Select a Course:	Math Grade 8
Teacher:	CORE Math Grade 8
Course:	Math Grade 8
Year:	2016-17
Months:	- All -

August

Grade 8 CCSS8 Operations with Fractions

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Multiplication and division are inverse operations for fractions Addition and Subtractions require common denominators	How is division related to realistic situations and to other operations?		Multiply/Divide fractions Add/Subtract with like denominators Add/Subtract with unlike denominators	

September

Grade 8 CCSS8 Rational and Real Numbers

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Every number has a decimal expansion Any real number can be written in multiple ways	Why is it helpful to write numbers in different ways?	8.EE.A.2 - Expressions and Equations Work with radicals and integer exponents ~ Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that ? 2 is irrational. 8.NS.A.1 - Know that there are numbers that are not rational, and approximate them by rational numbers ~ Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. 8.NS.A.2 - Know that there are numbers that are not rational, and approximate them by rational numbers ~ Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., ?2). CCSS.Math.Practice.MP3 - Construct viable arguments and critique the	Writing fractions as decimals and visa-versa a) See Livebinder Unit 1 “Lesson 1 of 3” Roots and cube roots a) See Livebinder Unit 1 “Lesson 1 of 3” Estimating irrational numbers a) See Livebinder Unit 1 “Lesson 1 of 3” Classifying and comparing real numbers a) See Livebinder Unit 1 “Lesson 1 of 3”	Rational Number Repeating Decimal Terminating Decimal Square Root Cube Root Perfect Square Perfect Cube Radical Sign Irrational Number Real Number

			reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP5 - Use appropriate tools strategically. CCSS.Math.Practice.MP6 - Attend to precision. CCSS.Math.Practice.MP7 - Look for and make use of structure. CCSS.Math.Practice.MP8 - Look for and express regularity in repeated reasoning. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them.		

October

Grade 8 CCSS8 Powers

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
The properties of powers can be determined by writing a numbers in different ways Very large and very small numbers can be written in another form to understand the magnitude of the number	Why is it helpful to write numbers in different ways?	8.EE.A.1 - Expressions and Equations Work with radicals and integer exponents ~ Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 × 3–5 = 3–3 = 1/33 = 1/27. 8.EE.A.3 - Expressions and Equations Work with radicals and integer exponents ~ Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. 8.EE.A.4 - Expressions and Equations Work with radicals and integer exponents ~ Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	Factors, Powers, Positive Exponents, Prime Factorization and Exponential Notation Order of Operations incorporating exponents Multiplying and Dividing Monomials Powers of Monomials Negative Exponents Scientific Notation/Computing with Scientific Notation	Power! Base Exponent Monomial Scientific Notation

November

Grade 8 CCSS8 Solving Equations Part A

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Linear equations can have one, infinitely many, or no solution To maintain equivalence you must do the same thing to both sides of the equal	What is equivalence?	8.EE.C.7 - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Solve linear equations in one variable. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them.	Solving 1- and 2-step Equations a) See Livebinder Unit 2 “Lesson 2” Simplifying algebraic expressions	Multiplicative Inverse Coefficient! Properties Two-Step

sign		CCSS.Math.Practice.MP2 - Reason abstractly and quantitatively. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP7 - Look for and make use of structure.	a) See Livebinder Unit 2 “Lesson 2” Solving multi-step equations a) See Livebinder Unit 2 “Lesson 2”	Equations Null Set Identity

Grade 8 CCSS8 Solving Equations - B. Pythagorean Th.

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Right triangles have a special relationship among the side lengths, which can be represented by a model and a formula The pythagorean theorem can be used to find the missing side lengths on the coordinate plane and in real life The pythagorean theorem and its converse can be proven	How can algebraic concepts be applied to geometry?	8.G.B.6 - Understand and apply the Pythagorean Theorem ~ Explain a proof of the Pythagorean Theorem and its converse. 8.G.B.8 - Understand and apply the Pythagorean Theorem ~ Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. 8.G.B.7 - Understand and apply the Pythagorean Theorem ~ Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP5 - Use appropriate tools strategically. CCSS.Math.Practice.MP7 - Look for and make use of structure. G6-8:1.25 - Use a variety of technology tools (e.g., dictionary, thesaurus, grammar-checker, calculator) to maximize the accuracy of work.	Pythagorean Theorem a) See Livebinder Unit 6 “Lesson 1 of 3” Converse a) See Livebinder Unit 6 “Lesson 1 of 3” Application Questions	Legs Hypotenuse Pythagorean Theorem Converse

December

Grade 8 CCSS8 Equations in two variable/linear relationships

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Unit rates can be explained in graphical representation and algebraic equations	Why are graphs helpful?	8.EE.B.5 - Understand the connections between proportional relationships, lines, and linear equations ~ Graph proportional relationships, interpreting the unit rate as the slope of the graph.	Constant Rate of Change/Slope Writing Equations	Linear Relationship Constant Rate of Change

	The equation y = mx + b is a straight line and the slope and y-intercept are critical to solving real-world problems		Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. 8.F.A.3 - Define, evaluate, and compare functions ~ Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. 8.F.B.4 - Use functions to model relationships between quantities ~ Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. CCSS.Math.Practice.MP2 - Reason abstractly and quantitatively. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP5 - Use appropriate tools strategically. CCSS.Math.Practice.MP7 - Look for and make use of structure. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them.	in Slope Intercept and Direct Variation Form Writing linear equations based off of a table, graph, or words	Slope Rise Run Direct Variation Constant of Variation/Proportionality y-Intercept Slope-Intercept Form x-Intercept Standard Form Point-Slope Form Linear Equation

January

Grade 8 CCSS8 Functions

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
A function is a specific relationship in which each input has a unique output A function can be represented with an algebraic rule Linear functions can be used to represent and generalize real-world situations	How can we model relationships between quantities?	8.F.A.1 - Define, evaluate, and compare functions ~ Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.1 8.F.A.2 - Define, evaluate, and compare functions ~ Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). 8.F.B.5 - Use functions to model relationships between quantities ~ Describe qualitatively the functional	Relations in functions a) See Livebinder Unit 4 “Lesson 2 of 5” Identifying Functions a) See Livebinder Unit 4 “Lesson 2 of 5” Comparing functions a) See Livebinder Unit 4 “Lesson 3 of 5” and “Lesson 4 of 5”	Relation Domain Range Function Function Table Independent Variable Dependent Variable

			relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. 8.EE.C.8 - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Analyze and solve pairs of simultaneous linear equations. 8.EE.C.7a - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). 8.EE.C.7b - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them. CCSS.Math.Practice.MP2 - Reason abstractly and quantitatively. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP7 - Look for and make use of structure.	Create functions and graphs to demonstrate real world applications a) See Livebinder Unit 4 “Lesson 3 of 5” (creating function representations)	Linear Function Continuous Data Discrete Data Qualitative Graphs

February

Grade 8 CCSS8 Systems of Functions

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
The solution to a system of two linear equations is an ordered pair that satisfies both equations Some systems of equations have no solutions (parallel lines) and others have infinitely many solutions (the same line)	How do graphs show equivalence?	8.EE.C.8a - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. 8.EE.C.8b - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Solve systems of two linear equations in two variables algebraically, and estimate solutions by	Systems of equations/problem solving Graphing and solving systems of equations by substitution	System of Equations Substitution

			graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6. 8.EE.C.8c - Analyze and solve linear equations and pairs of simultaneous linear equations ~ Solve real-world and mathematical problems leading to two linear equations in two variables. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP7 - Look for and make use of structure. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them.		

March

Grade 8 CCSS8 Geometric Figures

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
When parallel lines are cut by a transversal, the eight angles created have a special relationship Reflections, transformations, and rotations are actions that produce congruent geometric objects Geometry concepts can be used to algebraically find the measure of missing angles A dilation is a transformation that changes the objects size but not its shape	A) How can algebraic concepts be applied to geometry? B) How can we best show the change in position of a figure?	8.G.A.1 - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Verify experimentally the properties of rotations, reflections, and translations: 8.G.A.3 - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 8.G.A.5 - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. CCSS.Math.Practice.MP2 - Reason abstractly and quantitatively. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP8 - Look for and express regularity in repeated reasoning. CCSS.Math.Practice.MP7 - Look for and make use of structure.	Parallel Lines cut by a transversal Interior and Exterior Angles of Polygons Transformations on the coordinate plane (translations, reflections, dilations) a) See Livebinder Unit 3 “Lesson 1 of 3” (discovering the center of dilation, performing dilations, basic reflections, batman reflection, winking smiley face reflection, clock faces, trace paper rotations, coordinate plane graph paper)	Parallel Lines Perpendicular Lines Transversal Interior Angles Exterior Angles Alternate Interior Angles Alternate Exterior Angles Remote Interior Angles Corresponding Angles Triangle! Polygon Equiangular Regular Polygon Transformation Pre-image Image

			CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them.		Translation Congruent Reflection Line of Reflection Dilation

April

Grade 8 CCSS8 Congruence and Similarity

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Congruent figures have the same size and shape Two similar figures are related by a scale factor, which is the ratio of the lengths of corresponding sides Two shapes are similar if the length of all the corresponding sides are proportional and all corresponding angles are congruent	How can you determine congruence and similarity?	8.G.A.2 - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. 8.G.A.4 - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. 8.EE.B.6 - Understand the connections between proportional relationships, lines, and linear equations ~ Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. 8.G.A.1a - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Lines are taken to lines, and line segments to line segments of the same length. 8.G.A.1b - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Angles are taken to angles of the same measure. 8.G.A.1c - Understand congruence and similarity using physical models, transparencies, or geometry software ~ Parallel lines are taken to parallel lines. CCSS.Math.Practice.MP7 - Look for and make use of structure.	Prove congruence of two figures Similarity after transformations Similar Triangles and Indirect Measurement Slope and Similar Triangles	Corresponding Parts Similar Similar Polygons Scale Factors Indirect Measurement

			CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them. CCSS.Math.Practice.MP2 - Reason abstractly and quantitatively. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics.		

May

Grade 8 CCSS8 Volume and Surface Area

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Object volumes can be calculated with specific formulas Surface Area of objects are the sum of the area of each side	Why are formulas important in math and science?	8.G.C.9 - Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres ~ Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them. CCSS.Math.Practice.MP2 - Reason abstractly and quantitatively. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP6 - Attend to precision. CCSS.Math.Practice.MP7 - Look for and make use of structure. G6-8:1.25 - Use a variety of technology tools (e.g., dictionary, thesaurus, grammar-checker, calculator) to maximize the accuracy of work.	Surface area of cylinders and cones a) See Livebinder Unit 7 Volume of cylinders, cones, and spheres a) See Livebinder Unit 7	Volume Cylinder Composite Solids Cone Sphere Hemisphere Lateral Area Total Surface Area

Grade 8 CCSS8 Statistical Applications

Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
Linear functions ay be used to represent and generalize real situations Some data may be misleading based on representation	How are patterns used when comparing two quantities?	8.SP.A.4 - Investigate patterns of association in bivariate data ~ Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to	Scatter Plots a) See Livebinder Unit 8 Line of Best Fit a) See Livebinder Unit 8 Two-way Tables a) See Livebinder Unit	Bivariate Data Scatter Plots Line of Best Fit Relative Frequency

			describe possible association between the two variables. 8.SP.A.1 - Investigate patterns of association in bivariate data ~ onstruct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. 8.SP.A.2 - Investigate patterns of association in bivariate data ~ Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. 8.SP.A.3 - Investigate patterns of association in bivariate data ~ Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. CCSS.Math.Practice.MP3 - Construct viable arguments and critique the reasoning of others. CCSS.Math.Practice.MP4 - Model with mathematics. CCSS.Math.Practice.MP5 - Use appropriate tools strategically. CCSS.Math.Practice.MP1 - Make sense of problems and persevere in solving them. G6-8:1.16 - Distinguish among different types of charts and graphs, and choose the most appropriate type to represent given data.	8	Two-Way Table

June	Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language
July	Enduring Understandings	Essential Questions	Standards	Knowledge & Skills	Academic Language