Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Math
Course ID	CAMA86315	Grade Level	8
Course Name	Algebra Readiness (Pre-Algebra) B	# of Credits	0.5
SCED Code	02051B0.5012	Curriculum Type	Connections Academy

COURSE DESCRIPTION

This is the second of two courses that comprise Algebra Readiness. In this course, the student will explore basic algebraic principles. The student will also examine and evaluate two-step and multi-step equations and inequalities and then explore and use graphs to solve linear relations and functions. Next, the student will be introduced to basic concepts of geometry including angle relationships, parallel lines, polygons, circles, and transformations. The student will continue to apply his knowledge of geometry and algebra to solve area and volume problems. Then the student will explore nOAar functions and polynomials. Finally, the student will examine properties of right triangles, data analysis, and probability.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
8.NS.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0's or eventually repeat. Know that other numbers are call irrational.
8.NS.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.
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 3^2 × 3^(–5) = 3^(–3) = 1/(3^3) = 1/27.
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.
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.
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.
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.EE.7	Solve linear equations in one variable.
8.EE.7a	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).
8.EE.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
8.EE.8	Analyze and solve pairs of simultaneous linear equations.
8.EE.8a	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.
8.EE.8b	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.
8.EE.8c	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.
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

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.
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.
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.
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
8.G.9	Know the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
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.
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.
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.
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?

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
Unit 1: Geometry In this unit, you will learn to classify polygons based upon their sides and angles, and perform computations using related angles and parallel lines. In addition, you will find the area of common figures and the circumference of circles. Finally, you will use basic geometry tools to construct angles and parallel lines.	8.G.1, 8.G.2, 8.G.5	• Classify a polygon based upon its sides and angles • Identify and use congruent figures • Calculate the area of figures and circumference of circles
Unit 2: Measurement This unit focuses on the skills of calculating surface area and volume. By the end of the unit, you will be able to calculate the exact surface area and volumes of specific 3-D figures that are based upon rectangles and circles, including spheres. You will display your knowledge at the end in a portfolio project by finding, measuring, and calculating the surface area and volume of two items you probably already have at home.	8.G.7, 8.G.9	• Identify solids and their parts • Calculate the surface area and volume of cylinders, prisms, cones, pyramids, and spheres • Determine how a change in one dimension affects changes in surface area and volume
Unit 3: Using Graphs to Analyze Data In this unit of the course, you will examine, analyze, and construct scatter plots and tables. With these skills, you will be able to roughly predict the strength and direction of a pattern of association between two things. You will also find measures of central tendency and determine which graph and measure of central tendency best represents a data set.	8.SP.1, 8.SP.2, 8.SP.3, 8.SP.4,	• Calculate the mean, median, and mode of a data set and explain the best use of each • Determine the best type of graph to display a data set • Identify patterns of association—indicating strength and direction—of two factors and make predictions based upon a scatter plot

Unit 4: Probability In this unit of the course, you will find probabilities and odds of events.		• Calculate odds and probabilities of dependent and independent events, and make predictions using those calculations • Calculate permutations and combinations of sets of objects
Unit 5: Functions This unit focuses on the concept of functions. By the end, you will be able to identify a function as an equation having one output for every input, and you will be able to graph linear and non-linear functions on a coordinate plane.	8.EE.5, 8.EE.6, 8.EE.7a, 8.EE.8, 8.EE.8a, 8.EE.8b, 8.F.1, 8.F.2, 8.F.3, 8.F.4, 8.F.5	• Describe a sequence • Identify and graph functions and determine slope and y-intercept • Determine the solution of two functions by graphing
Unit 6: Polynomials and Properties of Exponents In this final unit, you will be working with expressions called polynomials. By the end, you will be able to add, subtract, and multiply these expressions. You will also simplify powers and use negative and zero exponents.	8.EE.1, 8.EE.3, 8.EE.4	• Add, subtract, and multiply polynomials • Multiply and divide powers with the same base, including numbers in scientific notation