Mathematics - Grade 6 Pacing Guide

Quarter 1		Quarter 2	
Unit 5 - Ratios and Unit Rates	**Unit 1 - Rational Numbers**	**Unit 2 - Arithmetic and Operations (including dividing by fractions)**	**Unit 4 - Expressions and Equations**
RP1	NS5	NS1	EE1
RP2	NS6	NS2	EE2
RP3	NS7	NS3	EE3
	NS7	NS4	EE4
	EE4		EE5
			EE6
			EE7
			EE9
Approximate 20 days	*Approximate 25 days*	*Approximate 25 days*	*Approximate 45 days*

Quarter 3		Quarter 4	
Unit 4 - Expressions and Equations	**Unit 3 - Area, Surface & Volume**	**Unit 6 - Statistics**	
EE1	RP3	SP1	
EE2	G1	SP2	
EE3	G2	SP3	
EE4	G3	SP4	
EE5	G4	SP5	
EE6	EE2	SP6	
EE7	EE5	SP7	
EE8	EE6	SP8	
EE9	EE7		
Approximate 45 days	*Approximate 25 days*	*Approximate 25 days*	

KPBSD MATH CURRICULUM
6th GRADE
UNIT 1 – RATIONAL NUMBERS

Desired Results

Priority Standards	Transfer

Priority Standards

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 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.

  a. Recognize opposite signs of numbers as indicating locations on opposite sides of on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., and that is its own opposite.

  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.

  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.

Transfer

Students will be able to independently use their learning to…
Apply and extend previous understandings of numbers to the system of rational numbers, compute fluently with multi-digit numbers, and find common factors and multiples.

Meaning

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Students will understand that… - Signs of numbers in ordered pairs as locations in quadrants of the coordinate plane. - The absolute value of a rational number as its distance from zero on the number line.	Students will keep considering… - What are ways we write, interpret, and explain order for rational numbers in real-world contexts? - How can we solve real-world and math problems by graphing points on a coordinate and use coordinates to find distances between points on a coordinate plane?

Acquisition

Students will know…	Students will be skilled at…
- Positive and negative numbers are used together to describe quantities having opposite directions or values. - A rational number as a point on the number line. - The absolute value of a rational number as its distance from zero on a number line - How to interpret statements of inequality as statements about the relative position of two numbers on a number line. - Signs of numbers in ordered pairs indicate locations in quadrants of the coordinate plane. - The difference between comparisons of absolute value from statements about order.	- I can recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognizing that the opposite of the opposite of a number is itself. - I can recognize that when two ordered pairs differ only by signs, the locations will be reflections across one or both axes. - I can find and position integers and other rational numbers on a horizontal or vertical number line diagram. - I can find and position pairs of integers and other rational numbers on a coordinate plane.

KPBSD MATH CURRICULUM
6th GRADE
UNIT 1 – RATIONAL NUMBERS

6.NS.C.7. Understand ordering and absolute value of rational numbers.
  a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
  b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
  c. Understand the absolute value of a rational number as its distance from on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
  d. Distinguish comparisons of absolute value from statements about order.
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.
		• I can interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
		• I can write, interpret, and explain statements of order for rational numbers in real-world contexts.
		• I can interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
		• I can distinguish comparisons of absolute value from statements about order.
		• I can include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Evidence

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):

Learning Plan

EngageNY Module 2 - A Story of Ratios

Math Practices and Vocabulary

KPBSD MATH CURRICULUM
6th GRADE
UNIT 1 – RATIONAL NUMBERS

MP.2. Reason abstractly and quantitatively. Students solve problems by analyzing and comparing ratios and unit rates given in tables, equations, and graphs. Students decontextualize a given constant speed situation, representing symbolically the quantities involved with the formula, distance = rate × time.

MP.4. Model with mathematics. Students use vertical and horizontal number lines to visualize integers and better understand their connection to whole numbers. They divide number line intervals into sub-intervals of tenths to determine the correct placement of rational numbers. Students may represent a decimal as a fraction or a fraction as a decimal to better understand its relationship to other rational numbers to which it is being compared. To explain the meaning of a quantity in a real-life situation (involving elevation, temperature, or direction), students may draw a diagram and/or number line to illustrate the location of the quantity in relation to zero or an established level that represents zero in that situation.

MP.6. Attend to precision. Students define and distinguish between ratio, the value of a ratio, a unit rate, a rate unit, and a rate. Students use precise language and symbols to describe ratios and rates. Students learn and apply the precise definition of percent.

MP.7. Look for and make use of structure. Students recognize the structure of equivalent ratios in solving word problems using tape diagrams. Students identify the structure of a ratio table and use it to find missing values in the table. Students make use of the structure of division and ratios to model 5 miles/2 hours as a quantity 2.5 mph.

Vocabulary

- Absolute value
- Integer
- Magnitude
- Negative number
- Opposite
- Positive number quadrant (description)
- Rational number (description)

KPBSD MATH CURRICULUM
6th GRADE
UNIT 2 – ARITHMETIC AND OPERATIONS INCLUDING DIVISION AND FRACTIONS

Desired Results

Priority Standards	Transfer
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. **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.4.** Find the greatest common factor of two whole numbers less than or equal to and the least common multiple of two whole numbers less than or equal to. 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.	Students will be able to independently use their learning to… Apply and extend previous understandings of multiplication and division to divide fractions by fractions, compute fluently with multi-digit numbers, and find common factors and multiples to solve read-world problems.

Meaning

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Students will understand that… • Contexts and visual models help make the connection between dividing by a fraction and multiplying by the reciprocal of that fraction. • There are relationships between numbers and their multiples. • Properties of operations are used to simplify and fluently compute problems with multi-digit numbers and decimals.	Students will keep considering… • How do models and visuals help me divide and multiply fractions? • How is division related to realistic situations and to the other operations? • What are ways I use estimation to check that my answer is reasonable? • What role does place value play in multi-digit decimal operations?

Acquisition

Students will know…	Students will be skilled at…
• Operations perform the same function on fractions and decimals as they do on whole numbers. • The difference between a whole number being divided by a fraction and a fraction being divided by a whole number. • Standard algorithms improve fluency of addition, subtraction, multiplication, and division with multi-digit numbers and decimals. • Prime factorization is a method for finding greatest common factors (GCF) and least common multiples (LCM).	• I can compute quotients of fractions divided by fractions (including mixed numbers). • I can use visual models such as fraction bars, number lines, and area models to show the quotient of whole numbers and fractions. • I can use models to show the connection between those models and the multiplication of fractions. • I can divide a fraction by a whole number.

KPBSD MATH CURRICULUM
6th GRADE
UNIT 2 – ARITHMETIC AND OPERATIONS INCLUDING DIVISION AND FRACTIONS

Evidence	
Evaluative Criteria	**Assessment Evidence**
	PERFORMANCE TASK(S):

Learning Plan
EngageNY Module 2 - A Story of Ratios

Math Practices and Vocabulary

MP.1. Make sense of problems and persevere in solving them. Students makes sense of and solve real-world and mathematical ratio, rate, and percent problems using representations, such as tape diagrams, ratio tables, and coordinate plane and double number line diagrams.

MP.2. Reason abstractly and quantitatively. Students solve problems by analyzing and comparing ratios and unit rates given in tables, equations, and graphs. Students decontextualize a given constant speed situation, representing symbolically the quantities involved with the formula, distance = rate × time.

MP.6. Attend to precision. Students define and distinguish between ratio, the value of a ratio, a unit rate, a rate unit, and a rate. Students use precise language and symbols to describe ratios and rates. Students learn and apply the precise definition of percent.

MP.7. Look for and make use of structure. Students recognize the structure of equivalent ratios in solving word problems using tape diagrams. Students identify the structure of a ratio table and use it to find missing values in the table. Students make use of the structure of division and ratios to model 5 miles/2 hours as a quantity 2.5 mph.

MP.8. Look for and express regularity in repeated reasoning. Students determine reasonable answers to problems involving operations with decimals. Estimation skills and compatible numbers are used.

Vocabulary

- Greatest common factor
- Least common multiple
- Multiplicative inverses

KPBSD MATH CURRICULUM
6th GRADE
UNIT 3 – AREA, SURFACE AREA, AND VOLUME PROBLEMS

Desired Results

Priority Standards	Transfer

Priority Standards

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.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

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.

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.

Transfer

Students will be able to independently use their learning to…
Solve real-world and mathematical problems involving area, surface area, and volume.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…
- Formulas help measure area and volume of two and three-dimensional shapes.
- There is a process to the development of the formula for the area of a triangle.
- Coordinates that are the same create horizontal or vertical lines.

ESSENTIAL QUESTIONS

Students will keep considering…
- How do models and visuals help me divide and multiply fractions?
- How is division related to realistic situations and to the other operations?
- What are ways I use estimation to check that my answer is reasonable?
- What role does place value play in multi-digit decimal operations?

Acquisition

Students will know…
- Area is the number of squares needed to cover a plane figure.
- The formula for finding the area of a rectangle (multiplying base x height; therefore, the area of the triangle is ½ bh or (b x h)/2.)
- A rectangle can be decomposed into two congruent triangles.
- That the unit cube may have fractional edge lengths. (ie. ½ • ½ • ½)
- Nets can be used to find the surface area of figures.
- That if both x-coordinates are the same (2, - 1) and (2, 4), then a vertical line has been created

Students will be skilled at…
- I can find area of triangles, special quadrilaterals, and polygons.
- I can compose polygons into rectangles.
- I can decompose polygons into triangles.
- I can apply composing and decomposing to find area within real-world and cultural contexts.
- I can describe the relationship between triangles and rectangles when finding area.
- I can explain how to find the area of a triangle and rectangle.
- I can find the volume of a rectangular prism with fractional edge lengths.

	and the distance between these coordinates is the distance between -1 and 4, or 5. • That if both the y-coordinates are the same (-5, 4) and (2, 4), then a horizontal line has been created and the distance between these coordinates is the distance between - 5 and 2, or 7.	• I can show relationship of volume when packing it with unit cubes and multiplying edge lengths. • I can apply formulas to find volumes of right rectangular prisms. • I can draw polygons in a coordinate plane given vertices. • I can use coordinates to find the length of a side and finding the length of a side by joining points. • I can represent three-dimensional figures using nets. • I can use nets to find surface area.

Evidence

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):

Learning Plan

EngageNY Module 2 - A Story of Ratios

Math Practices and Vocabulary

MP.1. Make sense of problems and persevere in solving them. Students make sense of real world problems that involve area, volume, and surface area. One problem involves multiple steps without breaking the problem into smaller, simpler questions. To solve surface area problems, students have to find the area of different parts of the polygon before calculating the total area.

MP.3. Construct viable arguments and critique the reasoning of others. Students develop different arguments as to why area formulas work for different polygons. Through this development, students may discuss and question their peers' thinking processes. When students draw nets to represent right rectangular prisms, their representations may be different from their peers'. Although more than one answer may be correct, students have an opportunity to defend their answers as well as question their peers. Students may also solve real-world problems using different methods; therefore, they may have to explain their thinking and critique their peers.

MP.4. Model with mathematics. Models are used to demonstrate why the area formulas for different quadrilaterals are accurate. Students use unit cubes to build right rectangular prisms and use these to calculate volume. The unit cubes are used to model that $V = lwh$ and $V = bh$, where b represents the

area of the base, and that both are accurate formulas to calculate the volume of a right rectangular prism. Students will use nets to model the process of calculating the surface area of a right rectangular prism.

MP.6. Attend to precision. Students define and distinguish between ratio, the value of a ratio, a unit rate, a rate unit, and a rate. Students use precise language and symbols to describe ratios and rates. Students learn and apply the precise definition of percent.

Vocabulary

- Altitude and base of a triangle
- Cube
- Hexagon
- Line perpendicular to a plane
- Net
- Parallel planes
- Pentagon
- Right rectangular prism
- Surface of a prism
- Triangular region
- Rectangles
- Special quadrilaterals
- Compose
- Decompose
- Polygons
- Right rectangular prism
- Fractional edge lengths
- Unit cubes
- Volume
- Formulas V = l w h and V = b h
- Polygons
- Coordinate plane
- Coordinates
- Points
- Vertices

KPBSD MATH CURRICULUM
6th GRADE
UNIT 4 – EXPRESSIONS AND EQUATIONS

Desired Results	

Priority Standards	**Transfer**
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.	Students will be able to independently use their learning to… Apply and extend previous understandings of arithmetic to algebraic expressions.

	Meaning	

Priority Standards (cont.)	**ENDURING UNDERSTANDINGS**	**ESSENTIAL QUESTIONS**
a. Write expressions that record operations with numbers and with letters standing for numbers. 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. 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). **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.	Students will understand that… • Numerical expressions can be written evaluated using whole number exponents. • Expressions can be written from verbal descriptions using letters and numbers. • The "order of operations" is important. • Properties of operations can be used to generate equivalent expressions. • Solving an equation or inequality is a process of answering questions.	Students will keep considering… • How do I use patterns to understand mathematics and model situations? • What is algebra? • What is the importance of the "order of operations"? • How do algebraic representations relate and compare to one another? • What questions do I ask when solving an equation or inequality?

	Acquisition	
	Students will know… • How to represent and analyze quantitative relationships between dependent and independent variables. • Order is important in writing subtraction and division problems. • Two expressions are equivalent when naming the same number. • Substitution can determine whether a given number in a specified set makes an equation or inequality true. • A variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	Students will be skilled at… • I can write numerical expressions using whole-number exponents. • I can evaluate numerical expressions using whole number exponents. • I can write and read expressions with letters. • I can identify and explain parts of an expression using precise language. • I can evaluate expressions with letters. • I can evaluate expressions at specific values of their variables. • I can perform arithmetic operations in conventional problems. • I can apply the properties of operations.

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 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. **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. **6.NS.2.** Fluently multiply and divide multi-digit whole numbers using the standard algorithm. Express the remainder as a whole number, decimal, or simplified fraction; explain or justify your choice based on the context of the problem.	• That the relationship between two variables begins with the distinction between dependent and independent variables.	• I can generate equivalent expressions. • I can explain why the distributive property works. • I can identify equivalent expressions. • I can explain how expressions are equivalent using precise language. • I can use variables to represent two quantities. • I can write an equation to express the quantity in terms. • I can analyze the relationship between the dependent and independent variables and relating the dependent and independent variables to the equation.

Evidence

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):

Learning Plan

EngageNY Module 2 - A Story of Ratios

KPBSD MATH CURRICULUM
6th GRADE
UNIT 4 – EXPRESSIONS AND EQUATIONS

Math Practices and Vocabulary

MP.2. Reason abstractly and quantitatively. Students solve problems by analyzing and comparing ratios and unit rates given in tables, equations, and graphs. Students decontextualize a given constant speed situation, representing symbolically the quantities involved with the formula, distance = rate × time.

MP.6. Attend to precision. Students define and distinguish between ratio, the value of a ratio, a unit rate, a rate unit, and a rate. Students use precise language and symbols to describe ratios and rates. Students learn and apply the precise definition of percent.

MP.7. Look for and make use of structure. Students recognize the structure of equivalent ratios in solving word problems using tape diagrams. Students identify the structure of a ratio table and use it to find missing values in the table. Students make use of the structure of division and ratios to model 5 miles/2 hours as a quantity 2.5 mph.

MP.8. Look for and express regularity in repeated reasoning. Students look for regularity in a repeated calculation and express it with a general formula. Students work with variable expressions while focusing more on the patterns that develop than the actual numbers that the variable represents. For example, students move from an expression such as $3 + 3 + 3 + 3 = 4 \cdot 3$ to the general form $m + m + m + m = 4 \cdot m$, or $4m$. Similarly, students move from expressions such as $5 \cdot 5 \cdot 5 \cdot 5 = 5^4$ to the general form $m \cdot m \cdot m \cdot m = m^4$. These are especially important when moving from the general form back to a specific value for the variable.

Vocabulary

- Equation
- Equivalent expressions
- Exponential notation for whole number exponents
- Expression
- Linear expression
- Number sentence
- Numerical expression
- Solution of an equation
- Truth Values of a number sentence
- Value of a numerical expression
- Variable

KPBSD MATH CURRICULUM
6th GRADE
UNIT 5 – RATIOS AND UNIT RATES

Desired Results

Priority Standards	**Transfer**
6.RP.1. Write and describe the relationship in real life context between two quantities using ratio language. **6.RP.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) and apply it to solve real-world problems (e.g., unit pricing, constant speed). **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 equations).	Students will be able to independently use their learning to… Use their learning to understand ratios and use ratio reasoning to solve problems.

Meaning	
ENDURING UNDERSTANDINGS	**ESSENTIAL QUESTIONS**
Students will understand that… • A ratio is an ordered pair of numbers which are both not zero. • A ratio is often used instead of describing the first number as a multiple of the second. • The relationship between rates, ratios, and fractions.	Students will keep considering… • What is a ratio? • When and how is a ratio used? • What is the relationship between fractions, decimals, percents, and ratios? • What are ways I represent relationships between two quantities in real life contexts?

Acquisition	
Students will know… • Order matters when writing a ratio. • Ratios can be simplified. • Ratios compare two quantities; the quantities do not need to be the same unit of measure. • Ratios appear in a variety of different contexts: part-to-whole, part to part, and rates. • A ratio is often used to describe the relationship between the amount of quantity and the amount of another quantity. • All ratios associated to a given rate are equivalent because they have the same value. • Conversion tables contain ratios that can be used to convert units of length, weight, or capacity.	Students will be skilled at… • I can use precise language and writing notation of ratios (_:_to _). • I can use and create tables to solve problems. • I can write and solve equations using the value of a ratio. • I can precisely identify the associated rate given a ratio. • I can use tables to compare proportional quantities. • I can plot pairs of values that represent equivalent ratios on the coordinate plane. • I can manipulate and transform units appropriately when multiplying or dividing quantities.

	• Percents are related to part-to-whole ratios and rate where the whole is 100.	• I can model and write percents as a fraction over 100 or a decimal to the hundredths place.

Evidence

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):

Learning Plan

EngageNY Module 1 - A Story of Ratios

Math Practices and Vocabulary

MP.1. Make sense of problems and persevere in solving them. Students make sense of and solve real-world and mathematical ratio, rate, and percent problems using representations, such as tape diagrams, ratio tables, and coordinate plane and double number line diagrams.

MP.2. Reason abstractly and quantitatively. Students solve problems by analyzing and comparing ratios and unit rates given in tables, equations, and graphs. Students decontextualize a given constant speed situation, representing symbolically the quantities involved with the formula, distance = rate × time.

MP.5. Use appropriate tools strategically. Students become proficient using a variety of representations that are useful in reasoning with rate and ratio problems, such as tape diagrams, double line diagrams, ratio tables, a coordinate plane, and equations. They then use judgment in selecting appropriate tools as they solve ratio and rate problems.

MP.6. Attend to precision. Students define and distinguish between ratio, the value of a ratio, a unit rate, a rate unit, and a rate. Students use precise language and symbols to describe ratios and rates. Students learn and apply the precise definition of percent.

MP.7. Look for and make use of structure. Students recognize the structure of equivalent ratios in solving word problems using tape diagrams. Students identify the structure of a ratio table and use it to find missing values in the table. Students make use of the structure of division and ratios to model 5 miles/2 hours as a quantity 2.5 mph.

KPBSD MATH CURRICULUM
6th GRADE
UNIT 5 – RATIOS AND UNIT RATES

Vocabulary

- Equivalent ratios
- Measurement of a quantity
- Percent
- Quantity (illustration)
- Rate (illustration)
- Ratio
- Ratio relationship
- Type of quantity (illustration)
- Unit of measurement
- Unit rate
- Value of a ratio

KPBSD MATH CURRICULUM
6th GRADE
UNIT 6 – STATISTICS

Desired Results	

Priority Standards

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.

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.

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:
 a. Reporting the number of observation.
 b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 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 deviations from the overall pattern with reference to the context in which the data were gathered.
 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.

Transfer

Students will be able to independently use their learning to…
Collect, organize, and display data to communicate and make predictions.

Meaning

ENDURING UNDERSTANDINGS

Students will understand that…
- Variability plays an important role in constructing statistical questions.
- A statistical question is a question that anticipates variability in the data and can help us predict answers.
- Data sets can be displayed in many ways.

ESSENTIAL QUESTIONS

Students will keep considering…
- How can I gather, organize, and display data to communicate and justify results in the real world?
- How can I analyze data to make inferences and/or predictions, based on surveys, experiments, probability, and observational studies?

Acquisition

Students will know…
- A distribution is the arrangement of the values of a data set and can be described using center (median or mean), and spread.
- Data collected can be represented and/or displayed on graphs to show the shape of the distribution of the data.
- The difference between a question and a statistical question.
- Measures of variation are used to describe how the value of a numerical data set varies with a single number.
- Precise mathematical language to describe the results of a statistical question.
- Numerical sets can be displayed in multiple ways.

Students will be skilled at…
- I can recognize and tell the difference between a question and a statistical question.
- I can explain how variability plays a role in statistical questions.
- I can describe the results of a statistical question using precise mathematical language.
- I can recognize the difference between the measure of center and measure of variation.
- I can display data using dot plots, histograms, and box plots.
- I can explain the distribution dependent on which display was used.
- I can summarize numerical data set in multiple ways.

		- I can report the number of observations and describe the nature of an attribute being investigated. - I can identify the measures of center. - I can recognize the variability in a data set. - I can describe overall patterns and deviations within a data set. - I can relate the measure of center and variability to the shape of the distribution and the context.

Evidence

Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):

Learning Plan

EngageNY Module 6 - A Story of Ratios

Math Practices and Vocabulary

MP 1. Make sense of problems and persevere in solving them. Students make sense of real-world problems that involve area, volume, and surface area. One problem involves multiple steps without breaking the problem into smaller, simpler questions. To solve surface area problems, students have to find the area of different parts of the polygon before calculating the total area.

MP.2. Reason abstractly and quantitatively. Students pose statistical questions and reason about how to collect and interpret data in order to answer these questions. Students use graphs to summarize the data and to answer statistical questions.

MP.3. Construct viable arguments and critique the reasoning of others. Students develop different arguments as to why area formulas work for different polygons. Through this development, students may discuss and question their peers' thinking processes. When students draw nets to represent right rectangular prisms, their representations may be different from their peers. Although more than one answer may be correct, students have an opportunity to defend their answers as well as question their peers. Students may also solve real-world problems using different methods; therefore, they may have to explain their thinking and critique their peers.

MP.4. Model with mathematics. Models are used to demonstrate why the area formulas for different quadrilaterals are accurate. Students use unit cubes to build right rectangular prisms and use these to calculate volume. The unit cubes are used to model that $V = lwh$ and $V = bh$, where b represents the

area of the base, and that both are accurate formulas to calculate the volume of a right rectangular prism. Students will use nets to model the process of calculating the surface area of a right rectangular prism.

MP.6. Attend to precision. Students define and distinguish between ratio, the value of a ratio, a unit rate, a rate unit, and a rate. Students use precise language and symbols to describe ratios and rates. Students learn and apply the precise definition of percent.

<u>Vocabulary</u>

- Absolute deviation
- Box plot
- Dot plot
- Frequency
- Interquartile range (iqr)
- Mean
- Mean absolute deviation (mad)
- Median
- Relative frequency
- Relative frequency table
- Variability
- Statistical question
- Set of data
- Distribution
- Center (median or mean) variability (interquartile range and/or mean absolute deviation)
- Spread
- Shape
- Measure of center
- A measure of variation
- Numerical data
- Histogram
- Box plot
- Number line
- Intervals
- Values
- Quartile
- Five-number summary

KPBSD MATH CURRICULUM
6th GRADE
UNIT 6 – STATISTICS

- Distribution
- Numerical data sets
- Attribute
- Units of measure
- Quantitative measures of center (median and/or mean)