Unit 1: Ready Classroom Geometric Figures *Rigid Transformations and Congruence*	8th Grade	4 weeks	SCSD Math 2020
Domain(s): Geometry			8.G
Essential Question(s): How do we best communicate changes in orientation of geometric figures? How do you determine congruence and similarity?			

Cluster(s): ***Understand congruence and similarity using physical models, transparencies or geometry software.***

G.1 Verify experimentally the properties of rotations, reflections, and translations.

Notes: A translation displaces every point in the plane by the same distance (in the same direction) and can be described using a vector. A rotation requires knowing the center/point of rotation and the measure/direction of the angle of rotation. A line reflection requires a line and the knowledge of perpendicular bisectors.

8G.1.a Verify experimentally lines are **mapped to lines,** and line segments to line segments of the same length.

8G.1.b Verify experimentally angles are **mapped** to angles of the same measure.

8G.1.c Verify experimentally parallel lines are **mapped** to parallel lines.

G.2 Know that a two-dimensional figure is congruent to another if the **corresponding angles are congruent and the corresponding sides are congruent. Equivalently, two two dimensional figures are congruent if one is the image of the other after a sequence of rotations, reflections, and translations.** Given two congruent figures, describe a sequence that **maps** the congruence between them **on the coordinate plane.**

G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Note: Lines of reflection are limited to both axes and lines of the form y=k and x=k, where k is a constant. Rotations are limited to 90 and 180 degrees about the origin. Unless otherwise specified, rotations are assumed to be counterclockwise.

Essential Skills: Unit 1	Vocabulary	District Resources
• Successfully identify the different rigid motions of transformational geometry • Draw transformations in the coordinate plane based on a knowledge of rules for transformations • Perform multiple transformations on a geometric figure • Be able to communicate a series of transformations on a given figure and its image drawn on a coordinate plane	• Center of rotation • Corresponding angles • Corresponding sides • Image • Pre-Image • Line of reflection • Reflection • Rigid Transformation • Rotation • Transformation • Translation • Rotational symmetry • Degree • Vertex • X coordinate • Y coordinate • Congruent (≅) • Sequence of Transformations **Academic Vocabulary** • Clockwise • Counter clockwise • Map onto • Reverse order	**Ready Classroom-** Unit 1 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 2: Ready Classroom **Geometric Figures** *Transformations, Similarity, and Angle Relationships*	8th Grade	4 weeks	SCSD **Math 2020**

Domain(s): Geometry 8.G

Essential Question(s): What are some real world applications of proportional relationships?

How do you determine congruence and similarity?

Cluster(s): ***Understand congruence and similarity using physical models, transparencies or geometry software.***

G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Note: Lines of reflection are limited to both axes and lines of the form y=k and x=k, where k is a constant. Rotations are limited to 90 and 180 degrees about the origin. Unless otherwise specified, rotations are assumed to be counterclockwise.

G.4 Know that a two-dimensional figure is similar to another if the **corresponding angles are congruent and the corresponding sides are in proportion. Equivalently, two two-dimensional figures are similar if one is the image of the other after a sequence of rotations, reflections, translations, and dilations.** Given two similar two-dimensional figures, describe a sequence that **maps** the similarity between them **on the coordinate plane.**

Note: With dilation, the center and scale factor must be specified.

8.G.5 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.
e.g. Arrange three copies of the same triangle so that the three angles appear to form a line, and give an argument in terms of transversals why this is so.

Note: This standard does not include formal geometric proof. Multiple representations may be used to demonstrate understanding.

Essential Skills: Unit 2	Vocabulary	District Resources
• Apply the scale factor to a dilation transformation in the coordinate plane • Recognize and understand the angles created from parallel lines cut by a transversal • Apply algebraic equation solving to find missing angles of parallel lines cut by a transversal • Find the measures of interior and exterior angles of polygons using the appropriate formulae • Recognize the characteristics of similarity in triangles • Recognize and understand the angles created from parallel lines cut by a transversal • Apply algebraic equation solving to find missing angles of parallel lines cut by a transversal	• Center of dilation • Dilation • Similar (~) • Congruent (≅) • Ray • Scale factor • Proportional Relationship • Interior angles • Exterior angles • Alternate exterior angles • Alternate interior angles • Corresponding angles • Linear pair • Same-side exterior angles • Same-side interior angles • Transversal • Adjacent angles • Supplementary angles • Vertical angles • Similar triangles • Parallel lines • Transversal **Academic Vocabulary** • Enlarge • Reduce • Statement • Prove • Intersect • Nonadjacent • Related	**Ready Classroom-** Unit 2 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 3: Ready Classroom **Linear Relationships** *Slope, Linear Equations, and Systems*	**8th Grade**	**8 weeks**	**SCSD** **Math 2020**
Domain(s): Expressions and Equations			8.EE
Essential Question(s): How can mathematical ideas be communicated correctly? Why are graphs helpful? What is equivalence? Do all equations lead to a solution?			
Cluster(s): Understand the connections between proportional relationships, lines, and linear equations. **8.EE.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. e.g., Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. **8.EE.6** 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. **Cluster(s): Analyze and solve linear equations and pairs of simultaneous linear equations.** **8.EE.7** Solve linear equations in one variable.			

EE.7.a Recognize when linear equations in one variable have one solution, infinitely many solutions, or no solutions. Give examples and show which of these possibilities is the case by successively transforming the given equation into simpler forms.

EE.7.b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.
Note: This includes equations that contain variables on both sides of the equation.

8.EE.8 Analyze and solve pairs of simultaneous linear equations.

EE.8.a 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. **Recognize when the system has one solution, no solution, or infinitely many solutions.**

EE.8.b Solve systems of two linear equations in two variables **with integer coefficients: graphically, numerically using a table, and algebraically.** Solve simple cases by inspection**.**
e.g., 3x + y = 5 and 3x + y = 6 have no solution because 3x + y cannot simultaneously be 5 and 6.

Notes: Solving systems algebraically will be limited to at least one equation containing at least one variable whose coefficient is 1. Algebraic solution methods include elimination and substitution.

This standard is a fluency expectation for grade 8. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Next Generation Mathematics Learning Standards.

8.EE.8c Solve real-world and mathematical problems involving systems of two linear equations in two variables with integer coefficients. Note: Solving systems algebraically will be limited to at least one equation containing at least one variable whose coefficient is 1.

Essential Skills: Unit 3	Vocabulary	District Resources
● Compute constant rate of change from a table of values ● Recognize that y=mx+b graphs to a line ● Be able to plot a linear function on the coordinate plane from its table of values ● Graph a line from slope intercept form	● Rate of change ● Slope ● Constant of proportionality ● Proportional relationship ● Right triangle ● Unit rate ● Linear equation	**Ready Classroom-** Unit 3 **I-Ready Math Pathways** **Problem-Attic**

● Differentiate between the different forms of an equation of a line ● Match a linear equation to its graph ● Use the slope formula to determine an equation of a line ● Find the slope of a line from a table or graph ● Recognize a direct variation equation ● Solve a system of equations in two variables graphically ● Use the elimination or substitution method to solve a pair of simultaneous equations ● Construct an algebraic solution to a word problem that requires a simultaneous system of equations ● Recognize and understand the properties of addition and multiplication to include associative, commutative, identity, inverse, and zero ● Use inverse operations to solve equations in one variable ● Apply the properties of addition and multiplication to simplify expressions to lead to solutions of linear equations ● Be able to express a literal equation in terms of one variable by applying the properties of addition and multiplication ● Construct algebraic solutions to real life word problems in one variable to include combining like terms, geometric, and consecutive integer scenarios	● Slope-intercept form ● Y-intercept ● Coefficient ● Distributive property ● Like terms ● Perimeter ● Term ● Variable ● Expression ● System of linear equations **Academic Vocabulary** ● Constant ● Define ● Derive ● Undefined ● Times as many ● In terms of ● Infinitely many ● Common ● Context ● Intersection ● Algebraically ● Eliminate ● Substitution ● Determine	**Delta Math** **Edpuzzle**

Unit 4: Ready Classroom Functions *Linear and Nonlinear Relationships*	8th Grade	6 weeks	SCSD Math 2020

Domain(s): **Functions** **8.F**

Essential Question(s): How can we model the relationship between quantities?

What is the best model for mathematical communication?

Cluster(s):

Define, evaluate, and compare functions.

F.1 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.

Notes: Function notation is not required in Grade 8.

The terms domain and range may be introduced at this level; however, these terms are formally introduced in Algebra I (AI-F.IF.1).

F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

e.g., Given a linear function represented by a table of values and a linear function represented by an algebraic equation, determine which function has the greater rate of change.

Note: Function notation is not required in Grade 8.

F.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line. Recognize examples of functions that are linear and non-linear.

e.g., The function $A=s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4), and (3,9), which are not on a straight line. *Note: Function notation is not required in Grade 8*.

Use functions to model relationships between quantities.

F.4 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.

F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described **in a real-world context**.
e.g., where the function is increasing or decreasing or when the function is linear or non-linear.

Essential Skills: Unit 4	Vocabulary	District Resources
● Compare properties of two functions graphically, algebraically, numerically within tables or by verbal descriptions ● Interpret y = mx+b to be the slope of a linear function that graphs to a straight line ● Be able to represent non-linear functions (ie. Exponential, quadratic) ● Construct a function to model a linear relationship between two quantities ● Determine the initial value and rate of change from a verbal word problem, from ordered pairs, or from a graph ● Sketch a graph that demonstrates the qualitative characteristics represented in a verbal scenario ● Describe a graph qualitatively	● Function ● Input (of a function) ● Linear function ● Nonlinear function ● Output (of a function) ● Initial value ● Quadrants ● Qualitative description **Review** ● Factors of a number ● Prime number ● Rate of change and slope ● Supplementary angles **Academic Vocabulary** ● Classify ● Model ● Interval ● Varying	**Ready Classroom-** Unit 4 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 5: Ready Classroom Integer Exponents *Properties and Scientific Notation*	8th Grade	4 weeks	SCSD Math 2020
Domain(s): Expressions and Equations			8.EE
Essential Question(s): How can mathematical ideas be represented? Why is it helpful to write numbers in different ways?			

Cluster(s): Know that there are numbers that are not rational and approximate them by rational numbers. Work with radicals and integer exponents.

EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.

e.g., $3^2 \times 3^{(-5)} = 3^{(-3)} = \frac{1}{(3^3)} = \frac{1}{27}$

EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
e.g., Estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.

EE.4 Perform **multiplication and division** with numbers expressed in scientific notation, including problems where both **standard decimal form** and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.

Essential Skills: Unit 5	Vocabulary	District Resources
● Apply the laws of exponents to simplify expressions to include integer exponents ● Convert standard form to scientific notation (and vice versa) of large and small quantities when posed with real life problems ● Compare numbers in scientific notations by representing them with equivalent magnitude ● Apply mathematical operations (+,-,x,÷) to numbers expressed in scientific notation ● Use technology to interpret and calculate scientific notation	● Base (of a power) ● Evaluate ● Exponent ● Power ● Reciprocal ● Integers ● Power of 10 ● Round ● Scientific notation ● Absolute value **Academic Vocabulary** ● Related Simplify ● Set equal to ● Simplify ● Express ● Mass ● Contiguous ● Molecule	**Ready Classroom-** Unit 5 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 6: Ready Classroom **Real Numbers** *Rational Numbers, Irrational Numbers and the Pythagorean Theorem*	**8th Grade**	**6 weeks**	**SCSD** **Math 2020**
Domain(s): The Number System			8.NS
Expressions and Equations			8.EE
Geometry			8.G
Essential Question(s): How can mathematical ideas be represented?			
Why is it helpful to write numbers in different ways?			
How can algebraic concepts be applied to geometry?			
Why are formulas important in math and science?			
Cluster(s): Know that there are numbers that are not rational and approximate them by rational numbers. Work with radicals and integer exponents. **NS.1** Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion eventually repeats. Know that other numbers that are not rational are called irrational.NS.2. 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. **NS.2** Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions.			

EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. **Know square roots of perfect squares up to 225 and cube roots of perfect cubes up to 125. Know that the square root of a non-perfect square is irrational.**
e.g., The $\sqrt{2}$ is irrational.

Understand and apply the Pythagorean Theorem.

8.G.6 Understand a proof of the Pythagorean Theorem and its converse.

8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

8.G.9 Given the formulas for the volume of cones, cylinders, and spheres, solve mathematical and real-world problems.

Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

8.G.9 Given the formulas for the volume of cones, cylinders, and spheres, solve mathematical and real-world problems.

Essential Skills: Unit 6	New/Review Vocabulary	District Resources
● Classify numbers as rational or irrational ● Be able to convert rational numbers from fraction to decimal to order them according to value ● Differentiate between the subsets of the real number system ● Calculate perfect squares and cubes ● Estimate the square or cube of a given integer ● Solve simple equations using square and cubed rootsSolve word problems using the Pythagorean Theorem ● Connect the Pythagorean theorem to the slope of a line	● Cube root of x ● Perfect cube ● Perfect square ● Square root of x ● Integers ● Inverse operations ● Product ● Surface area ● Rational number ● Repeating decimals ● Terminating decimals ● Irrational number ● Real number ● Pi (π) ● Pythagorean Theorem	**Ready Classroom-** Unit 6 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

● Use the Pythagorean Theorem to derive the distance formula in the coordinate plan ● Calculate the volume and surface area of three dimensional figures ● Find the value of a missing dimension of a three dimensional figure	● Converse of the Pythagorean Theorem ● Right triangle ● Hypotenuse ● Legs (of a right triangle) ● Multiple ● Right rectangular prism ● Cone ● Sphere ● Cylinder ● Prism ● Radius (of a circle) ● Vertex ● Volume **Academic Vocabulary** ● Substitute ● Eventually ● Approximate (adjective) ($\approx$) ● Approximate (verb) ● Approximation ● Exact ● Proof ● Prove ● Consider ● Circular ● Cylindrical ● Spherical	

Unit 7: Ready Classroom Statistics *Two Variable Data and Fitting a Linear Model*	8th Grade	4 weeks	SCSD Math 2020
Domain(s): Statistics and Probability			8.SP
Essential Question(s): How are patterns used to compare two quantities? How are trends in data used to predict outcomes?			

Cluster(s):

Investigate patterns of association in bivariate data.

SP.1 Construct 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.

SP.2 **Understand** 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.

SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
e.g., In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.

SP.4 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 describe possible association between the two variables

Essential Skills	Vocabulary	District Resources
● Construct a scatter plot from a bivariate data table ● Interpret trends of data from a scatter plot ● Recognize positive,negative, or no correlations of a bivariate set of data ● Complete a two-way table from a verbal scenario ● Successfully answer questions posed from a scatter plot and/or two way table of bivariate data ● Model a line of best fit given a scatter plot and/or a table of values ● Connect the slope of a line and a linear equation of best fit to scatter plot correlation ● Determine the line of best fit for a bivariate data set	● Association (between two variables) ● Balance Point ● Bivariate ● Line of fit ● Linear association ● Nonlinear association ● Negative association ● Positive association ● No association ● Scatter plot ● Data **Academic Vocabulary** ● Shape (of data)	**Ready Classroom-** Unit 7 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**