K-Prep 8th Grade Mathematics Blueprint

Sadlier *Progress Mathematics and Progress Monitor Benchmark Assessments*
Correlated to the Kentucky Department of Education **K-Prep 8th Grade Mathematics Blueprint**

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics**	
					# of Items	% of Test
The Number System, Expressions and Equations		25–30%			30	43%
Know that there are numbers that are not rational, and approximate them by rational numbers.					5	7%
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 1	Understand Rational and Irrational Numbers—pp. 10–17	3	
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* $\sqrt{2}$*, show that* $\sqrt{2}$ *is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*		Lesson 2	Use Rational Approximations of Irrational Numbers—pp. 18–25	2	
Work with radicals and integer exponents.					8	11%
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 3	Understand Zero and Negative Exponent—pp. 32–39	2	
			Lesson 4	Learn Properties of Exponents—pp. 40–47		
			Lesson 5	Use Properties of Exponents Generate Equivalent Expressions—pp. 48–55		

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

K-Prep 8th Grade Mathematics Blueprint

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics** # of Items	% of Test
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.		Lesson 6	Evaluate Square Roots and Cube Roots—pp. 56–63	2	
			Lesson 7	Solve Simple Equations Involving Squares and Cubes—pp. 64–71		
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 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.*		Lesson 8	Estimate and Compare Large or Small Quantities—pp. 72–79	2	
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 9	Calculate with Numbers in Scientific Notation—pp. 80–87	2	
Understand the connections between proportional relationships, lines, and linear equations.					4	6%
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 10	Understand Proportional Relationships and Slope—pp. 88–95	2	
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 11	Understand Slope—pp. 96–103	2	
			Lesson 12	Write Equations for Lines—pp. 104–111		

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

K-Prep 8th Grade Mathematics Blueprint

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics**	
					# of Items	% of Test
Analyze and solve linear equations and pairs of simultaneous linear equations.					13	19%
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).		Lesson 13	Solve Linear Equations—pp. 112–119	2	
	b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.		Lesson 13	Solve Linear Equations—pp. 112–119	2	
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.		Lesson 14	Solve Systems of Equations—pp. 120–127	3	
	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 14	Solve Systems of Equations—pp. 120–127	3	
	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 15	Problem-Solving: Systems of Equations—pp. 128–135	3	

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.
* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

K-Prep 8th Grade Mathematics Blueprint

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics** # of Items	Sadlier *Progress Monitor Benchmark Assessments: Mathematics** % of Test
Functions		20–25%			14	20%
Define, evaluate, and compare functions.					8	11%
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.[1] [1]Function notation is not required in grade 8.		Lesson 16 Lesson 17	Understand Functions—pp. 142–149 Represent Functions—pp. 150–157	3	
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 Lesson 18	Represent Functions—pp. 150–157 Compare Functions—pp. 158–165	3	
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 19	Investigate Linear and Non-Linear Functions—pp. 166–173	2	
Use functions to model relationships between quantities.					6	9%
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 20 Lesson 21	Use Functions to Model Relationships—pp. 174–181 Problem Solving: Use Linear Models—pp. 182–189	3	

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

K-Prep 8th Grade Mathematics Blueprint

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics** # of Items	% of Test
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 22	Analyze Graphs of Functions—pp. 190–197	3	
Geometry		25–30%			25	36%
Understand congruence and similarity using physical models, transparencies, or geometry software.					17	24%
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.		Lesson 23	Verify Properties of Reflections and Translations—pp. 204–211	1	
			Lesson 24	Verify Properties of Rotations—pp. 212–219		
	b. Angles are taken to angles of the same measure.		Lesson 23	Verify Properties of Reflections and Translations—pp. 204–211	2	
			Lesson 24	Verify Properties of Rotations—pp. 212–219		
	c. Parallel lines are taken to parallel lines.		Lesson 23	Verify Properties of Reflections and Translations—pp. 204–211	2	
			Lesson 24	Verify Properties of Rotations—pp. 212–219		
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 25	Understand and Identify Congruent Figures—pp. 220–227	3	

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

K-Prep 8th Grade Mathematics Blueprint

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics** # of Items	% of Test
8.G.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 26	Reflect and Translate Figures on the Coordinate Plane—pp. 228–235	3	
			Lesson 27	Rotate Figures on the Coordinate Plane—pp. 236–243		
			Lesson 28	Dilate Figures on the Coordinate Plane—pp. 244–251		
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 29	Identify Similar Figures—pp. 252–259	3	
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 30	Establish Facts about Parallel Lines and Angles—pp. 260–265	3	
			Lesson 31	Establish Facts about Triangles and Angles—pp. 266–275		
Understand and apply the Pythagorean Theorem.					6	9%
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.		Lesson 32	Understand the Pythagorean Theorem—pp. 276–283	2	
			Lesson 33	Understand the Converse of the Pythagorean Theorem—pp. 284–291		
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 34	Problem Solving: The Pythagorean Theorem—pp. 292–299	2	
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.		Lesson 35	Calculate Distances in the Coordinate Plane—pp. 300–307	2	

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

K-Prep 8th Grade Mathematics Blueprint

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics**	
					# of Items	% of Test
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.					2	3%
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 36	Learn and Apply Volume Formulas—pp. 308–315	2	
Statistics and Probability		20–25%			10	14%
Investigate patterns of association in bivariate data.					10	14%
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 37	Construct and Interpret Scatter Plots—pp. 322–329	2	
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 38	Fit Linear Models to Data—pp. 330–337	3	
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 39	Problem Solving: Use Linear Models—pp. 338–345	3	
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 *— continued on next page —*		Lesson 40	Analyze Data in Two-Way Tables—pp. 346–353	2	

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.

Domain, Cluster, Kentucky Academic Standard		Target %	Sadlier *Progress Mathematics* Grade 8		Sadlier *Progress Monitor Benchmark Assessments: Mathematics**	
					# of Items	% of Test
	— *continued from previous page* — 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?*					

Benchmark Assessments are also available in an interactive format in *iProgress Monitor Mathematics. iProgress Monitor* includes a Build an Assessment feature to customize assessments using a standards-aligned item bank.

* Sadlier *Progress Monitor Benchmark Assessments: Mathematics* includes four Benchmarks with 70 items each; 6 of 70 items in each Benchmark assess more than one standard.