Year at a Glance: Math - Gr. 8 Student Learning Objectives Clustered by Unit

DOCUMENT KEY: WALT (That) ... indicates a concept. WALT (To) ... indicates a skill.

KEY	
	Focus - Explicit Instruction and Assessment
	Revisited and Reinforced
	Not Addressed in the Unit

NJSLS	SLO	Units	1A	1B	1C	2A	2B	3A	3B	3C	4A
			Unit 1 Exponents, Irrational Numbers, and Linear Equations			**Unit 2** Pythagorean Theorem, Congruence and Similarity		**Unit 3** Linear Relationships and Functions			**Unit 4** Linear Models for Scatter Plots and Two-Way Tables
THE NUMBER SYSTEM											
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.	WALT numbers that are not rational are called irrational	1									
	WALT every number has a decimal expansion	1									
	WALT show that rational numbers have decimal expansions that either terminate in zeros or repeats eventually	1									
	WALT convert a repeating decimal to a rational number	1									
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., π2). *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*	WALT estimate the value of irrational numbers using rational approximations	1									
	WALT use rational approximations of irrational numbers to compare their size	1									
	WALT use rational approximations of irrational numbers to locate them on a number line	1									
EXPRESSIONS and EQUATIONS											
8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.*	WALT know the properties of integer exponents	1									
	WALT determine whether two numerical expressions involving integer exponents are equivalent	1									
	WALT generate equivalent expressions using the properties of exponents	1									
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.	WALT use square root and cube root symbols to represent solutions to equations in the form $x^2 = p$ and $x^3 = p$	1									
	WALT evaluate square roots of small perfect squares and cube roots of small perfect cubes	1									
	WALT √2 is an irrational number	1									
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	WALT estimate a very large or very small number as a single digit times an	1									
	WALT express how many times larger one quantity is compared to another	1									
8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.	WALT add, subtract, multiply, and divide numbers expressed in scientific	1									
	WALT add, subtract, multiply, and divide numbers where one is expressed in	1									

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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.	WALT choose appropriate units to represent measurements of very large or	1									
	WALT interpret scientific notation generated by technology as a number	1									
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.	WALT graph proportional relationships represented in different ways (i.e.	3									
	WALT recognize that for proportional relationships, the unit rate is the slope of the graph	3									
	WALT compare the unit rates of two proportional relationships represented in different ways	3									
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.	WALT explain why the slope is the same between any two distinct points on a	3									
	WALT derive the equation $y = mx$ for a line through the origin	3									
	WALT derive the equation $y = mx + b$ for a line intercepting the *y-axis* at b	3									
8.EE.C.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).* b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	WALT a linear equation in one variable can result in one solution, infinitely many solutions, or no solution	1									
	WALT show which of these outcomes is the case by transforming the original equation into the form $x = a$, $a = a$, or $a = b$	1									
	WALT solve linear equations in one variable with rational number coefficients, including equations that require expanding expressions using the distributive property and combining like terms	1									
8.EE.C.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. 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.* 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*	WALT solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs	3									
	WALT points of intersection satisfy both equations simultaneously	3									
	WALT solve systems of two linear equations in two variables algebraically	3									
	WALT estimate solutions of two linear equations in two variables by graphing the equations	3									
	WALT determine the number of solutions a system of two linear equations will have based upon inspection	3									

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			1A	**1B**	**1C**	**2A**	**2B**	**3A**	**3B**	**3C**	**4A**
whether the line through the first pair of points intersects the line through the second pair.	WALT solve a system of two linear equations modeling real-world and mathematical problems	3									
FUNCTIONS											
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.	WALT a function is a rule that assigns to each input exactly one output	3									
	WALT the graph of a function is the set of ordered pairs consisting of an input and the corresponding output	3									
8.F.A.2 Compare properties (e.g. rate of change, intercepts, domain and range) 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.*	WALT compare properties such as rate of change, intercepts, domain and range of two functions each represented in a different way	3									
8.F.A.3 Inteprete 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.*	WALT the equation $y = mx + b$ defines a linear function	3									
	WALT interpret a set of points forming a straight line as the graph of a linear function	3									
	WALT graph linear equations	3									
	WALT give examples of nonlinear functions	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.	WALT construct a function to model a linear relationship between two quantities	3									
	WALT determine the rate of change and initial value of a function from a description of a relationship or from two *(x, y)* values, including reading these from a table or from a graph	3									
	WALT interpret the rate of change and initial value of a function in terms of the situation it models	3									
8.F.B.5 Describe qualitatively the functional relationship between two	WALT describe qualitatively the functional relationships between two quantities by analyzing a graph	3									

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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.	WALT sketch a graph that exhibits the qualitative features of a function given a verbal description	3									
Geometry											
Verify experimentally the properties of rotations, reflections, and translations: a. Lines are transformed to lines, and line segments to line segments of the same length. b. Angles are transformed to angles of the same measure	WALT verify that when a reflection, rotation, and/or translation is performed,	2									
	WALT verify that when a reflection, rotation, and/or translation is performed,	2									
	WALT verify that when a reflection, rotation, and/or translation is performed,	2									
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.	WALT two figures are congruent if one can be obtained from the other by a sequence of rotations, reflections, and/or translations	2									
	WALT describe a sequence of transformations that maps one congruent figure onto another	2									
8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	WALT dilate, translate, rotate, and reflect two-dimensional figures on a coordinate plane	2									
	WALT describe the effects of dilations, translations, rotations, and reflections using coordinates	2									
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.	WALT two figures are similar if one can be obtained from the other by a sequence of dilations and rotations, reflections, and/or translations	2									
	WALT describe a sequence of transformations that maps one similar figure onto another	2									
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.*	WALT the sum of the interior angles of a triangle is 180 degrees	2									
	WALT the measure of an exterior angle of a triangle is equal to the sum of the	2									
	WALT when parallel lines are cut by a transversal, corresponding, alternate	2									
	WALT if two sets of corresponding angles in two triangles are congruent, then	2									
	WALT use facts about angles to construct an informal argument	2									
8.G.B 6 Explain a proof of the Pythagorean Theorem and its converse.	WALT the Pythagorean Theorem states that the square of the hypotenuse of a	2									
	WALT explain a proof of the Pythagorean Theorem	2									
	WALT explain a proof of the converse of the Pythagorean Theorem	2									
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.	WALT apply the Pythagorean Theorem to determine unknown side lengths in	2									
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8.G.B.8	WALT apply the Pythagorean Theorem to find the distance between two points	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.	WALT apply the formulas for volume of a cone, cylinder, or sphere in a real-	1									
	WALT calculate the volume of a cone, cylinder, or sphere	1									
	WALT find a missing dimension of a cone, cylinder or sphere given its volume	1									
STATISTICS and PROBABILITY											
8.SP.A.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.	WALT construct scatter plots	4									
	WALT interpret scatter plots to investigate patterns of association between two quantities	4									
	WALT describe patterns such as clustering, outliers, positive or negative	4									
8.SP.A.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 (e.g. line of best fit) by judging the closeness of the data points to the line.	WALT straight lines are used to model relationships between two quantitative variables	4									
	WALT informally fit a straight line for scatter plots that suggest a linear association	4									
	WALT informally assess the fit of the line for a scatter plot by judging the closeness of the data points to the line	4									
8.SP.A.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.*	WALT interpret the slope and intercept in the context of bivariate measurement data using the equation of a linear model	4									
8.SP.A.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 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?*	WALT two-way tables can be used to show patterns of association in categorical data	4									
	WALT construct a two-way table summarizing data on two categorical variables collected from the same subjects	4									
	WALT interpret a two-way table by identifying joint frequencies and calculating marginal frequencies	4									
	WALT use relative frequencies calculated for rows or columns to describe possible association between the two variables	4									