How to Read the Crosswalk Document

This West Virginia Crosswalk document is designed to help readers easily understand the similarities and differences between the Next Generation (NxG) WV Content Standards and Objectives for Mathematics, which have been aligned with the *Common Core State Standards for Mathematics,* and the current 21st Century Content Standards and Objectives (CSOs) for Mathematics in WV Schools.

Grade Change (△) Next Generation WV Objective – WV 21st Century Objective.

Positive (+) Grade Change – Content moving to higher grade.

Negative (-) Grade Change – Content moving to lower grade

NxG WV State Objective Aligned to CCSS	WV 21st Century Objective	Grade△	Alignment	
	This objective is the currently adopted objective in WV Public Schools.	**+1 Positive Grade change; Content moving to the next higher grade** **0 No change** **-1 Negative Grade change; Content moving to previous or lower grade**	**Index** **3: Excellent** **2: Partial** **1: Weak** **0: No Match**	**The comment section will provide the reader with specific information relevant to the crosswalk between the standards identified. The intent is to provide the reader specific information relevant to any changes in student expectations.**

Eight Grade Mathematics

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The West Virginia Crosswalk document is designed to help readers easily understand the similarities and differences between the 21st Century Content Standards and Objectives for English Language Arts and Mathematics in WV Schools and the NxG WV Objective WV Content Standards and Objectives for English Language Arts and Mathematics that have been aligned with the Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science and Technical Subjects and the Common Core State Standards for Mathematics.

NxG WV State Objective Aligned to CCSS	WV 21st Century Objective	Grade △	Alignment	Comment
M.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.	**M.O.8.1.1** analyze, describe and compare the characteristics of rational and irrational numbers.	0	2	The NxG WV objective emphasizes the characteristics of rational numbers.
M.8.NS.2 Use rational approximations of irrational numbers to compare the size of	**M.O.8.1.1** analyze, describe and compare the characteristics of rational and irrational numbers.	0	2	The NxG WV objective requires students locate irrationals in relation to rational numbers.

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 g.et better approximations.	**M.O.8.1.2** analyze and solve application problems with • powers, • squares, • square roots, • scientific notation, and verify solutions using estimation techniques.	0	1	The NxG WV objective focuses ion finding approximations of square roots.
M.8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	**M.O.7.1.6** use inductive reasoning to find and justify the laws of exponents with numeric bases.	+1	3	There is a strong alignment
	M.O.A1.2.4 develop and test hypotheses to derive the laws of exponents and use them to perform operations on expressions with integral exponents.	-1	3	There is a strong alignment
M.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 √2 is irrational.	**M.O.7.1.2** model the relationship between perfect squares and square roots using physical representations; estimate square root and evaluate using technology.	+1	1	The NxG WV objective goes beyond modeling, addresses cube roots, and recognizes irrational numbers as possible solutions to equations.
	M.O.8.1.1analyze, describe and compare the characteristics of rational and irrational numbers.	0	1	The NxG WV objective requires students to apply and understand irrational numbers.
	M.O.8.1.2 analyze and solve application problems with • powers, • squares, • square roots, • scientific notation, and verify solutions using estimation techniques.	0	2	The NxG WV objective addresses cube roots.

M.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 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.	**M.O.8.1.2** analyze and solve application problems with • powers, • squares, • square roots, • scientific notation, and verify solutions using estimation techniques.	0	2	The NxG WV objective expects students to understand the magnitude of the differences in scientific notation.
M.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.	**M.O.7.1.7** solve problems using numbers in scientific notation (positive and negative exponents) with and without technology, and interpret from real life contexts.	+1	3	There is a strong alignment.
	M.O.8.1.2 analyze and solve application problems with • powers, • squares, • square roots, • scientific notation, and verify solutions using estimation techniques.	0	2	NxG WV objective focuses on understanding scientific notation.
M.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.	**M.O.7.2.7** determine the slope of a line from its graphical representation.	+1	1	The NxG WV objective develops an understanding of slope and connects slope to the real world.
	M.O.8.2.2 identify proportional relationships in real-world situations, then find and select an appropriate method to determine the solution; justify the reasonableness of the solution.	0	1	The NxG WV objective focuses on graphing and interpreting slope and making comparisons.
	M.O.8.2.8 determine the slope of a line using a variety of methods including • graphing • change in y over change in x • equation.	0	1	The NxG WV objective addresses the relationship between proportions and slope.

	M.O.8.2.10 identify a real life problem involving change over time; make a hypothesis as to the outcome; develop, justify, and implement a method to collect, organize, and analyze data; generalize the results to make a conclusion; compare the hypothesis and the results of the investigation; present the project using words, graphs, drawings, models, or tables.	0	1	The connection to the proportional nature of slope and unit rate is the focus of the NxG WV objective.
	A.1.2.6 determine the slope of a line through a variety of strategies (e.g. given an equation or graph).	-1	1	The NxG WV objective develops an understanding of slope and connects slope to the real world.
M.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.	**A.1.2.6** determine the slope of a line through a variety of strategies (e.g. given an equation or graph).	-1	1	The NxG WV objective uses similar triangles to develop an understanding of slope.
M.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). b. b. Solve linear equations with rational number coefficients, including	**M.O.8.2.1** use a variety of strategies to solve one and two-step linear equations and inequalities with rational solutions; defend the selection of the strategy; graph the solutions and justify the reasonableness of the solution.	0	2	The NxG WV objective provides specific examples of linear equations.

equations whose solutions require expanding expressions using the distributive property and collecting like terms.				
M.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. 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. 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.	**M.O.8.2.4** use systems of linear equations to analyze situations and solve problems.	0	3	The NxG WV objective requires greater depth of understanding.

M.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] (function notation not required in grade 8.)	**M.O.6.2.4** determine the rule, output or input; given an input/output model using one operation, write an algebraic expression for the rule and use to identify other input/output values.	+2	3	There is a strong alignment
	M.O.8.2.5- apply inductive and deductive reasoning to write a rule from data in an input/output table, analyze the table and the rule to determine if a functional relationship exists.	0	3	There is a strong alignment
	M.O8.2.6- graph linear equations and inequalities within the Cartesian coordinate plane by generating a table of values (with and without technology).	0	1	The NxG WV objective requires greater depth of understanding.
M.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.	**M.O.8.2.10**- identify a real life problem involving change over time; make a hypothesis as to the outcome; develop, justify, and implement a method to collect, organize, and analyze data; generalize the results to make a conclusion; compare the hypothesis and the results of the investigation; present the project using words, graphs, drawings, models, or tables.	0	1	The NxG WV objective requires greater depth of understanding.
M.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.			0	

M.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.	**M.O.8.2.10** -identify a real life problem involving change over time; make a hypothesis as to the outcome; develop, justify, and implement a method to collect, organize, and analyze data; generalize the results to make a conclusion; compare the hypothesis and the results of the investigation; present the project using words, graphs, drawings, models, or tables.	0	3	The NxG WV objective is specific about what needs to be interpreted from a graph of a real world problem.
	M.O.A1.2.21-use multiple representations, such as words, graphs, tables of values and equations, to solve practical problems; describe advantages and disadvantages of the use of each representation.	-1	1	The NxG WV objective focuses on linear relationships.
M.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.			0	
M.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. b. Angles are taken to angles of the same measure. c. c. Parallel lines are taken to parallel lines.	**M.O.4.3.7** select, analyze and justify appropriate use of transformations (translations, rotations, flips) to solve geometric problems including congruency and tiling (tessellations).	+4	3	The NxG WV objective requires students to verify properties of rotations.
	M.O.6.3.5 predict, describe, and perform transformations on two-dimensional shapes • translations • rotations • reflections.	+2	3	The NxG WV objective focuses on verifying the properties.

	M.O.7.3.3 apply rotations, reflections, translations to plane figures and determine the coordinates of its transformation and compare and contrast the new figure with the original.	+1	3	There is a strong alignment
M.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.	**M.O.6.3.5** predict, describe, and perform transformations on two-dimensional shapes • translations • rotations • reflections.	+2	2	The NxG WV objective specifies how the transformations can be used to prove congruency.
M.8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	**M.O.7.3.3** apply rotations, reflections, translations to plane figures and determine the coordinates of its transformation and compare and contrast the new figure with the original.	+1	3	The NxG WV objective extends to include dilations.
M.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.	**M.O.8.3.4 c**reate geometric patterns including tiling, art design, tessellations and scaling using transformations (rotations, reflections, translations) and predict results of combining, subdividing, and changing shapes of plane figures and solids.	0	1	The NxG WV objective asks for a sequence and understanding of similarity..
M.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.	**M.O.8.3.1** justify the relationships among corresponding, alternate interior, alternate exterior and vertical angles when parallel lines are cut by a transversal using models, pencil/paper, graphing calculator, and technology.	0	1	The NxG WV objective contains several new concepts i.e. angle sum of triangles and angle-angle similarity.

M.8.G.6 Explain a proof of the Pythagorean Theorem and its converse.	**M.O.7.4.2** use the Pythagorean Theorem to find the length of any side of a right triangle and apply to problem solving situations.	+1	1	The NxG WV objective extends student understanding of the Pythagorean Theorem.
M.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.	**M.O.7.4.2** use the Pythagorean Theorem to find the length of any side of a right triangle and apply to problem solving situations.	+1	3	There is a strong alignment
	M.O.8.4.3solve right triangle problems where the existence of triangles is not obvious using the Pythagorean Theorem and indirect measurement in real-world problem solving situations**.**	0	3	There is a strong alignment
M.8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**M.O.7.4.2** use the Pythagorean Theorem to find the length of any side of a right triangle and apply to problem solving situations.	+1	2	The NxG WV objective applies the Pythagorean Theorem to the coordinate system.
	M.O.8.4.3solve right triangle problems where the existence of triangles is not obvious using the Pythagorean Theorem and indirect measurement in real-world problem solving situations**.**	0	2	The NxG WV objective applies the Pythagorean Theorem to the coordinate system.
	M.O. 8.4.1select and apply an appropriate method to solve; justify the method and the reasonableness of the solution of problems involving volume of • prisms • cylinders • cones • pyramids • spheres given real-world problem solving situations.	0	3	There is a strong alignment
	M.O.8.4.2solve problems involving missing measurements in plane and solid geometric figures using formulas and drawings including irregular figures, models or definitions.	0	2	The NxG WV objective focuses on volume.

	M.O.8.4.3solve right triangle problems where the existence of triangles is not obvious using the Pythagorean Theorem and indirect measurement in real-world problem solving situations**.**	+2	2	The NxG WV objective encompasses cylinders, cones, and spheres.
M.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.	**M.O.8.5.3** create and extrapolate information from multiple bar graphs, box and whisker plots, and other data displays using appropriate technology.	0	1	The NxG WV Objective focuses on bivariate scatter plots.
M.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.			0	
M.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.	**M.O. 8.2.10** identify a real life problem involving change over time; make a hypothesis as to the outcome; develop, justify, and implement a method to collect, organize, and analyze data; generalize the results to make a conclusion; compare the hypothesis and the results of the investigation; present the project using words, graphs, drawings, models, or tables.	0	1	The NxG WV objective is specific to linear models and bivariate scatter plots.

M.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 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?	**M.O.8.5.3 create** and extrapolate information from multiple bar graphs, box and whisker plots, and other data displays using appropriate technology.	0	2	The NxG WV objective is more specific about the types of data and displays to be created and interpreted.