COMMON CORE STATE STANDARDS TO BOOK CORRELATION

After a standard is introduced, it is revisited many times in subsequent activities, lessons, and exercises.

Domain: The Number System

Standards

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.

- **Section 6.3** Approximating Square Roots

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.

- **Section 6.3** Approximating Square Roots
- **Lesson 6.3b** Real Numbers
- **Section 6.4** Simplifying Square Roots

Domain: Expressions and Equations

Standards

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

- **Section 9.1** Exponents
- **Section 9.2** Product of Powers Property
- **Section 9.3** Quotient of Powers Property
- **Section 9.4** Zero and Negative Exponents

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 $\sqrt{2}$ is irrational.

- **Section 6.1** Finding Square Roots
- **Section 6.2** The Pythagorean Theorem
- **Section 6.3** Approximating Square Roots
- **Lesson 6.3b** Real Numbers
- **Section 6.5** Using the Pythagorean Theorem

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.

- **Section 9.5** Reading Scientific Notation
- **Section 9.6** Writing Scientific Notation
- **Lesson 9.6b** Scientific Notation

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. Interpret scientific notation that has been generated by technology.

- **Section 9.5** Reading Scientific Notation
- **Section 9.6** Writing Scientific Notation
- **Lesson 9.6b** Scientific Notation

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.

- **Section 1.5** Converting Units of Measure
- **Section 2.2** Slope of a Line
- **Lesson 4.4b** Comparing Rates

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 2.2b** Triangles and Slope
- **Section 2.3** Graphing Linear Equations in Slope-Intercept Form
- **Section 2.4** Graphing Linear Equations in Standard Form
- **Section 3.1** Writing Equations in Slope-Intercept Form
- **Section 3.2** Writing Equations Using a Slope and a Point
- **Section 3.4** Solving Real-Life Problems

8.EE.7 Solve linear equations in one variable.

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).

- **Section 1.1** Solving Simple Equations
- **Section 1.2** Solving Multi-Step Equations
- **Section 1.3** Solving Equations with Variables on Both Sides
- **Lesson 1.3b** Solutions of Linear Equations
- **Section 8.1** Writing and Graphing Inequalities
- **Section 8.2** Solving Inequalities Using Addition or Subtraction
- **Section 8.3** Solving Inequalities Using Multiplication or Division
- **Section 8.4** Solving Multi-Step Inequalities

b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

- **Section 1.1** Solving Simple Equations
- **Section 1.2** Solving Multi-Step Equations
- **Section 1.3** Solving Equations with Variables on Both Sides
- **Lesson 1.3b** Solutions of Linear Equations
- **Section 1.4** Rewriting Equations and Formulas
- **Section 8.1** Writing and Graphing Inequalities
- **Section 8.2** Solving Inequalities Using Addition or Subtraction
- **Section 8.3** Solving Inequalities Using Multiplication or Division
- **Section 8.4** Solving Multi-Step Inequalities

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

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.

- **Section 2.1** Graphing Linear Equations
- **Section 2.5** Systems of Linear Equations
- **Section 2.6** Special Systems of Linear Equations
- **Section 2.7** Solving Equations by Graphing
- **Section 3.5** Writing Systems of Linear Equations

b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.

- **Section 2.5** Systems of Linear Equations
- **Section 2.6** Special Systems of Linear Equations
- **Section 2.7** Solving Equations by Graphing
- **Section 3.5** Writing Systems of Linear Equations

c. Solve real-world and mathematical problems leading to two linear equations in two variables.

- **Section 2.5** Systems of Linear Equations
- **Section 2.6** Special Systems of Linear Equations
- **Section 2.7** Solving Equations by Graphing
- **Section 3.5** Writing Systems of Linear Equations

Domain: Functions

Standards

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.

- **Section 4.1** Domain and Range of a Function
- **Section 4.2** Discrete and Continuous Domains
- **Section 4.3** Linear Function Patterns
- **Section 4.4** Comparing Linear and Nonlinear Functions

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

- **Section 4.1** Domain and Range of a Function
- **Section 4.2** Discrete and Continuous Domains
- **Section 4.3** Linear Function Patterns
- **Section 4.4** Comparing Linear and Nonlinear Functions
- **Lesson 4.4b** Comparing Rates

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.

- **Section 4.3** Linear Function Patterns
- **Section 4.4** Comparing Linear and Nonlinear Functions

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.

- **Section 3.2** Writing Equations Using a Slope and a Point
- **Section 3.3** Writing Equations Using Two Points
- **Section 3.4** Solving Real-Life Problems
- **Section 4.3** Linear Function Patterns

8.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 verbally.

- **Section 4.4** Comparing Linear and Nonlinear Functions

Domain: Geometry

Standards

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

a. Lines are taken to lines, and line segments to line segments of the same length.

- **Topic 1** Transformations

b. Angles are taken to angles of the same measure.

- **Topic 1** Transformations

c. Parallel lines are taken to parallel lines.

- **Topic 1** Transformations

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.

- **Topic 1** Transformations

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

- **Topic 1** Transformations

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.

- **Topic 1** Transformations

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.

- **Section 5.1** Classifying Angles
- **Section 5.2** Angles and Sides of Triangles
- **Section 5.3** Angles of Polygons
- **Section 5.4** Using Similar Triangles
- **Section 5.5** Parallel Lines and Transversals

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

- **Section 6.2** The Pythagorean Theorem
- **Section 6.5** Using 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.

- **Section 6.2** The Pythagorean Theorem
- **Section 6.5** Using the Pythagorean Theorem

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

- **Section 6.5** Using the Pythagorean Theorem

8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

- **Topic 2** Volume

Domain: Statistics and Probability

Standards

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.

- **Section 7.1** Measures of Central Tendency
- **Section 7.2** Box-and-Whisker Plots
- **Section 7.3** Scatter Plots and Lines of Best Fit
- **Section 7.4** Choosing a Data Display

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.

- **Section 7.3** Scatter Plots and Lines of Best Fit

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.

- **Section 2.1** Graphing Linear Equations
- **Section 7.3** Scatter Plots and Lines of Best Fit

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.

- **Lesson 7.3b** Two-Way Tables