2019-2020 Math Pacing Guide: Grade 6

DATES OF UNIT ARE APPROXIMATE, AND SUBJECT TO CHANGE SLIGHTLY

School Calendar 2019-2020					Days
August					**176**
5	6	7	8	9	
12	13	14	15	16	
19	20	21	22	23	
26	27	28	29	30	
September					
2	3	4	5	6	
9	10	11	12	13	
16	17	18	19	20	Unit 1 24 days
23	24	25	26	27	
October					
30	1	2	3	4	
7	8	9	10	11	
14	15	16	17	18	Unit 2 22 days
21	22	23	24	25	
28	29	30	31		
November					
				1	
4	5	6	7	8	
11	12	13	14	15	
18	19	20	21	22	Unit 3 21 days
25	26	27	28	29	
December					
2	3	4	5	6	
9	10	11	12	13	

Big Idea(s) and Topic(s)

*****The pacing included in this document is flexible, and should be adjusted as needed to meet the individual needs of your students, as well as to allow for sufficient time for assessment and re-teaching as needed.**

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

The Number System

• 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.

• Apply and extend previous understandings of numbers to the system of rational numbers.***

Learner Outcomes

- I can use a visual model to represent the division of a fraction by a fraction. S
- I can divide fractions by fractions using an algorithm or mathematical reasoning. S
- I can **justify** the quotient of a division problem by relating it to a multiplication problem. R
- I can use the mathematical reasoning to **justify** the standard algorithm for fraction division. R
- I can solve real world problems involving the division of fractions and **interpret** the quotient in the context of the problem. S
- I can **create** story contexts for problems involving the division of a fraction by a fraction. P

.6.2

- I can use the standard algorithm to fluently divide multi-digit numbers. S

.6.3

- I can fluently add and subtract multi-digit decimals using the standard algorithm. S
- I can fluently multiply multi-digit decimals using the standard algorithm. S
- I can fluently divide multi-digit decimals using the standard algorithm. S

.6.4

- I can find all factors of a given number, less than or equal to 100. S
- I can find the greatest common factor of any two numbers, less than or equal to 100. S
- I can create a list of multiples for any number less than or equal to 12. S
- I can use the distributive property to rewrite a simple addition problem when the addends have a common factor. S

16	17	18	19	20	85

School Calendar

January					
		1	2	3	
6	7	8	9	10	
13	14	15	16	17	Unit 4 31 days
20	21	22	23	24	
27	28	29	30	31	
February					
3	4	5	6	7	
10	11	12	13	14	
17	18	19	20	21	
24	25	26	27	28	Unit 5 28 days
March					
2	3	4	5	6	
9	10	11	12	13	
16	17	18	19	20	Unit 6 21 days
23	24	25	26	27	
April					
30	31	1	2	3	
6	7	8	9	10	
13	14	15	16	17	
20	21	22	23	24	
27	28	29	30		
May					

(These will be used in multiple units.)

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

NS.6.1- 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?***

Compute fluently with multi-digit numbers and find common factors and multiples.

NS.6.2-Fluently divide multi-digit numbers using the standard algorithm.

NS.6.3-Fluently add, subtract, multiply, and divide multi-digit decimals using

.6.5

- I can **describe and give examples** of how positive or negative numbers are used to describe quantities having opposite directions or opposite values. R
- I can recognize at positive and negative signs represent opposite values and/or directions. K
- I can **explain** that the number zero is the point at which direction or value will change. K
- I can use positive and negative numbers along with zero to represent real world situations. S
- I can **show and explain** why every rational number can be represented by a point on a number line R
- I can plot a number and its opposite on a number line and recognize that they are equidistant from zero. K
- I can find the opposite of any given number including zero. K
- I can use the signs of the coordinates to determine the location of an ordered pair in the coordinate plane. K
- I can reason about the location of two ordered pairs that have the same values but different signs. R
- I can plot a point on a number line or coordinate plane. S
- I can read a point from a number line or a coordinate plane. S

NS.6.7

- I can describe the relative position of two numbers on a number line when given an inequality. S
- I can interpret a given inequality in terms of a real world situation. S
- I can define absolute value as it applies to a number line. K
- I can describe absolute value as the magnitude of the number in a real world situation. K
- I can compare between using a signed number and using the absolute value of a signed number when referring to a real world situation. R

NS.6.8

				1	Unit 7 20 days
4	5	6	7	8	Testing
11	12	13	14	15	Testing
18	19	20	21	22	91

Length of Units are approximate only.

the standard algorithm for each operation.

NS.6.4-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).*

Apply and extend previous understandings of numbers to the system of rational numbers.

NS.6.5 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.

NS.6.6a- 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.

- I can graph points in any quadrant of the coordinate plane to solve real-world and mathematical problems. S
- I can use absolute value to find the distance between two points with the same x-coordinate or the same y-coordinate. R

						a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. **NS.6.6b- 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. 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.** **NS6.6c- 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. 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.**	

						NS.6.7a- 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. *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.*** **NS .6.7b Understand ordering and absolute value of rational numbers.** **b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3 oC > –7 oC to express the fact that –3 oC is warmer than –7 oC.*** **NS .6.7c Understand ordering and absolute value of rational numbers.** **c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.*** **NS .6.7d Understand ordering and absolute value of rational numbers.** **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.* **NS.6.8 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.**	
						Ratios and Proportional Relationships **• Understand ratio concepts and use ratio reasoning to solve problems.** **RP.6.1. 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 for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*** **RP.6.2. Understand the concept of a unit rate *a*/*b* associated with a ratio *a*:*b* with $b \neq 0$, 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 15 hamburgers, which is a rate of $5 per hamburger."**1** **RP.6.3. 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.** **a. Make tables of equivalent ratios relating quantities with wholenumber measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.** **b. 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?*** **c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.** **d. Use ratio reasoning to convert measurement units; manipulate and transform**	RP.6.1 • *I can define the term ratio and demonstrate my understanding by giving various examples. K* • *I can write a ratio that describes a relationship between two quantities. S* • *I can explain the relationship that a ratio represents. (R)* *RP.6.2* • I can define the term "unit rate" and demonstrate my understanding by giving various examples. K • I can recognize a ratio written as a unit rate, and give an example of a unit rate. K • I can convert a given ratio to a unit rate. S • I can describe the ratio relationship described by a unit rate. R RP.6.3 • I can solve real world problems involving proportional reasoning by using various diagrams. R • I can create a table of equivalent ratios. S • I can use the proportional relationship to find missing values in a table of equivalent ratios. R • I can compare ratios resented in various tables. R • I can plot corresponding values from an equivalent ratio table on a coordinate grid. S • I can use proportional reasoning to solve unit rate problems. R • I can use visual representations (tape diagrams, one hundred grids, percent bars) to model percents. R • I can write a percent as a rate per one hundred. K • I can use proportional reasoning to find percent of a number. R • I can use proportional reasoning to find the whole when given the part and the percent. R • I can use a ratio as a conversion factor when working with measurement of different units. S

						Expressions and Equations **• Apply and extend previous understandings of arithmetic to algebraic expressions.** **• Reason about and solve one-variable equations and inequalities.** **• Represent and analyze quantitative relationships between dependent and independent variables.** **Apply and extend previous understandings of arithmetic to algebraic expressions.** **EE.6.1. Write and evaluate numerical expressions involving whole-number exponents.** **EE.6.2. Write, read, and evaluate expressions in which letters stand for numbers.** **a. 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.*** **Common Core State Standards for MAT HEMAT ICS** **grade 6 | 44** **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. *For example, describe the***	EE.6.1 ● I can explain the meaning of a number raised to a power. K ● I can write numerical expressions involving whole-number expressions. S ● I can evaluate numerical expressions involving whole number expressions. S

						expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms. **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 wholenumber 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.*** **EE.6.3. 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.*** **EE.6.4. 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***	EE.6.2 • I can translate a relationship given in words into an algebraic expression. S • I can identify parts of an algebraic expression by using correct mathematical terms. K • I can recognize when an expression is representing a sum and/or difference of terms versus a product and/or quotient of terms (the expression 5(x+3) is representing a product of the terms 5 and (x+3) while the expressions 5x+3 is representing a sum of the terms 5x and 3) K • I can recognize an expression as both a single value and as two or more terms on which an operation is performed. R • I can evaluate an algebraic expression for a given value. S • I can substitute values in formulas to solve real-world problems. S • I can apply the order of operations when evaluating both arithmetic and algebraic expressions. S .6.3 • I can create a visual model to show two expressions are equivalent (use algebra tiles to model that 3(2+x)= 6 + 3x) R • I can apply the properties of operations- especially the distributive property- to generate equivalent expressions. S EE.6.4 • I can determine whether two expressions are equivalent by using the same value to evaluate both expressions. S • I can use the properties of operations to justify that two expressions are equivalent. S EE.6.5 • I can explain that solving an equation or inequality leads to finding the value or values of the variable that will make a true mathematical statement. R • I can substitute a given value into an algebraic equation or inequality to determine whether is a part of the solution set. S

						number y stands for. **Reason about and solve one-variable equations and inequalities.** **EE.6.5. 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.** **EE.6.6. 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.** **EE.6.7. 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.** **EE.6.8. 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.** **Represent and analyze quantitative relationships between**	EE.6.6 • I can use a variable to write an algebraic expression that represents a real-world situation when a specific number is unknown. S • I can explain and give examples of how a variable can represent a single unknown number (x=9 or 5 y= 10) or can represent any number in a specified set (m<6 or n + 6 > 10) R • I can use a variable to write an expression that represents a consistent relationship in a particular pattern (use function tables to write an expression that would represent the output for any input) S EE.6.7 • I can solve equations in the form x+ p = q where p and q are given numbers. S • I can solve equations in the form px = q where p and q are given numbers. S • I can write and solve algebraic equations that represent real world problems. S EE.6.8 • I can write a simple inequality to represent the constraints or conditions of numerical values in a real world or mathematical problem. S • I can explain what the solution set of an inequality represents. R • I can show the solution set of an inequality by graphing it on a number line. K

						dependent and independent variables. **EE.6.9. 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.*** **Geometry** **• Solve real-world and mathematical problems involving area, surface area, and volume.** **G.6.1. 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.** **G.6.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction**	• I can create a table of two variables that represents a real world situation in which one quantity will change in relation to the other. S • I can explain the difference between the independent variable and the dependent variable and give examples of both. R • I can determine the independent and dependent variable in a relationship. S • I can write an algebraic equation that represents the relationship between the two variables. S • I can create a graph by plotting the dependent variable on the x axis and the independent variable on the y axis of a coordinate plane. S • I can analyze the relationship between the dependent and independent variables by comparing the table, graph, and equations. R

						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. **G.6.3. 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.** **G.6.4. 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.**	.
						Statistics and Probability **• Develop understanding of statistical variability.** **• Summarize and describe distributions.** **Develop understanding of statistical variability.** SP.6.1. Recognize a statistical question as one that anticipates variability in	• I can show how to find the area of a parallelogram by decomposing it and recomposing the parts to form a rectangle. (S) • I can show how to find the area of a right triangle by composing two of them into a rectangle. (S) • I can show how to find the area of a right triangle by composing two of them into a parallelogram or rectangle or by decomposing the triangle and recomposing its parts to form a parallelogram or rectangle.(S) • I can show how to find the area of a trapezoid by composing two of them into a rectangle or

						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.* SP.6.2. 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. SP.6.3. 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.** SP.6.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. SP.6.5. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. 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	parallelogram or decomposing the trapezoid into a rectangle and one or more triangles. (S) • I can show how to find the area of other polygons by decomposing them into simpler shapes such as triangles, rectangles and parallelograms and combining the areas of those simple shapes.(S) • I can explain the relationship between the formulas for the area of rectangles, parallelograms, triangles, and trapezoids.(R) • I can solve real world problems that involve finding the area of polygons. (S) • I can find the volume of a right rectangular prism by reasoning about the number of unit cubes it takes to cover the first layer of the prism and the number of layers needed to fill the entire prism.(S) • I can generalize finding the volume of a right rectangular prism to the equation V=lwh or V=Bh.(R) • I can solve real world problems that involve finding the volume of right rectangular prisms. (S) **G.6.3** • I can plot vertices in the coordinate plane to draw specific polygons. (S) • I can use the coordinates of the vertices of a polygon to find the length of a specific side.(S) • I can plot points, draw figures, and find lengths on the coordinate plane to solve real world problems. (S) **G.6.4** • I can match a net to the correct right rectangular prism, right triangular prism, right square pyramid, or right tetrahedron. (S) • I can draw a net for a given rectangular prism, right triangular prism, right square pyramid, or right tetrahedron. (S) • I can use a net to find the surface area of a given rectangular prism, right triangular prism, right pyramid, or right tetrahedron.(S) • I can solve real world problems that involve finding the surface area of a rectangular prism, right triangular prism, right square pyramid, or right tetrahedron.(S)

						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. ***Resources: Crosswalk Coach Book*** ***Glencoe Math Course 1*** ***Glencoe Math Course 2*** ***Buckle Down*** ***Big Ideas Math***	**SP.6.1** • I can explain what makes a good statistical question.(R) • I can develop a question that can be used to collect statistical information.(S) **SP.6.2** • I can explain that there are three ways that the distribution of a set of data can be described by its center, spread, and overall shape.(K) • I can describe the center of a set of statistical data in terms of the mean, median, and the mode. (K) • I can describe the spread of a set of statistical data in terms of extremes, clusters, gaps, and outliers. (K) • I can describe the overall shape of the set of data in terms of its symmetry or skewness.(K) **SP.6.3** • I can define a measure of center as a single value that summarizes a data set. (K) • I can find the measures of center by calculating the mean, median, and mode of a set of numerical data. • I can define a measure of variation as the range of the data relative to the measure of center. • I can find measures of variation by calculating the interquartile range or the mean absolute deviation of a set of numerical data (S) **SP.6.4** • I can organize and display data as a line plot or dot plot. (S) • I can organize and display data in a histogram. (S) • I can organize and display data in a box plot. (S) • I can determine the upper and lower extremes, median, and upper and lower quartiles of a set of data and use this information to display the data in a box plot. (S)

							• I can identify the similarities and differences of representing the seam data in a line plot, histogram, or a box plot. (R) • I can decide and explain which type of plot (dot plot, line plot, histogram, or box plot) is the best way to display my data depending on what I want to communicate about the data. (R) **SP.6.5** • I can write a data collection summary that includes the number of observations, what is being investigated, how it is measured, and the units of measurement. (P) • I can determine the measures of center and measures of variability of the collected data. (S) • I can justify the use of a particular measure of center or measure of variability based on the shape of the data. (R) • I can use a measure of center and a measure of variation to draw inferences about the shape of the data distribution. (R) • I can describe overall patterns in the data and how they relate the context of the problem. (R) • I can describe any deviations from the overall pattern and how they relate to the context of the problem. (R)