2014 Mathematics Grade 8 Performance Level Descriptors

Level	Basic	Proficient	Advanced
Policy Level Descriptors	Marginal academic performance, work approaching, but not yet reaching, satisfactory performance, indicating partial understanding and limited display of the knowledge and skills included in the Wyoming Content and Performance Standards.	Satisfactory academic performance indicating a solid understanding and display of the knowledge and skills included in the Wyoming Content and Performance Standards.	Superior academic performance indicating an in-depth understanding and exemplary display of the knowledge and skills included in the Wyoming Content and Performance Standards.
Domain	The Number System		
Range PLD: Cluster A - Know that there are numbers that are not rational and approximate them by rational numbers.	Basic students identify numbers as being rational or irrational (8.NS.1);		
		Proficient students determine the repeating decimal expansion for a rational number and determine the rational number from a repeating decimal expansion (8.NS.1);	
		Proficient students determine that a non-repeating decimal expansion represents an irrational number (8.NS.2).	Advanced students use approximation strategies with rational numbers to identify and compare the estimated values of irrational numbers with respect to a real number line (8.NS.2).

Level	Basic	Proficient	Advanced
Domain	**Expressions and Equations**		
Range PLD: Cluster B - Work with radicals and integer exponents.	Basic students apply the properties of integer exponents with only positive integers involving one operation (8.EE.1);	Proficient students apply the properties of integer exponents with integers to generate equivalent numerical expressions (8.EE.1);	Advanced students apply the properties of integer exponents with integers involving multiple negative exponents (8.EE.1);
	Basic students represent solutions with either square root or cube root symbols for x in the equations $x^2 = p$ and $x^3 = p$ when p is a whole number (8.EE.2);	Proficient students represent solutions with both square root and cube root symbols for x in the equations $x^2 = p$ and $x^3 = p$ when p is a positive rational number (8.EE.2);	Advanced students represent solutions of two-step equations with both square root and cube root symbols for x in the equations $x^2 + a = p$ and $x^3 + a = p$ when a and p are rational numbers and $p - a$ is greater than 0;
		Proficient students evaluate square roots of perfect squares up to 144 and cube roots of perfect cubes up to 1,000 (8.EE.2);	
	Basic students express numbers in scientific notation (8.EE.3).	Proficient students compare or multiply/divide two numbers in scientific notation (8.EE.4);	Advanced students compare or apply the four operations (+, -, x, and ÷) between two or more numbers in scientific notation (8.EE.4).
		Proficient students choose units of appropriate size for measurements of very large or very small quantities in scientific notation (8.EE.4).	
Range PLD: Cluster C - Understand the connections between proportional relationships, lines, and linear equations.	Basic students graph proportional relationships from a table of values (8.EE.5);	Proficient students graph proportional relationships from the equation $y = mx$ (8.EE.5);	Advanced students compare two different proportional relationships represented in different ways (8.EE.5);
		Proficient students interpret the unit rate within context as the slope of the graph (8.EE.5);	Advanced students explain why the slope (m) is equivalent between any two different points located on any non-vertical line in the coordinate plane (8.EE.5);
	Basic students derive the equation $y = mx$ with slope (m) from a graph (8.EE.6).	Proficient students derive the equation $y = mx$ with slope (m) from a table or graph and derive the equation $y = mx + b$ with slope (m) and y-intercept (b) from a table or graph (8.EE.6).	Advanced students derive the equation $y = mx + b$ with slope (m) and y-intercept (b) from a verbal description (8.EE.6).
Range PLD: Cluster D - Analyze and solve linear equations and pairs of simultaneous linear equations.	Basic students solve two-step linear equations in one variable with integer coefficients and constants (8.EE.7);	Proficient students solve linear equations in one variable with integer coefficients and constants that require multi-steps and identify the solution of a linear equation in one variable as infinitely many solutions or no solutions (8.EE.7);	Advanced students solve linear equations in one variable with rational number coefficients and constants that require multi-steps and identify the solution of a linear equation in one variable as infinitely many solutions or no solutions (8.EE.7);
	Basic students identify the solution to a system of two linear equations from a graph as the point of intersection of the two lines (8.EE.8).	Proficient students solve systems of two linear equations in two variables algebraically or graphically (8.EE.8).	Advanced students construct and solve systems of two linear equations which represent real-world or mathematical problems (8.EE.8).

Level	Basic	Proficient	Advanced
Domain	Functions		
Range PLD: Cluster E - Define, evaluate, and compare functions.	Basic students evaluate functions with integer coefficients and constants with positive integers as the inputs (8.F.1);	Proficient students evaluate functions with rational coefficients and constants with integers as the inputs (8.F.1);	Advanced students evaluate functions with rational coefficients and constants with rational numbers as the inputs (8.F.1);
		Proficient students identify if a table of values or a graph in the coordinate plane represent a function (8.F.1);	
	Basic students compare the properties of two linear functions represented by graphs (8.F.2);	Proficient students compare the properties of two linear functions represented in different ways (8.F.2);	Advanced students compare the properties of two functions, with at least one non-linear function, which are represented in different ways (8.F.2);
	Basic students identify linear and non-linear functions represented by graphs (8.F.3).	Proficient students identify linear and non-linear functions represented by equations and tables (8.F.3).	Advanced students identify linear and non-linear functions represented by verbal descriptions (8.F.3).
Range PLD: Cluster F - Use functions to model relationships between quantities.	Basic students construct a graph to model a real-world linear relationship between two quantities (8.F.4);	Proficient students create an equation to represent a function which models a real-world linear relationship between two quantities (8.F.4);	Advanced students use the graph and equation representing a function to analyze the relationship between two quantities (8.F.4);
	Basic students determine the rate of change and initial value of a function from a graph (8.F.4);	Proficient students determine the rate of change and initial value of a function from a table (8.F.4);	Advanced students determine the rate of change and initial value of a function from a verbal description (8.F.4);
	Basic students interpret the rate of change and initial value of a real-world linear function in terms of its graph (8.F.4);	Proficient students interpret the rate of change and initial value of a real-world linear function in terms of its graph or table of values (8.F.4);	Advanced students interpret the rate of change and initial value of a real-world linear function in terms of a verbal description (8.F.4);
	Basic students identify graphs of functional relationships as being linear or non-linear (8.F.5).	Proficient students identify and describe the qualitative features from analyzing a linear function (8.F.5).	Advanced students identify and describe the qualitative features from analyzing a non-linear function (8.F.5).

Level	Basic	Proficient	Advanced
Domain	Geometry		
Range PLD: Cluster G - Understand congruence and similarity using physical models, transparencies, or geometry software.	Basic students identify the transformations (rotation, reflection, and translation) of figures (8.G.1);	Proficient students describe the effects on lines, line segments, and angles of figures when rotations, reflections, and translations are performed (8.G.1);	
		Proficient students describe the properties of congruency between two figures when at most two transformations are performed (8.G.2);	Advanced students describe the properties of congruency between two figures when three or more transformations are performed (8.G.2);
	Basic students translation is performed on the coordinate plane (8.G.3);	Proficient students identify coordinates when a sequence of rotations, reflections, translations, or dilations are performed in the coordinate plane (8.G.3);	Advanced students explain the sequence of rotations, reflections, translations, and dilations performed on the pre-image to determine the image (8.G.3);
	Basic students identify similarity from a sequence of transformations (8.G.4);	Proficient students describe the properties of similarity between two figures when transformations are performed (8.G.4);	Advanced students describe the property of similarity with triangles when identifying and establishing the Angle-Angle (AA) criterion for the triangles (8.G.5).
	Basic students determine the interior angle measure(s) of a triangle (8.G.5);	Proficient students determine the interior and exterior angle measures of a triangle (8.G.5);	
	Basic students identify the types of angles created when parallel lines are cut by a transversal (8.G.5).	Proficient students determine the measurement of angles or properties of angles that are created when parallel lines are cut by a transversal (8.G.5).	
Range PLD: Cluster H - Understand and apply the Pythagorean theorem.	Basic students apply the Pythagorean Theorem in mathematical problems by setting up the equation $a^2 + b^2 = c^2$ (8.G.7).	Proficient students calculate the unknown side lengths in right triangles in real-world and mathematical problems (8.G.7);	Advanced students explain and identify the proofs of the Pythagorean Theorem and the converse of the Pythagorean Theorem (8.G.6);
		Proficient students calculate the distance between two points on a grid by applying the Pythagorean Theorem (8.G.8).	Advanced students calculate the distance between two points by applying the distance formula.
Range PLD: Cluster I - Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	Basic students identify the formulas for the volumes of cones, cylinders, and spheres (8.G.9).	Proficient students calculate the volumes of a cone, cylinder, or sphere as a decimal value or in terms of pi (8.G.9).	Advanced students solve for a component part (radius or height) given the volume of a cone, cylinder, or sphere and determine the volume of a composite figure containing two to more cones, cylinders, or spheres (8.G.9).

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Domain	**Statistics and Probability**		
Range PLD: Cluster J - Investigate patterns of association in bivariate data.	Basic students identify the pattern of association in scatter plots as a positive association, negative association, or no association (8.SP.1);	Proficient students identify the pattern of association as a positive association, negative association, or no association given data in a table and describe characteristics of scatter plots such as clustering, outliers, and linear versus non-linear association (8.SP.1);	Advanced students identify the pattern of association given a verbal description as a positive association, negative association, or no association (8.SP.1);
		Proficient students identify a line of best fit for scatter plots (8.SP.2);	Advanced students graph a curve of best fit for scatter plots;
	Basic students use the equation of a linear model in the context of data to identify slope and intercepts (8.SP.3);	Proficient students use the equation of a linear model in the context of data to interpret the meaning of the slope and intercepts (8.SP.3);	Advanced students use the data in a scatter plot to create an equation of a line of best fit (8.SP.3);
	Basic students identify values from a two-way table (8.SP.4).	Proficient students interpret the data numerically in a two-way table (8.SP.4).	Advanced students justify conclusions about the frequencies and relative frequencies of data in a two-way table (8.SP.4).