Accelerated Math 6
Grade 6

Unit A
Decimals and Fractions: Base-Ten Operations, Division with Fractions

Essential Question
How can models and algorithms help us solve real-world problems involving fractions and decimals?

Unit Summary
Students use efficient algorithms to compute fluently with multi-digit decimals and divide multi-digit whole numbers. Students use number sense to interpret quotients of fractions. Students use models to divide fractions. Students find the GCF and LCM of whole numbers.

Guiding Questions
Content and Process

- **How does dividing by a fraction affect the quotient? 6.NS.1**
- **How are models used to represent finding the quotient of fractions? 6.NS.1**
- **How is an algorithm used to compute multi-digit decimals? 6.NS.3**
- How is an algorithm used to divide multi-digit numbers? 6.NS.2
- How is the LCM or GCF of two numbers found? 6.NS.4
- How can the distributive property be used to create equivalent expressions? 6.NS.4

Reflective

- What strategy do you use to compute with multi-digit decimals?
- How would you explain dividing fractions using a model?
- What method is most effective for you in determining the GCF and LCM of two numbers?

Power Standards

- **6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, requiring multiple exposures connecting various concrete and abstract models.**
- **6.NS.3 Fluently (efficiently, accurately, and flexibly) add, subtract, multiply, and divide multi-digit decimals using an efficient algorithm for each operation**.

Supporting Standards

- 6.NS.2 Fluently (efficiently, accurately, and flexibly) divide multi-digit numbers using an efficient algorithm.
- 6.NS.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 18+48 as 6(3+8).*

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Grade 6

Unit B
Ratio Reasoning: Ratio Concepts and Equivalent Ratios

Essential Question
How can ratios and rates help us make sense of the world around us?

Unit Summary
Students use ratio language to describe a relationship between two quantities. Students use a variety of strategies to represent and reason about ratio relationships and to solve problems. Students find unit rates and use them to solve real-world problems.

Guiding Questions
Content and Process

- **How are tables, graphs, and other strategies used to compare ratios and find missing values? 6.RP.3a**
- **How can a unit rate be found and used to compute equivalent ratios? 6.RP.3a**
- **How can converting unit rates help us compare rates? 6.RP.3c**
- How can ratios be used to represent a relationship between two quantities? 6.RP.1
- How does thinking about part-to-part and part-to-whole relationships help solve ratio problems? 6.RP.1
- How is language related to ratio and rate used to understand unit rate? 6.RP.2

Reflective

- Where do you see ratios outside the classroom?
- How do you find missing values when comparing ratios?
- What proportional relationships in the world can you think of?

- What problems in the real world could be solved by finding unit rates?
- How could you explain to a friend how to convert between units using unit rates?

Power Standards

- **6.RP.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 using calculations).***
    - **6.RP.3a. Make tables of equivalent ratios relating quantities with whole-number measurements, find the missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.**
    - **6.RP.3c Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.**

Supporting Standards

- 6.RP.1. Use ratio language to describe a relationship between two quantities. Distinguish between part-to-part and part-to-whole relationships. *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.2 Use unit rate language ("for each one", "for every one" and "per") and unit rate notation to demonstrate understanding the concept of a unit rate ab associated with a ratio a:b with b0, *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 34 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."* (Expectations for unit rates in this grade are limited to non-complex fractions.)

Accelerated Math 6
Grade 6

Unit C
Proportional Relationships-Unit Rates, Scale, Proportions, and Percents

Essential Question
How can rates and percentages help us make sense of the world around us?

Unit Summary
Students find unit rates and use them to solve real-world problems. Students use rates to find percentages and convert between units. Students will visually represent proportional relationships with rational numbers and use them to solve real-world and mathematical problems.

Guiding Questions
Content and Process

- **How can a unit rate be found and used to compute equivalent ratios? 6.RP.3a**
- **How is a rate per 100 used to find the percent of a quantity? 6.RP.3b**
- **What strategies can be used to compute unit rates from a ratio of fractions? 7.RP.1**
- **Why are two quantities considered proportional? 7.RP.2, 7.RP.2a**
- **How does the correlation between values in a table or points on a graph and their unit rate determine proportionally? 7.RP.2b**
- **How can equations represent a proportional relationship? 7.RP.2, 7.RP.2c**
- **What do the points on a graph of a proportional relationship represent in terms of the situation? 7.RP.2d**
- **How can proportions be used to solve multi-step ratio and percent problems? 7.RP.3**
- How are the sides and area affected when scaling geometric figures? 7.G.1
- How can scale drawings be used to reproduce figures at different sizes? 7.G.1

Reflective

- What problems in the real world could be solved by finding a unit rate?
- How could you explain to a friend how to convert between units using unit rate?
- How can I find the constant of proportionality in a table, graph, or equation?
- What proportional relationships in the world can you think of?
- For you, what is more useful for seeing proportional relationships: a table, graph, or an equation? Why?
- What coupon would you rather have, 20% off or $20 off?

Power Standards

6.RP.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 using calculations).*

- **6.RP.3b Find a percent of a quantity as a rate per 100 *(e.g. 30% of a quantity means* $\frac{30}{100}$ *times the quantity*); solve problems involving finding the whole, given a part and the percent.**
- **6.RP.3c Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.**
- **7.RP.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks* $\frac{1}{2}$ *mile in each* $\frac{1}{4}$ *hour, compute the unit rate as the complex fraction* $\frac{\frac{1}{2}}{\frac{1}{4}}$ *miles per hour (interpreting a complex fraction as division of fractions), equivalently 2 miles per hour.***
- **7.RP.2 Recognize and represent proportional relationships between quantities:**
    - **7.RP.2a. Determine whether two quantities are in a proportional relationship, e.g. by testing for equivalent ratios in a table or graphing**

on a coordinate plane and observing whether the graph is a straight line through the origin.

- **7.RP.2b. 7.RP.2c. 7.RP.2d. Analyze a table or graph and recognize that, in a proportional relationship, every pair of numbers has the same unit rate (referred to as the "m").**
- **Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as uu = $eeaa$.**
- **Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.**

- **7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.**

Supporting Standards

- 7.G.1. Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Accelerated Math 6
Grade 6

Unit D
Positive and Negative Numbers: Absolute Value

Essential Question
How are rational numbers used to represent real-world situations?

Unit Summary
Students will write, solve, and visually represent inequalities on a number line. Students understand the meaning of positive and negative numbers and can compare them.

Guiding Questions
Content and Process

- **How do positive and negative values describe real-world situations? 6.NS.5a**
- **What is the meaning of zero in situations that have opposite values? 6.NS.5b**
- **How are inequalities used to compare rational numbers? 6.NS.7a, 6.NS.7b**
- **How does absolute value explain positive and negative quantities in the real world? 6.NS.7c, 6.NS.7d**
- How does the sign of a number affect its placement on a number line? 6.NS.6a
- How does the sign of a number affect its placement on a number line? 6.NS.6a
- How does reflecting a point across an axis change values in an ordered pair? 6.NS.6b, 6.NS.6c

- **Reflective**
- What do you know about a negative value?
- How does a number line help you compare and order values?

- How would you explain the opposite of a number to a peer?
- How would you convince a friend that distance is always positive?

Power Standards

- **6.NS.5 Understand positive and negative numbers 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).***
    - **6.NS.5a Use positive and negative numbers to represent quantities in real-world contexts.**
    - **6.NS.5b Explaining the meaning of 0 in each situation.**
- **6.NS.7 Understand ordering and absolute value of rational numbers.**
    - **6.NS.7a 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.***
    - **6.NS.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3*** ℃ ***> -7*** ℃ ***to express the fact that -3*** ℃ ***is warmer than -7*** ℃**.**
    - **6.NS.7c Explain 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.***
    - **6.NS.7d 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.***

Supporting Standards

- 6.NS.6 Understand a rational number as a point on the number line and a coordinate pair as a location on a coordinate plane.

- 6.NS.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.
- 6.NS.6b Recognize signs of numbers in ordered pairs indicate 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.
- 6.NS.6c 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.

Accelerated Math 6
Grade 6

Unit E
Numbers and Operations: Add and Subtract Rational Numbers

Essential Question
How can visuals and models be used to represent the addition and subtraction of rational numbers in our world?

Unit Summary
Students will use models to represent adding and subtracting rational numbers. Students will solve and interpret real-world and mathematical problems involving adding and subtracting rational numbers.

Guiding Questions
Content and Process

- **How can a number line be used to represent addition and subtraction? 7.NS.1**
- **How are models used to prove that opposites combine to 0? 7.NS.1a**
- **How does understanding absolute value help when adding and subtracting rational numbers? 7.NS.1b, 7.NS.1d**
- **How can the additive inverse be used to model the subtraction of rational numbers? 7.NS.1c**
- **How can the properties of operations be used as a strategy to add and subtract rational numbers? 7.NS.1e**

Reflective

- What surprised you when operating with rational numbers?
- Using a model, how would you show a friend how to add and subtract integers?
- Why is it important for me to understand integer operations in the world?

Power Standards

- **7.NS.1. Represent addition and subtraction on a horizontal or vertical number line diagram.**
    - **7.NS.1a. Describe situations in which opposite quantities combine to make 0. Show that a number and its opposite have a sum of 0 (are additive inverses). For example, show zero-pairs with two-color counters. (7.NS.1a)**
    - **7.NS.1b. Show ee+qq as the number located a distance |qq| from p, in the positive or negative direction depending on whether q is positive or negative. (7.NS.1b)**
    - **7.NS.1c Model subtraction of rational numbers as adding the additive inverse, p-q=(-q).**
    - **7.NS.1d Model subtraction as the distance between two rational numbers on the number line, where the distance is the absolute value of their difference.**
    - **7.NS.1e Apply properties of operations as strategies to add and subtract rational numbers.**

Supporting Standards

None

Accelerated Math 6
Grade 6

Unit F
Numbers and Operations: Multiply and Divide Rational Numbers

Essential Question
How can visuals and models be used to represent the multiplication and division of rational numbers in our world?

Unit Summary
Students will use models to represent multiplying and dividing rational numbers. Students will solve and interpret real-world and mathematical problems involving multiplying and dividing rational numbers.

Guiding Questions
Content and Process

- **How is multiplying and dividing negative numbers related to multiplying and dividing positive numbers? 7.NS.2**
- **What patterns are present when multiplying and dividing signed numbers? 7.NS.2a, 7.NS.2b**
- **What methods can be used to convert fractions to decimals? 7.NS.2d**
- **How do the characteristics of a decimal determine it if it is rational? 7.NS.2d**
- **How can operations with rational numbers be used to solve real-world problems? 7.NS.3**
- **How can rational numbers in equivalent forms be used to solve multi-step real-life problems? 7.EE.3**
- **How can estimation be used and mental computation to assess the reasonableness of answers? 7.EE.3**

Reflective

- What surprised you when multiplying and dividing rational numbers?
- Why is it important to understand integer operations in our world?

Power Standards

- **7.NS.2. Apply and extend previous understandings of multiplication and division of positive rational numbers to multiply and divide all rational numbers.**
    - **7.NS.2a. Describe how multiplication is extended from positive rational numbers to all rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers.**
    - **7.NS.2b. Explain that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. Leading to situations such that if *p* and *q* are integers, then $-\left(\frac{p}{q}\right) = \frac{-p}{q} = \frac{p}{-q}$.**
    - **7.NS.2c. Apply properties of operations as strategies to multiply and divide rational numbers.**
    - **7.NS.2d. Convert a rational number in the form of a fraction to its decimal equivalent using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.**
- **7.NS.3. Solve and interpret real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)**
- **7.EE.3. Solve multi-step real-life and mathematical problems with rational numbers. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or $2.50, for a new***

salary of $27.50.

Supporting Standards

None

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Grade 6

Unit G
Expressions and Equations: Algebraic Expressions, Exponents, and Equations with Variables

Essential Question
How can geometric figures and real-world scenarios be represented with algebraic expressions? How can situations be expressed with symbols?

Unit Summary
Students use the distributive property to express sums of whole numbers. Students generate equivalent expressions. Students write and solve equations with variables. Students explore relationships between variables.

Students develop methods to determine the area of polygons. Students visualize, fold, and construct nets made up of rectangles and triangles to determine surface area. Students write and evaluate expressions using variables to represent unknown quantities. Students find the GCF and LCM of whole numbers.

Guiding Questions
Content and Process

- **How are numbers, letters, and operations used to write expressions? 6.EE.2, 6.EE.2a**
- **What are the parts of an expression? 6.EE.2b**
- **How is the conventional Order of Operations used to evaluate expressions? 6.EE.2c**
- **How is the conventional Order of Operations used to evaluate expressions? 6.EE.2c**
- **How are operations used to solve equations? 6.EE.6**
- **How are variables identified in real-world problems? 6.EE.8a**
- **How are equations used to explain the relationship between two variables? 6.EE.8b**
- **How is an equation represented using tables and graphs? 6.EE.8c**

- How are expressions with exponents written and evaluated? 6.EE.1
- How are expressions used to represent real-world problems? 6.EE.5
- What makes a variable independent or dependent? 6.RP.8a
- How are properties of operations used to simplify expressions? 6.EE.3
- How are properties of operations used to simplify expressions? 6.EE.3
- How does substitution prove an equation to be true? 6.EE.4

Reflective

- How can creating nets help you find the surface area of 3D figures?
- How can you tell if a net will work to make a solid?
- How did writing and evaluating expressions help you make sense of real-world scenarios?
- What method is most effective for you in determining the GCF and LCM of two numbers?
- How can you express sums using the distributive property?
- How do symbols help you communicate mathematical ideas?
- How do you know the relationship between variables is the same in your equation, table and graph?

Power Standards

- **6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.**
    - **6.EE.2a Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as*** $5 - y$**.**
    - **6.EE.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. *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.2c 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*** $V = s^3$ ***and*** $A = 6s^2$ ***to find the volume and***

surface area of a cube with sides of length $s = \frac{1}{2}$**.**

- **6.EE.6 Write and solve one-step equations involving non-negative rational numbers using addition, subtraction, multiplication and division.**
- **6.EE.8 Use variables to represent two quantities in a real-world problem that change in relationship to one another.**
    - **6.EE.8a. 6.EE.8b. 6.EE.8c. Identify the independent and dependent variable.**
    - **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. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation** aa **= 65**uu **to represent the relationship between distance and time.**
    - **Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.**

Supporting Standards

- 6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.
- 6.EE.3**.** Apply the properties of operations and combine like terms,
- with the conventions of algebraic notation, to identify and generate equivalent expressions. *For example, apply*
- *the distributive property to the expression 3(2+x) to produce the equivalent expression 6+3x apply properties of operations to y+y+y to produce the equivalent expression 3y.*
- 6.EE.4 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.5 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.

Accelerated Math 6
Grade 6

Unit H
Algebraic Thinking: Expressions, Equations, and Inequalities

Essential Question
How can algebraic concepts be used to represent real-world situations?

Unit Summary
Students will apply and make use of percentages in real-world situations. Students will use all four operations to generate equivalent expressions. Students will write and apply equations or inequalities to real-world situations to find solutions.

Guiding Questions
Content and Process

- **How can rational numbers in equivalent forms be used to solve multi-step real-life problems? 7.EE.3**
- **How can estimation be used and mental computation to assess the reasonableness of answers? 7.EE.3**
- **How can two-step equations and inequalities be used to make sense of real-world situations? 7.EE.4**
- **How can rational numbers in word problems be used to construct equations and solve for unknowns? 7.EE.4a**
- **How can rational numbers in word problems be used to construct inequalities and solve for unknowns? 7.EE.4b**
- **How can the solution set of an inequality be graphed on a number line? 7.EE.4b**
- How does substitution prove an equation to be true? 6.EE.4
- How are the solutions of inequalities represented on a number line? 6.EE.7
- How can the properties be used to add, subtract, factor, and expand linear expressions? 7.EE.1

- How can various forms of expression show how quantities are related? 7. EE.2

- **Reflective**
- What real-world scenario could be used to represent the equation 2x + 3 = 13?
- What are two scenarios where you would use variables in your life?
- How could you explain to a friend how to graph y < 2x+1?
- How can you express sums using the distributive property?
- How do symbols help you communicate mathematical ideas?
- How do you know the relationship between variables is the same in your equation, table and graph?

Power Standards

- **7.EE.3 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, aa + 0.05aa = 1.05aa means that "increase by 5%" is the same as "multiply by 1.05."**
- **7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct two-step equations and inequalities to solve problems by reasoning about the quantities.**
    - **7.EE.4a. Solve word problems leading to equations of the form $eexx$ + qq = ff, and $ee(xx + qq) = ff$ where p, q, and r are specific rational numbers. Solve equations of these forms fluently (efficiently, accurately, and flexibly). Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?**
    - **7.EE.4b. Page | 57 8/20/2019 Solve word problems leading to inequalities of the form $eexx + qq > ff$ or $e\ exx + qq < ff$ where p, q, and r are specific rational numbers and $ee > 0$. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This**

week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

Supporting Standards

- 6.EE.4**.** 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.7 Write an inequality of the form $xx > cc$ *ffff* $xx < cc$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $xx > cc$ *ffff* $xx < cc$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
- 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Note: factoring is limited to integer coefficients. For example: apply the distributive property to the expression $24xx + 18yy$ to produce the equivalent expression $6(4xx + 3yy)$.
- 7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $aa + 0.05aa = 1.05aa$ means that “increase by 5%” is the same as “multiply by 1.05.”

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Unit I
Geometry and Coordinate Plane

Essential Question
How can geometric figures and real-world scenarios be represented with algebraic expressions?

Unit Summary
Students understand how plotting on the coordinate plane helps to find distance. Students develop methods to determine the area of polygons. Students visualize, fold and construct nets made up of rectangles and triangles to determine surface area. Students write and evaluate expressions using variables to represent unknown quantities. Students find the GCF and LCM of whole numbers. Students explore and develop methods to calculate the volume of prisms. Students understand absolute value. Students develop an understanding of how plotting on the coordinate plane helps to find distance.

Guiding Questions
Content and Process

- How does reflecting a point across an axis change values in an ordered pair? 6.NS.6b, 6.NS.6c
- How are points graphed on a coordinate plane? 6.NS.8
- How is absolute value used to calculate distances between points with the same first or second coordinate? 6.NS.8
- How can coordinate points be used to find edge lengths of polygons? 6.G.3
- How does decomposing and rearranging polygons with partial squares help to find the area of polygons? 6.G.1
- How does finding the area of the base help determine the volume of a 3D shape? 6.G.2
- How does a fractional edge impact calculating the volume of a solid? 6.G.2

- 7.G.4
- How do rectangles and triangles represent 3D figures? 6.G.4
- How are 3D figures decomposed to help find surface area? 6.G.4

Reflective

- How can creating nets help you find the surface area of 3D figures?
- How can you tell if a net will work to make a solid?
- How can you express sums using the distributive property?
- How do symbols help you communicate mathematical ideas?
- How do you know the relationship between variables is the same in your equation, table, and graph?
- How would you explain finding the volume of a solid to a friend?
- How would you convince a friend that distance is always positive?

Power Standards

None

Supporting Standards

- 6.NS.6 Understand a rational number as a point on the number line and a coordinate pair as a location on a coordinate plane.
    - 6.NS.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.
    - 6.NS.6b Recognize signs of numbers in ordered pairs indicate 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.
    - 6.NS.6c 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.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.G.1 Find the area of all triangles, special quadrilaterals (including parallelograms, kites and trapezoids), and polygons whose edges meet at right angles (rectilinear figure (See Geometry Progression K-6 Pg. 19 Paragraph 4) 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.2 Find the volume of a right rectangular prism with fractional edge lengths by applying the formulas $V\ V = llwwh\ aaaaaa\ VV = BBh$ (B is the area of the base and h is the height) to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. (Builds on the 5th grade concept of packing unit cubes to find the volume of a rectangular prism with whole number edge lengths.)
- 6.G.3 Draw polygons whose edges meet at right angles (rectilinear figure 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.
- 6.G.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.
- 7.G.4 Use the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

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Unit J
Statistical Thinking: Data Distributions and Measures of Center and Variability

Essential Question
How can measures of center, variability, and shape be used to analyze data?

Unit Summary
Students generate questions that anticipate variability. Students use appropriate measures to analyze data. Students display data visually.

Guiding Questions
Content and Process

- What makes a question statistical? **6.SP.1**
- How are measures of center and spread of data identified? **6.SP.2**
- How can individual numbers be used to summarize the center of data and also its variance? **6.SP.3**
- How are dot plots, stem and leaf plots, box plots, and histograms created from data? **6.SP.4**
- How can data be summarized in reference to the context? **6.SP.5a, 6.SP.5b, 6.SP.5c**
- How does the shape of a data set determine the appropriate measure of center? **6.SP.5d**

Reflective

- How would you define “average”?
- How do you determine when to use the appropriate measure of center?
- What does the shape and spread of data tell you?
- How do visuals help you summarize data?

Power Standards

None

Supporting Standards

- 6.SP.1 Recognize and generate 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.2 Analyze a set of data collected to answer a statistical question with a distribution which can be described by its center (mean, median and/or mode), spread (range and/or interquartile range), and overall shape (cluster, peak, gap, symmetry, skew (data) and/or outlier).
- 6.SP.3 Recognize that a measure of center (mean, median and/or mode) for a numerical data set summarizes all of its values with a single number, while a measure of variation (range and/or interquartile range) describes how its values vary with a single number.
- 6.SP.4 Display numerical data on dot plots, histograms, stem-and-leaf plots, and box plots.
- 6.SP.5 Summarize numerical data sets in relation to their context, such as by:
- 6.SP.5a Reporting the number of observations.
- 6.SP.5b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
- 6.SP.5c Giving quantitative measures of center (mean, median and/or mode) and variability (range and/or interquartile range), 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.
- 6.SP.5d. Relating the choice of measures of center and variability to the distribution of the data.