Chapter 12: Statistics

12.1 Scatter Plots........8.SP.A.1 ☐

12.2 Modeling Linear Associations........8.SP.A.2 ☐, 8.SP.A.3 ☐

12.3 Two-Way Tables........8.SP.A.4 ☐

CCSS	CCSS Descriptor	Section Number
8.NS.A.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.	1.1, 1.2, 1.3▲
8.NS.A.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.*	1.2
8.EE.A.1 ■	Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3_2 \times 3_{-5} = 3_{-3} = 1/3_3 = 1/27$.	2.1, 2.2, 2.3, 2.4, 2.5
8.EE.A.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.	2.6
8.EE.A.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* $3 \times 10_8$ *and the population of the world as* $7 \times 10_9$*, and determine that the world population is more than 20 times larger.*	3.1, 3.3
8.EE.A.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.	3.2
8.EE.B.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.*	5.5
8.EE.B.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*.	5.1, 5.2, 5.3, 5.4
8.EE.C.7 ■	Solve linear equations in one variable.	4.1, 4.2, 4.3, 4.4, 4.5▲
8.EE.C.7a ■	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).	4.2
8.EE.C.7b ■	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	4.1, 4.3, 4.4, 4.5▲

8.EE.C.8 ■	Analyze and solve pairs of simultaneous linear equations.	6.1, 6.2, 6.3, 6.4, 6.5
8.EE.C.8a ■	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.	6.1, 6.4
8.EE.C.8b ■	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.	6.2, 6.5
8.EE.C.8c ■	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.	6.3
8.F.A.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.	7.1, 7.2
8.F.A.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.*	7.4
8.F.A.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.	7.3
8.F.B.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.	7.3
8.F.B.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.	7.3
8.G.A.1 ■	Verify experimentally the properties of rotations, reflections, and translations:	9.5
8.G.A.1a ■	Lines are taken to lines, and line segments to line segments of the same length.	9.5
8.G.A.1b ■	Angles are taken to angles of the same measure.	9.5
8.G.A.1c ■	Parallel lines are taken to parallel lines.	9.5

8.G.A.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.	10.3
8.G.A.3 ■	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	9.1, 9.2, 9.3, 9.4
8.G.A.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.	10.3
8.G.A.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.*	10.2
8.G.B.6 ■	Explain a proof of the Pythagorean Theorem and its converse.	8.1
8.G.B.7 ■	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	8.1, 8.3
8.G.B.8 ■	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	8.2
8.G.C.9 ○	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	11.1, 11.2, 11.3, 11.4, 11.5
8.SP.A.1 □	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.	12.1
8.SP.A.2 □	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.	12.2
8.SP.A.3 □	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. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*	12.3
8.SP.A.4 □	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. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*	12.4