Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA86305	Grade Level	6
Course Name	Middle School Math 6 B	# of Credits	0.5
SCED Code	02036G0.5022	Curriculum Type	Connections Academy

COURSE DESCRIPTION

Throughout this course, the student will engage in group and individual learning using a consumable textbook and intelligent, adaptive software as the basis for content. The student will use arithmetic properties and apply them to algebraic expressions. The student will investigate equations and graphs to develop strategies to make sense of and reason about unknown quantities in a variety of real-world and mathematical problems. The student will use a number line to represent, make sense of, and order negative numbers. The student will build on his or her knowledge of plotting and interpreting data in the first-quadrant of a coordinate plane to construct a four-quadrant graph. The students will be introduced to the field of statistics, which is the study of data and the statistical problem-solving process. The student will calculate numerical summaries to describe a data set. Finally, the student will learn what separates mathematical and statistical reasoning—the presence of variability.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
6.NS.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6.NS.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
6.NS.6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.
6.NS.6b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
6.NS.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
6.NS.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right.
6.NS.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3°C > -7°C$ to express the fact that $-3°C$ is warmer than $-7°C$.
6.NS.7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of -30 dollars, write $|-30| = 30$ to describe the size of the debt in dollars.
6.NS.7d	Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.
6.NS.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
6.EE.1	Write and evaluate numerical expressions involving whole-number exponents.
6.EE.2	Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.2a	Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as $5 - y$.
6.EE.2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.
6.EE.2c	Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.
6.EE.3	Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.
6.EE.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.
6.EE.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
6.EE.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
6.EE.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.
6.G.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

6.SP.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.
6.SP.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
6.SP.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.5	Summarize numerical data sets in relation to their context, such as by: **a.** Reporting the number of observations. **b.** Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. **c.** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered. **d.** Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OBJECTIVES
Unit 1: Experessions In this unit, you will extend your application of the Order of Operations with numerical expressions to include exponents. You will write and evaluate algebraic expressions to solve problems. Finally, you will create equivalent expressions and determine if expressions are equivalent.	6.EE.1, 6.EE.2, 6.EE.2a, 6.EE.2b, 6.EE.2c, 6.EE.3, 6.EE.4, 6.EE.6	• Evaluate numeric expressions • Apply arithmetic properties and algebra to rewrite algebraic expressions in equivalent forms and model algebraic expressions • Use properties, tables, and graphs to show how expressions are or are not equivalent • Use algebraic expressions to solve problems
Unit 2: Equations In this unit, you will learn that the equals sign indicate a relationship between two expressions. You will learn that equations can have 1, 0, or infinite solutions and that inequalities have a solution set. You will use bar models to reason about solving one-step addition and multiplication equations. You will develop strategies for solving equations without the models and practice writing and solving equations.	6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8, 6.EE.9	• Apply properties to rewrite equations • Analyze graphs and solution sets of algebraic inequalities • Use arithmetic properties and algebra to solve addition and multiplication equations • Solve a variety of real-world and mathematical problems that can be modeled by one-step equations
Unit 3: Graphing Quantitative Relationships In this unit you will use multiple representations to model and solve problems. You will learn that quantities can vary in relation to each other and are often referred to as independent and dependent quantities. Quantities do not necessarily vary in a linear pattern; you will analyze graphs for non-linear as well as linear scenarios. You will solve for unknown values of the independent or dependent variable by analyzing their graphs. You will then solve linear equations using the variety of tools available, and you will contrast the advantages and limitations of each.	6.EE.9	• Analyze graphs of equations and inequalities • Determine the types of graphs to use for given scenarios • Identify independent and dependent quantities and represent those quantities using variables • Apply graphical representations to solve real-world problems
Unit 4: Signed Numbers In this unit you will explore positive and negative numbers on a number line. You will interpret the meanings of positive rational numbers, negative rational numbers, and zero in real-world and mathematical situations. You will develop an understanding of the relationship between opposites and distance on a number line, defining absolute value of a rational number. You will classify numbers into their respective number systems and explore the density of the rational numbers.	6.NS.5, 6.NS.6, 6.NS.6a, 6.NS.6c, 6.NS.7a, 6.NS.7b, 6.NS.7c, 6.NS.7d	• Explain the meaning of zero, positive numbers, and negative numbers in a variety of contexts • Define absolute value of a rational number • Solve problems using absolute value statements • Sort and classify numbers as natural numbers
Unit 5: The Four Quadrants In this unit you will explore the four quadrant coordinate plane. You will look for patterns in the signs of the ordered pairs in each quadrant and for ordered pairs that lie along the same vertical and horizontal grid lines. You will analyze and solve problems involving geometric shapes on the coordinate plane. You will then solve a wide range of problems on the coordinate plane using scenarios, graphs, equations, and tables.	6.EE.9, 6.NS.6b, 6.NS.6c, 6.NS.8, 6.G.3	• Identify patterns in the signs of the ordered pairs in each quadrant • Graph and solve problems with geometric figures on the coordinate plane • Determine the perimeter and area of polygons on the coordinate plane • Apply knowledge of plotting rational numbers on the coordinate plane, interpreting points on a coordinate plane, creating tables of values, and writing and solving equations to solve a variety of problems situated on the coordinate plane
Unit 6: The Statistical Process In this unit, you will learn about the statistical problem solving process: formulate questions, collect data, analyze data, and interpret the results. You will learn about variability in data, statistical questions, and basic forms of data collection. Finally, you will use real-world data to create and analyze dot plots, stem-and-leaf plots, and histograms in terms of their shape and defining characteristics.	6.SP.1, 6.SP.2, 6.SP.3, 6.SP.4, 6.SP.5,	• Determine the best method of data collection to answer each question • Apply the statistical process to analyze data • Interpret dot plots, stem-and-leaf plots, and histograms

Unit 7: Numerical Summaries of Data	6.SP.2, 6, SP.3, 6.SP.4	• Interpret data using the three different measures of center: mode, median, and mean
In this unit, you will learn about measures of central tendency and measures of variability and when each is the most appropriate measure for a given data set. You will identify the modes and calculate means and medians of data sets. You will calculate the five-number summaries and interquartile ranges of data sets and use them to create box-and-whisker plots. Finally, you will calculate the mean absolute deviations of data sets.		• Calculate the measures of center • Construct, analyze, and interpret box-and-whisker plots of real-world data • Calculate the mean absolute deviation of data sets • Determine the appropriate measures of center and variation to best describe a data set