Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA86311	Grade Level	8
Course Name	Middle School Math 8 A	# of Credits	0.5
SCED Code	02038G0.5012	Curriculum Type	Connections Academy

COURSE DESCRIPTION

Throughout this course, the student will engage in group and individual learning activities using a consumable textbook and intelligent, adaptive software as the basis for content. The student will learn to analyze transformations in the coordinate plane, including translations, reflections, rotations, and dilations. The student will then use dilations to investigate proportionality and similar figures. The student will explore linear relationships using multiple representations, including tables, graphs, and equations. Finally, the student will use patterns to infer functional relationships and apply properties of functions to solve problems in real-world contexts.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
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.
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.
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. (Function notation is not required in Grade 8.)
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.
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.
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.
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.
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.** Parallel lines are taken to parallel lines.
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.
8.G.3	Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.
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.
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 three angles appear to form a line, and give an argument in terms of transversals why this is so.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OBJECTIVES
<u>Unit 1: Rigid Motion Transformations</u> Students use patty paper and the coordinate plane to investigate the creation of congruent figures with translations, reflections, and rotations. They use patty paper to develop intuition about the properties of the transformations, and then make generalizations about the coordinates of figures after transformations. Students determine sequences of transformations that map congruent figures to each other.	8.G.1, 8.G.2. 8.G.3	• Define and identify translations, rotations, and reflections • Translate, reflect, and rotate geometric figures on the coordinate plane • Describe the changes to the x- and y-coordinates of a figure after either a translation, reflection, or rotation • Identify corresponding sides and corresponding angles of congruent figures • Use prime notation to describe an image after a translation, reflection, or rotation
<u>Unit 2: Similarity</u> Students investigate dilations and similarity. They make connections between scale factors and dilation factors and define similar figures. Students dilate figures on the coordinate plane using different locations for the center of dilation, and generalize the coordinates of images formed from a dilation with a center at the origin. Then they identify a sequence of transformations that map from a figure to a similar figure.	8.G.3, 8.G.4	• Define and identify dilations and similar figures • Identify the scale factor of a dilation • Dilate geometric figures on the coordinate plane • Describe the changes to the x- and y-coordinates of a figure after a dilation • Identify corresponding sides and corresponding angles of similar figures

Unit 3: Line and Angle Relationships Students use their knowledge of transformations, congruence, and similarity to establish the triangle sum theorem, the exterior angle theorem, relationships between angles formed when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. They use hands-on tools to make and justify conjectures. Once results are justified, students solve related problems, including ones with complex diagrams.	8.G.5,	• Show that the sum of the interior angles of a triangle is 180 degrees • Show that the measure of an exterior angle of a triangle is equal to the sum of its two remote interior angles • Define and identify transversals • Identify the special angle pairs formed when parallel lines are intersected by a transversal • Use the Angle-Angle Similarity Theorem to prove similarity among triangles
Unit 4: From Proprtions to Linear Relationships Students connect proportional relationships, lines, and linear equations. They compare proportional relationships, review the constant of proportionality, k, as a rate of change, and assign the new term slope to the rate of change for any line. They connect the equation for proportional relationships to the equation, y = mx, where m is the slope of the line. From there, students derive the equation y = mx + b for a line that passes through the point 0, b rather than the origin.	8.EE.5 8.EE.6	• Graph proportional relationships by interpreting the unit rate as the slope of the graph • Compare proportional relationships using multiple representations • Use a table, an equation, or a graph to determine the unit rate of a proportional relationship • Identify the rate of change and unit rate of change between two quantities in a linear relationship • Distinguish between proportional and nonproportional situations using tables, graphs, and equations
Unit 5: Linear Equations Students develop fluency with analyzing linear relationships, writing equations of lines, and graphing lines. They determine and interpret rates of change and initial values from contexts, tables, graphs, and equations. They derive and use the slope-intercept and point-slope forms of linear equations. Students learn to graph lines given the three common forms of a linear equation, including standard form.	8.F.4	• Compare representations of linear relationships using tables, graphs, and equations • Create a linear equation to model a linear relationship between two quantities • Interpret the slope and y-intercept of linear relationships in terms of the context and relate them to the graph or a table of values • Determine the slope and y-intercept of a linear relationship from a table of values, two coordinate pairs, a context, a graph, or an equation • Write and graph equations of lines in slope-intercept, point-slope, or standard form
Unit 6: Introduction to Functions Students begin to formalize the concept of function. They explore functions in terms of sequences, mappings, sets of ordered pairs, graphs, tables, verbal descriptions, and equations. Because students have a strong foundation in writing equations of lines, they can construct equations for linear functions. To build flexibility with their understanding of function, students analyze linear and nonlinear functions in terms of qualitative descriptions and compare functions represented in different ways. Then, they connect geometric transformations, slope and y-intercept of graphs of linear functions, and equations of linear functions as they transform and compare linear functions with either the same slope.	8.F.1, 8.F.2, 8.F.3, 8.F.4, 8.F.5,	• Match the graph of a function to a given situation • Identify functions using graphs, tables, verbal descriptions, and equations • Generate a set of ordered pairs from a function and graph the function • Determine and interpret the slope and y-intercept of a linear function given two points, a verbal description, values in a table, or a graph