to explore the relationship between the independent and dependent variables. (6.RP.A.3a from Unit 1)  Students will use unit rates to write equations that model the relationship between the independent and dependent variables (6.RP.A.3b from Unit 1 and 6.NS.C.8 from Unit 10) |
| **Focus Standards of Mathematical Practice** | | |
| **MP.2** Reason abstractly and quantitatively. | Students look for and express regularity in repeated reasoning (**MP.8**) as they generate algebraic models (**MP.4**) to represent relationships. Students will also reason about the relationship between the dependent and independent variables in real-world contexts (**MP.2**). | |
| **MP.4** Model with mathematics. |
| **MP.8** Look for and express regularity in repeated reasoning. |