

# COMMON CORE STATE STANDARDS TO BOOK CORRELATION

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

## Conceptual Category: Number and Quantity

### Domain: The Real Number System

- 7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
- Describe situations in which opposite quantities combine to make 0.
    - Section 2.3** Multiplying and Dividing Rational Numbers
  - Understand  $p + q$  as the number located a distance  $|q|$  from  $p$ , in the positive or negative direction depending on whether  $q$  is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
    - Section 1.2** Adding Integers
    - Section 1.6** The Coordinate Plane
    - Section 2.2** Adding and Subtracting Rational Numbers
  - Understand subtraction of rational numbers as adding the additive inverse,  $p - q = p + (-q)$ . Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
    - Section 1.3** Subtracting Integers
    - Section 2.2** Adding and Subtracting Rational Numbers
  - Apply properties of operations as strategies to add and subtract rational numbers.
    - Section 1.2** Adding Integers
    - Section 1.3** Subtracting Integers
    - Section 2.2** Adding and Subtracting Rational Numbers
    - Section 2.3** Multiplying and Dividing Rational Numbers
- 7.NS.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
- Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as  $(-1)(-1) = 1$  and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
    - Section 1.4** Multiplying Integers
    - Section 2.3** Multiplying and Dividing Rational Numbers

- b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If  $p$  and  $q$  are integers, then  $-(p/q) = (-p)/q = p/(-q)$ . Interpret quotients of rational numbers by describing real-world contexts.
- **Section 1.5** Dividing Integers
  - **Section 2.1** Rational Numbers
  - **Section 2.3** Multiplying and Dividing Rational Numbers
- c. Apply properties of operations as strategies to multiply and divide rational numbers.
- **Section 1.4** Multiplying Integers
  - **Section 1.5** Dividing Integers
  - **Section 2.3** Multiplying and Dividing Rational Numbers
- d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- **Section 2.1** Rational Numbers
- 7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.
- **Section 1.2** Adding Integers
  - **Section 1.3** Subtracting Integers
  - **Section 1.4** Multiplying Integers
  - **Section 1.5** Dividing Integers
  - **Section 2.2** Adding and Subtracting Rational Numbers
  - **Section 2.3** Multiplying and Dividing 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.
- **Section 12.3** 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 12.3** Approximating Square Roots
  - **Section 12.4** Simplifying Square Roots
- 8.EE.1** Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- **Section 13.1** Exponents
  - **Section 13.2** Product of Powers Property
  - **Section 13.3** Quotient of Powers Property
  - **Section 13.4** 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 12.1** Finding Square Roots
- **Section 12.2** The Pythagorean Theorem
- **Section 12.3** Approximating Square Roots
- **Section 12.4** Simplifying Square Roots
- **Section 12.5** 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 13.5** Reading Scientific Notation
- **Section 13.6** Writing 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 13.5** Reading Scientific Notation
- **Section 13.6** Writing Scientific Notation

## Domain: Quantities

**7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

- **Section 3.1** Ratios and Rates

**7.RP.2** Recognize and represent proportional relationships between quantities.

a. Decide whether two quantities are in a proportional relationship.

- **Section 3.3** Proportions
- **Section 3.4** Writing Proportions
- **Section 3.5** Solving Proportions
- **Section 3.7** Direct Variation
- **Section 3.8** Inverse Variation

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

- **Section 3.1** Ratios and Rates
- **Section 3.2** Slope
- **Section 3.5** Solving Proportions
- **Section 3.7** Direct Variation
- **Section 10.4** Slope of a Line

c. Represent proportional relationships by equations.

- **Section 3.7** Direct Variation

- d. Explain what a point  $(x, y)$  on the graph of a proportional relationship means in terms of the situation, with special attention to the points  $(0, 0)$  and  $(1, r)$  where  $r$  is the unit rate.

- **Section 3.5** Solving Proportions
- **Section 3.7** Direct Variation

**7.RP.3** Use proportional relationships to solve multistep ratio and percent problems.

- **Section 3.6** Converting Measures Between Systems
- **Section 3.7** Direct Variation
- **Section 4.1** The Percent Equation
- **Section 4.2** Percents of Increase and Decrease
- **Section 4.3** Discounts and Markups
- **Section 4.4** Simple Interest
- **Topic 3** Converting Units of Measure

## Conceptual Category: Algebra

### Domain: Seeing Structure in Expressions

**7.EE.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

- **Section 2.5** Solving Equations Using Multiplication or Division

**7.EE.2** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

- **Section 2.5** Solving Equations Using Multiplication or Division
- **Section 4.3** Discounts and Markups

**7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

- **Section 1.1** Integers and Absolute Value
- **Section 1.2** Adding Integers
- **Section 1.3** Subtracting Integers
- **Section 1.4** Multiplying Integers
- **Section 1.5** Dividing Integers
- **Section 2.1** Rational Numbers
- **Section 2.2** Adding and Subtracting Rational Numbers
- **Section 2.3** Multiplying and Dividing Rational Numbers
- **Section 4.1** The Percent Equation
- **Section 4.2** Percents of Increase and Decrease
- **Section 4.3** Discounts and Markups
- **Section 4.4** Simple Interest

- 7.EE.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- Solve word problems leading to equations of the form  $px + q = r$  and  $p(x + q) = r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
    - Section 2.4** Solving Equations Using Addition or Subtraction
    - Section 2.5** Solving Equations Using Multiplication or Division
    - Section 2.6** Solving Two-Step Equations
  - Solve word problems leading to inequalities of the form  $px + q > r$  or  $px + q < r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.
    - Section 2.6** Solving Two-Step Equations

### **Domain:** Reasoning with Equations and Inequalities

- 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 3.2** Slope
  - Section 3.7** Direct Variation
  - Topic 4** 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  $b$ .
- Section 10.5** Linear Functions
  - Topic 7** Triangles and Slope
- 8.EE.7** Solve linear equations in one variable.
- 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 2.4** Solving Equations Using Addition or Subtraction
    - Section 2.5** Solving Equations Using Multiplication or Division
    - Section 2.6** Solving Two-Step Equations
    - Section 10.1** Solving Multi-Step Equations
    - Section 10.2** Solving Equations with Variables on Both Sides
    - Section 10.3** Solving Equations Using Tables and Graphs
  - Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
    - Section 2.4** Solving Equations Using Addition or Subtraction
    - Section 2.5** Solving Equations Using Multiplication or Division

- **Section 2.6** Solving Two-Step Equations
- **Section 10.1** Solving Multi-Step Equations
- **Section 10.2** Solving Equations with Variables on Both Sides
- **Section 10.3** Solving Equations Using Tables and Graphs

## Conceptual Category: Geometry

### Domain: Congruence

- 7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- **Section 5.5** Translations
  - **Section 5.6** Reflections
  - **Section 5.7** Rotations
  - **Topic 2** Geometry
- 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.
    - **Section 5.5** Translations
    - **Section 5.6** Reflections
    - **Section 5.7** Rotations
    - **Topic 5** Transformations
  - b. Angles are taken to angles of the same measure.
    - **Section 5.5** Translations
    - **Section 5.6** Reflections
    - **Section 5.7** Rotations
    - **Topic 5** Transformations
  - c. Parallel lines are taken to parallel lines.
    - **Section 5.5** Translations
    - **Section 5.6** Reflections
    - **Section 5.7** Rotations
    - **Topic 5** 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.
- **Section 5.5** Translations
  - **Section 5.6** Reflections
  - **Section 5.7** Rotations
  - **Topic 5** 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 11.1** Classifying Angles
- **Section 11.2** Angles and Sides of Triangles
- **Section 11.3** Angles of Polygons
- **Section 11.4** Using Similar Triangles
- **Section 11.5** Parallel Lines and Transversals

## **Domain:** Similarity, Right Triangles, and Trigonometry

**7.G.1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

- **Section 5.1** Identifying Similar Figures
- **Section 5.2** Perimeters and Areas of Similar Figures
- **Section 5.3** Finding Unknown Measures in Similar Figures
- **Section 5.4** Scale Drawings

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

- **Section 5.5** Translations
- **Section 5.6** Reflections
- **Section 5.7** Rotations
- **Topic 5** 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 5** 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 11.1** Classifying Angles
- **Section 11.2** Angles and Sides of Triangles
- **Section 11.3** Angles of Polygons
- **Section 11.4** Using Similar Triangles
- **Section 11.5** Parallel Lines and Transversals

## **Domain:** Geometric Measurement and Dimensions

- 7.G.3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
- **Section 6.1** Drawing 3-Dimensional Figures
  - **Topic 2** Geometry
- 7.G.4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- **Section 6.2** Surface Areas of Prisms
  - **Section 6.3** Surface Areas of Cylinders
  - **Section 6.5** Surface Areas of Cones
  - **Section 6.6** Surface Areas of Composite Solids
  - **Section 7.2** Volumes of Cylinders
  - **Section 7.4** Volumes of Cones
  - **Section 7.5** Volumes of Composite Solids
  - **Section 7.6** Surface Areas and Volumes of Similar Solids
- 7.G.5** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- **Topic 1** Angles
- 7.G.6** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
- **Section 6.2** Surface Areas of Prisms
  - **Section 6.3** Surface Areas of Cylinders
  - **Section 6.4** Surface Areas of Pyramids
  - **Section 6.5** Surface Areas of Cones
  - **Section 6.6** Surface Areas of Composite Solids
  - **Section 7.1** Volumes of Prisms
  - **Section 7.2** Volumes of Cylinders
  - **Section 7.3** Volumes of Pyramids
  - **Section 7.4** Volumes of Cones
  - **Section 7.5** Volumes of Composite Solids
  - **Section 7.6** Surface Areas and Volumes of Similar Solids
- 8.G.9** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
- **Section 7.2** Volumes of Cylinders
  - **Section 7.4** Volumes of Cones
  - **Topic 6** Volumes of Spheres



## **Conceptual Category:** Statistics and Probability

### **Domain:** Making Inferences and Justifying Conclusions

- 7.SP.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- **Section 8.1** Stem-and-Leaf Plots
  - **Section 8.2** Histograms
  - **Section 8.3** Circle Graphs
  - **Section 8.4** Samples and Populations
- 7.SP.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- **Section 8.1** Stem-and-Leaf Plots
  - **Section 8.2** Histograms
  - **Section 8.3** Circle Graphs
  - **Section 8.4** Samples and Populations
- 7.SP.3** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- **Section 8.4** Samples and Populations
- 7.SP.4** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
- **Section 8.4** Samples and Populations

## Domain: Conditional Probability and the Rules of Probability

- 7.SP.5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around  $\frac{1}{2}$  indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- **Section 9.1** Introduction to Probability
- 7.SP.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- **Section 9.3** Experimental Probability
- 7.SP.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
    - **Section 9.2** Theoretical Probability
  - Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
    - **Section 9.2** Theoretical Probability
- 7.SP.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
    - **Section 9.4** Independent and Dependent Events
  - Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language, identify the outcomes in the sample space which compose the event.
    - **Section 9.4** Independent and Dependent Events
  - Design and use a simulation to generate frequencies for compound events.
    - **Section 9.4** Independent and Dependent Events