i-Ready Classroom Mathematics

to the

California Common Core State Standards for Mathematics

Grade 8

California Common Core State Standards for Mathematics Grade 8		i-Ready Classroom Mathematics Lessons Grade 8
Grade 8		
8.NS	**The Number System**	
	Know that there are numbers that are not rational, and approximate them by rational numbers.	
8.NS.1	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.	**Lesson 24:** Express Rational Numbers as Fractions and Decimals **Lesson 25:** Find Rational Approximations of Irrational Numbers
8.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 (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*	**Lesson 25**: Find Rational Approximations of Irrational Numbers **Supporting Content:** Lesson 27: Apply the Pythagorean Theorem; Lesson 28: Solve Problems with Volumes of Cylinders, Cones, and Spheres **Math in Action**: pp. 679–687
8.EE	**Expressions and Equations**	
	Work with radicals and integer exponents.	
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27.$	**Lesson 19**: Apply Exponent Properties for Positive Integer Exponents **Lesson 20:** Apply Exponent Properties for All Integer Exponents **Supporting Content:** Lesson 21: Express Numbers Using Integer Powers of 10; Lesson 22: Work with Scientific Notation **Math in Action**: pp. 541–549

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8.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. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.	**Lesson 23:** Find Square Roots and Cube Roots to Solve Problems **Lesson 25**: Find Rational Approximations of Irrational Numbers **Supporting Content**: Lesson 26: Understand the Pythagorean Theorem and Its Converse; Lesson 27: Apply the Pythagorean Theorem **Math in Action**: pp. 679–687
8.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. *For example, estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109, and determine that the world population is more than 20 times larger.*	**Lesson 21:** Express Numbers Using Integer Powers of 10 **Supporting Content:** Lesson 22: Work with Scientific Notation **Math in Action**: pp. 541–549
8.EE.4	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.	**Lesson 22**: Work with Scientific Notation **Supporting Content:** Lesson 21: Express Numbers Using Integer Powers of 10 **Math in Action**: pp. 541–549

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	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. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed*.	**Lesson 8**: Graph Proportional Relationships and Define Slope **Lesson 17**: Compare Different Representations of Functions **Supporting Content:** Lesson 9: Derive and Graph Linear Equations of the Form $y = mx + b$ **Math in Action**: pp. 331–339; 431–439
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.	**Lesson 8**: Graph Proportional Relationships and Define Slope **Lesson 9**: Derive and Graph Linear Equations of the Form $y = mx + b$ **Supporting Content:** Lesson 15: Understand Functions; Lesson 16: Use Functions to Model Linear Relationships
	Analyze and solve linear equations and pairs of simultaneous linear equations.	
8.EE.7	Solve linear equations in one variable.	
8.EE.7.a	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).	**Lesson 11:** Determine the Number of Solutions to One-Variable Equations **Supporting Content:** Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically **Math in Action**: pp. 331–339

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8.EE.7.b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	**Lesson 10:** Solve Linear Equations in One Variable **Supporting Content:** Lesson 9: Derive and Graph Linear Equations of the Form $y = mx + b$; Lesson 11: Determine the Number of Solutions to One-Variable Equations; Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically; Lesson 14: Represent and Solve Problems with Systems of Linear Equations; Lesson 24: Express Rational Numbers as Fractions and Decimals **Math in Action**: pp. 331–339
8.EE.8	Analyze and solve pairs of simultaneous linear equations.	
8.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.	**Lesson 12**: Understand Systems of Linear Equations in Two Variables **Supporting Content:** Lesson 13: Solve Systems of Linear Equations Algebraically; Lesson 14: Represent and Solve Problems with Systems of Linear Equations **Math in Action**: pp. 331–339
8.EE.8.b	Solve systems of two linear equations in two variables algebraically, and estimate solutions by 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.*	**Lesson 12**: Understand Systems of Linear Equations in Two Variables **Lesson 13:** Solve Systems of Linear Equations Algebraically **Supporting Content:** Lesson 14: Represent and Solve Problems with Systems of Linear Equations **Math in Action**: pp. 331–339

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8.EE.8.c	Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair .*	**Lesson 14:** Represent and Solve Problems with Systems of Linear Equations **Supporting Content:** Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically **Math in Action**: pp. 331–339
8.F	**Functions**	
	Define, evaluate, and compare functions.	
8.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.	**Lesson 15**: Understand Functions **Supporting Content:** Lesson 17: Compare Different Representations of Functions **Math in Action**: pp. 431–439
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*	**Lesson 17**: Compare Different Representations of Functions **Supporting Content:** Lesson 16: Use Functions to Model Linear Relationships **Math in Action**: pp. 431–439
8.F.3	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. *For example, 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.*	**Lesson 15:** Understand Functions **Supporting Content:** Lesson 9: Derive and Graph Linear Equations of the Form $y = mx + b$; Lesson 16: Use Functions to Model Linear Relationships; Lesson 17: Compare Different Representations of Functions; Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data **Math in Action**: pp. 431–439

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	Use functions to model relationships between quantities.	
8.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.	**Lesson 16**: Use Functions to Model Linear Relationships **Supporting Content**: Lesson 12: Understand Systems of Linear Equations in Two Variables; Lesson 13: Solve Systems of Linear Equations Algebraically; Lesson 14: Represent and Solve Problems with Systems of Linear Equations; Lesson 17: Compare Different Representations of Functions; Lesson 18: Analyze Functional Relationships Qualitatively; Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data **Math in Action**: pp. 431–439
8.F.5	Describe qualitatively the functional 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.	**Lesson 18:** Analyze Functional Relationships Qualitatively **Supporting Content:** Lesson 16: Use Functions to Model Linear Relationships; Lesson 17: Compare Different Representations of Functions; Lesson 29: Analyze Scatter Plots and Fit a Linear Model to Data **Math in Action**: pp. 431–439
8.G	**Geometry**	
	Understand congruence and similarity using physical models, transparencies, or geometry software.	
8.G.1	Verify experimentally the properties of rotations, reflections, and translations:	
8.G.1.a	Lines are taken to lines, and line segments to line segments of the same length.	**Lesson 1**: Understand Rigid Transformations and Their Properties **Supporting Content:** Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 3: Work with Sequences of Transformations and Congruence **Math in Action**: pp. 65–73

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8.G.1.b	Angles are taken to angles of the same measure.	**Lesson 1**: Understand Rigid Transformations and Their Properties **Supporting Content:** Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 3: Work with Sequences of Transformations and Congruence
8.G.1.c	Parallel lines are taken to parallel lines.	**Lesson 1**: Understand Rigid Transformations and Their Properties **Supporting Content**: Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 3: Work with Sequences of Transformations and Congruence
8.G.2	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.	**Lesson 3:** Work with Sequences of Transformations and Congruence **Supporting Content:** Lesson 1: Understand Rigid Transformations and Their Properties; Lesson 2: Work with Single Rigid Transformations in the Coordinate Plane; Lesson 6: Describe Angle Relationships; Lesson 7: Describe Angle Relationships in Triangles **Math in Action**: pp. 65–73
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	**Lesson 2:** Work with Single Rigid Transformations in the Coordinate Plane **Lesson 3:** Work with Sequences of Transformations and Congruence **Lesson 5:** Perform and Describe Transformations Involving Dilations **Supporting Content:** **Math in Action**: pp. 65–73; 159–167

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8.G.4	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.	**Lesson 4**: Understand Dilations and Similarity **Lesson 5**: Perform and Describe Transformations Involving Dilations **Supporting Content:** Lesson 7: Describe Angle Relationships in Triangles; Lesson 8: Graph Proportional Relationships and Define Slope **Math in Action**: pp. 159–167
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. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*	**Lesson 6:** Describe Angle Relationships **Lesson 7:** Describe Angle Relationships in Triangles **Supporting Content**: Lesson 8: Graph Proportional Relationships and Define Slope; Lesson 10: Solve Linear Equations in One Variable **Math in Action**: pp. 159–167
	Understand and apply the Pythagorean Theorem.	
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.	**Lesson 26**: Understand the Pythagorean Theorem and Its Converse **Supporting Content**: Lesson 27: Apply the Pythagorean Theorem
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.	**Lesson 27:** Apply the Pythagorean Theorem **Supporting Content:** Lesson 28: Solve Problems with Volumes of Cylinders, Cones, and Spheres **Math in Action**: pp. 679–687
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**Lesson 27:** Apply the Pythagorean Theorem

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	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	**Lesson 28:** Solve Problems with Volumes of Cylinders, Cones, and Spheres **Supporting Content**: **Math in Action**: pp. 679–687
8.SP	**Statistics and Probability**	
	Investigate patterns of association in bivariate data.	
8.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.	**Lesson 29:** Analyze Scatter Plots and Fit a Linear Model to Data **Supporting Content**: Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data **Math in Action**: pp. 779–787
8.SP.2	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.	**Lesson 29:** Analyze Scatter Plots and Fit a Linear Model to Data **Supporting Content**: Lesson 30: Write and Analyze an Equation for Fitting a Linear Model to Data **Math in Action**: pp. 779–787
8.SP.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, 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.*	**Lesson 30:** Write and Analyze an Equation for Fitting a Linear Model to Data **Supporting Content:** Lesson 16: Use Functions to Model Linear Relationships **Math in Action**: pp. 779–787

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8.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. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*	**Lesson 31**: Understand Two-Way Tables **Lesson 32**: Construct and Interpret Two-Way Tables **Supporting Content**: **Math in Action**: pp. 779–787