Creve Coeur School District 76
Mathematics

Grade 8

Mathematical Practices

Students will be able to demonstrate the following practices at the cognitive level of this grade:

- *Make sense of problems and persevere in solving them.*
- *Reason abstractly and quantitatively.*
- *Construct viable arguments and critique the reasoning of others.*
- *Model with mathematics.*
- *Use appropriate tools strategically.*
- *Attend to precision.*
- *Look for and make use of structure.*
- *Look for and express regularity in repeated reasoning.*

Number System

Content	District Code	Essential Skill	Instructional Mastery			
			1	2	3	4
Number Sense Irrational. *ILS10 8.NS.2*	*8.NS.1*	Define irrational numbers.	I			M
	8.NS.2	Approximate irrational numbers as rational numbers.				M
	8.NS.3	Approximately locate irrational numbers on a number line.				M
	8.NS.4	Estimate the value of expressions involving irrational numbers using rational approximations. (For example, by truncating the decimal expansion of the square root of two, show that the square root of two is between one and two, then between 1.4 and 1.5, and explain how to continue on to get better approximations.).				M
	8.NS.5	Compare the size of irrational numbers using rational approximations.				M
Number Sense Rational. *ILS10 8.NS.1*	*8.NS.6*	Show that the decimal expansion of rational numbers repeats eventually.				M
	8.NS.7	Convert a decimal expansion which repeats eventually into a rational number.				M
	8.NS.8	Show informally that every number has a decimal expansion.				M

Content	District Code	Essential Skill	Instructional Mastery			
			1	2	3	4
Radicals and Integer Exponents Equivalent Expressions with Exponents. *ILS10 8.EE.1*	*8.EE.1*	Explain and apply the properties of integer exponents to generate equivalent numerical expressions. (e.g., $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$).				M
Exponents Evaluating Radicals. *ILS10 8.EE.2*	*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.				M
	8.EE.3	Evaluate square roots of small perfect squares.				M
Radicals and Integer Exponents Scientific Notation. *ILS10 8.EE.3* *ILS10 8.EE.4*	*8.EE.4*	Express numbers as a single digit times an integer power of ten. (Write numbers in scientific notation).				M
	8.EE.5	Use scientific notation to estimate very large and/or very small quantities.				M
	8.EE.6	Compare quantities (written in scientific notation) to express how much larger one is compared to the other.				M
	8.EE.7	Perform operations using numbers expressed in scientific notations.				M
	8.EE.8	Interpret scientific notation that has been generated by technology				M
	8.EE.9	Choose appropriate units of measure when using scientific notation.				M
Proportional Relationships, Lines, and Linear Equations Connections. *ILS10 8.EE.5* *ILS10 8.EE.6*	*8.EE.10*	Graph proportional relationships.		I	M	
	8.EE.11	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.)		I	M	
	8.EE.12	Interpret the unit rate of proportional relationships as the slope of the graph.		I	M	
	8.EE.13	Find the slope of a line		I	M	
	8.EE.14	Determine the y-intercept of a line.		I	M	

Note: Instructional Mastery indicates the quarter in which students are expected to have mastered the skill.

Creve Coeur School District 76
Mathematics

	8.EE.15	Interpret unit rate as the slope of the graph.		I	M	
	8.EE.16	Analyze patterns for points on a line through the origin.		I	M	
	8.EE.17	Derive an equation of the form y = mx for a line through the origin.		I	M	
	8.EE.18	Analyze patterns for points on a line that do not pass through or include the origin.		I	M	
	8.EE.19	Derive an equation of the form y=mx + b for a line intercepting the vertical axis at b (the y-intercept).		I	M	
	8.EE.20	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.		I	M	
Linear Equations Analysis. *ILS10 8.EE.7*	*8.EE.21*	Give examples of linear equations with one variable and one solution to show that the given example equation has one solution by successively transforming the equation into an equivalent equation of the form x = a.	I	M		
	8.EE.22	Give examples of linear equations with one variable and infinitely many solutions to show that the given example has infinitely many solutions by successively transforming the equation into an equivalent equation of the form a = a.	I	M		
	8.EE.23	Give examples of linear equations with one variable and no solution to show that the given example has no solution by successively transforming the equation into an equivalent equation of the form b = a, where a and b are different numbers.	I	M		
Linear Equations Solving. *ILS10 8.EE.7*	*8.EE.24*	Solve linear equations with rational number coefficients.		I	M	
	8.EE.25	Solve equations whose solutions require expanding expressions using the distributive property and/ or collecting like terms.		I	M	
Linear Equations Simultaneous. *ILS10 8.EE.8*	*8.EE.26*	Identify the solution(s) to a system of two linear equations in two variables as the point(s) of intersection of their graphs.		I	M	
	8.EE.27	Describe the point(s) of intersection between two lines as points that satisfy both equations simultaneously.		I	M	
Linear Equations Systems of Equations. *ILS10 8.EE.8*	*8.EE.28*	Define “inspection”.		I	M	
	8.EE.29	Identify cases in which a system of two equations with two unknowns has no solution.		I	M	
	8.EE.30	Identify cases in which a system of two equations with two unknowns has an infinite number of solutions.		I	M	
	8.EE.31	Solve a system of two equations (linear) with two unknowns algebraically.		I	M	
	8.EE.32	Solve simple cases of systems of two linear equations with two variables by inspection.		I	M	
	8.EE.33	Estimate the point(s) of intersection for a system of two equations with two unknowns by graphing the equations.		I	M	
	8.EE.34	Solve real world and mathematical problems leading to two linear equations in two variables.		I	M	
Content	**District Code**	**Essential Skills**	**Instructional Mastery**			
			1	**2**	**3**	**4**
Functions Define, Evaluate, and Compare. *ILS10 8.F.1* *ILS10 8.F.2*	*8.F.1*	Define a function as a rule that assigns to each input exactly one output.		I	M	
	8.F.2	Graph a function as a set of ordered pairs consisting of an input and the corresponding output.		I	M	
	8.F.3	Identify functions algebraically including slope and y intercept.		I	M	
	8.F.4	Identify functions using graphs.		I	M	
	8.F.5	Identify functions using tables.		I	M	
	8.F.6	Identify functions using verbal descriptions.		I	M	
	8.F.7	Compare and contrast two functions with different representations.		I	M	
	8.F.8	Draw conclusions based on different representations of functions.		I	M	
Functions Linear v. Non-linear. *ILS10 8.F.2* *ILS10 8.F.3*	*8.F.9*	Recognize that a linear function is graphed as a straight line.		I	M	
	8.F.10	Recognize the equation y=mx+b is the equation of a function whose graph is a straight line where m is the slope and b is the y-intercept.		I	M	
	8.F.11	Provide examples of nonlinear functions using multiple representations.		I	M	
	8.F.12	Compare the characteristics of linear and nonlinear functions using various representations.		I	M	
Functions Modeling Relationships. *ILS10 8.F.4*	*8.F.13*	Recognize that slope is determined by the constant rate of change.		I	M	
	8.F.14	Recognize that the y-intercept is the initial value where x=0.		I	M	
	8.F.15	Determine the rate of change from two (x,y) values, a verbal description, values in a table, or graph.		I	M	
	8.F.16	Determine the initial value from two (x,y) values, a verbal description, values in a table, or graph.		I	M	
	8.F.17	Construct a function to model a linear relationship between two quantities.		I	M	
	8.F.18	Relate the rate of change and initial value to real world quantities in a linear function in terms of the situation modeled and in terms of its graph or a table of values.		I	M	
Functions Analysis. *ILS10 8.F.5*	*8.F.19*	Analyze a graph and describe the functional relationship between two quantities using the qualities of the graph.		I	M	
	8.F.20	Sketch a graph given a verbal description of its qualitative features.		I	M	

Note: Instructional Mastery indicates the quarter in which students are expected to have mastered the skill.

Creve Coeur School District 76
Mathematics

	8.F.21	Interpret the relationship between x and y values by analyzing a graph.		I	M	
Content	**District Code**	**Essential Skill**	**Instructional Mastery**			
			1	**2**	**3**	**4**
Transformations *ILS10 8.G.1*	*8.G.1*	Define & identify rotations, reflections, and translations.				M
	8.G.2	Identify corresponding sides & corresponding angles.				M
	8.G.3	Use prime notation to describe an image after a translation, reflection, or rotation.				M
	8.G.4	Identify center of rotation.				M
	8.G.5	Identify direction and degree of rotation.				M
	8.G.6	Identify line of reflection.				M
	8.G.7	Use physical models, transparencies, or geometry software to verify the properties of rotations, reflections, and translations (i.e.. Lines are taken to lines and line segments to line segments of the same length, angles are taken to angles of the same measure, & parallel lines are taken to parallel lines)				M
Congruency *ILS10 8.G.2*	*8.G.8*	Define congruency.				M
	8.G.9	Identify symbols for congruency.				M
	8.G.10	Apply the concept of congruency to write congruent statements.				M
	8.G.11	Reason that a two-dimensional figure is congruent to another if the second can be obtained by a sequence of rotations, reflections, or translations.				M
	8.G.12	Describe the sequence of rotations, reflections, translations that exhibits the congruence between two-dimensional figures using words.				M
Dilation *ILS10 8.G.3*	*8.G.13*	Define dilations as a reduction or enlargement of a figure.				M
	8.G.14	Identify scale factor of the dilation.				M
	8.G.15	Describe the effects of dilations, translations, rotations, & reflections on two-dimensional figures using coordinates.				M
Similarity. *ILS10 8.G.4*	*8.G.16*	Define similar figures as corresponding angles are congruent and corresponding sides are proportional.				M
	8.G.17	Recognize symbol for similar.				M
	8.G.18	Apply the concept of similarity to write similarity statements.				M
	8.G.19	Reason that a two-dimensional figure is similar to another if the second can be obtained by a sequence of rotations, reflections, translation, or dilation.				M
	8.G.20	Describe the sequence of rotations, reflections, translations, or dilations that exhibits the similarity between two-dimensional figures using words and/or symbols.				M
Angle relationships. *ILS10 8.G.4* *ILS10 8.G.5*	*8.G.21*	Define similar triangles				M
	8.G.22	Define and identify transversals				M
	8.G.23	Identify angles created when parallel line is cut by transversal (alternate interior, alternate exterior, corresponding, vertical, adjacent, etc.)				M
	8.G.24	Justify that the sum of interior angles equals 180. (e.g., arrange three copies of the same triangle so that the three angles appear to form a line.)				M
	8.G.25	Justify that the exterior angle of a triangle is equal to the sum of the two remote interior angles.				M
	8.G.26	Use angle-angle criterion to prove similarity among triangles. (Give an argument in terms of transversals why this is so.)				M
Pythagorean Theorem Concept. *ILS10 8.G.6*	*8.G.27*	Define key vocabulary: square root, Pythagorean Theorem, right triangle, legs a & b, hypotenuse, sides, right angle, converse, base, height, proof.				M
	8.G.28	Be able to identify the legs and hypotenuse of a right triangle.				M
	8.G.29	Explain a proof of the Pythagorean Theorem.				M
	8.G.30	Explain a proof of the converse of the Pythagorean Theorem.				M
Pythagorean Theorem Application. *ILS10 8.G.7* *ILS10 8.G.8*	*8.G.31*	Solve basic mathematical Pythagorean theorem problems and its converse to find missing lengths of sides of triangles in two and three-dimensions.				M
	8.G.32	Apply Pythagorean theorem in solving real-world problems dealing with two and three-dimensional shapes.				M
	8.G.33	Determine how to create a right triangle from two points on a coordinate graph.				M

Note: Instructional Mastery indicates the quarter in which students are expected to have mastered the skill.

	8.G.34	Use the Pythagorean Theorem to solve for the distance between the two points.				M
Volume. *ILS10 8.G.9*	*8.G.35*	Identify and define vocabulary: cone, cylinder, sphere, radius, diameter, circumference, area, volume, pi, base, height.		I		M
	8.G.36	Identify formulas for volume of cones, cylinders, and spheres.		I		M
	8.G.37	Compare the volume of cones, cylinders, and spheres.		I		M
	8.G.38	Determine and apply appropriate volume formulas in order to solve mathematical and real-world problems for the given shape.		I		M
	8.G.39	Find the radii, height, or approximate for π, given the volume of a cone, cylinder, or sphere.		I		M
Content	**District Code**	**Essential Skill**	**Instructional Mastery**			
			1	**2**	**3**	**4**
Bivariate Data Patterns and Displays. *ILS10 8.SP.1*	*8.SP.1*	Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.			I	M
	8.SP.2	Construct scatter plots for bivariate measurement data			I	M
	8.SP.3	Interpret scatter plots for bivariate (two different variables such as distance and time) measurement data to investigate patterns of association between two quantities.			I	M
Bivariate Data Modeling. *ILS10 8.SP.2*	*8.SP.4*	Model relationships between two quantitative variables using straight lines.			I	M
	8.SP.5	Informally assess the model fit by judging the closeness of the data points to the line.			I	M
	8.SP.6	Fit a straight line within the plotted data.			I	M
Bivariate Data Linear Equations. *ILS10 8.SP.3*	*8.SP.7*	Find the slope and intercept of a linear equation.		I	M	
	8.SP.8	Interpret the meaning of the slope and intercept of a linear equation in terms of the situation. (e.g., 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.)		I	M	
	8.SP.9	Solve problems using the equation of a linear model.		I	M	
Bivariate Data Analysis. *ILS10 8.SP.4*	*8.SP.10*	Recognize patterns shown in comparison of two sets of data.		I	M	
	8.SP.11	Construct a two-way table.		I	M	
	8.SP.12	Interpret the data in the two-way table to recognize patterns. (e.g., 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?) .		I	M	
	8.SP.13	Use relative frequencies of the data to describe relationships (positive, negative, or no correlation).			I	M

Note: Instructional Mastery indicates the quarter in which students are expected to have mastered the skill.