Wyoming Department of Education Required Virtual Education Course Syllabus

2201001 - Washakie County School District No. 1

Program Name	Washakie #1 Online	Content Area	MA
Course ID	WOL-PreAlgebra B	Grade Level	7
Course Name	WOL-PreAlgebraB-7	# of Credits	NA
SCED Code	NA	Curriculum Type	K-12 Fuel Education

COURSE DESCRIPTION

I PreAlgebra B, typically taught second semester of 7th grade, students take a broader look at computational and problem-solving skills while learning the language of algebra. Students will continue to solidify their knowledge of the basic building blocks of mathematics translating word phrases and sentences into mathematical expressions; solve problems involving percentages, ratios, and proportions; graph different kinds of equations and inequalities; calculate statistical measures and probabilities; apply the Pythagorean theorem; and explain strategies for solving real-world problems. Students have the opportunity to move forward in their mathematics skills through lessons in counting, probability, and statistics.

Online lessons provide demonstrations of key concepts, as well as interactive problems with contextual feedback.

A textbook supplements the online material. Students who take Pre-Algebra A are expected to have mastered the skills and concepts presented in the (6th grade) K12 Fundamentals of Geometry and Algebra course (or its equivalent).

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
7.RP.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.
7.RP.2	Recognize and represent proportional relationships between quantities.
7.RP.2a	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
7.RP.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.2c	Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.
7.RP.2d	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

WYOMING CONTENT AND PERFORMANCE STANDARDS	
STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
7.NS.2d	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)
7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
7.G.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
7.G.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
7.G.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
7.SP.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
7.SP.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.
7.SP.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.
7.SP.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.
7.SP.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
7.SP.6	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.
7.SP.7	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
7.SP.7a	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.
7.SP.7b	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?
7.SP.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
7.SP.8a	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

WYOMING CONTENT AND PERFORMANCE STANDARDS	
STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
7.SP.8b	Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
7.SP.8c	Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?
G.SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
G.GPE.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*
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.

SCOPE AND SEQUENCE		
UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS
SEMESTER TWO **Unit 1: Ratio, Proportion and Percent** Model builders use ratios and percents to describe how their models compare to real objects. They can use proportions to figure out the length of every item in the model. • Ratio • Proportion • Percents, Fractions and Decimals • Similarity and Scale • Working with Percent • Percent of Increase or Decrease • Simple Interest	7.RP.A.1 7.RP.A.2.a 7.RP.A.2.b 7.RP.A.2.c 7.RP.A.2.d 7.RP.A.3 7.NS.A.2.d 7.GA.1	Student will . . . • Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. • Decide whether two quantities are in a proportional relationship, • Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. • Represent proportional relationships by equations. • Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. • Use proportional relationships to solve multistep ratio and percent problems. • Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. • Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
Unit 2: Analytic Geometry A pilot uses numbers to locate the airport she is flying to. An air traffic controller uses numbers on a radar screen to locate each airplane approaching the airport. Without a system of locating points, airplanes would have a hard time getting anywhere safely. • Points on the Plane • Two-Variable Equations • Linear Equations and Intercepts • Slope • Problem Solving	7.GA.2 7.GB.4 7.GB.5 7.GB.6	Student will . . . • Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. • Know the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle. • Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to

• Relations and Functions • Systems of Linear Equations		write and use them to solve simple equations for an unknown angle in a figure. • Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Unit 3: Perimeter and Area You can find geometric shapes in art. Whether determining the amount of leading or the amount of glass for a piece of stained glass art, stained-glass artists need to understand perimeter and area to solve many practical problems. • Types of Polygons • Perimeter • Areas of Rectangles and Triangles • Special Quadrilaterals • Areas of Special Quadrilaterals • Circumference • Areas of Circles	7.GA.2 7.GB.4 7.GB.5 7.GB.6	Student will . . . • Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. • Know the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle. • Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure. • Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Unit 4: Square Roots and Right Triangles Since ancient times, people have used right triangles to survey land and build structures. Even before Pythagoras was born, the relationship between the side lengths of a right triangle has been essential to anyone building just about any structure, including pyramids, houses, skyscrapers, and bridges. • Rational Square Roots • Irrational Square Roots • The Pythagorean Theorem • The Distance Formula • Special Types of Triangles • Trigonometric Ratios Note: Lesson moves beyond 7th Grade Math standards.	G-SRT.8 G-GPE.7 8.EE.1	Students will . . . • Find square roots of a perfect square. Solve simple equations with squares. Determine whether a square is rational or irrational. • Find consecutive integers between which a square root lies. Write square roots of positive whole numbers in simplified radical form. • Solve word problems involving square roots. • Use the Pythagorean theorem to solve problems. • Find the distance between two points on a coordinate grid and coordinate plane. • Find the perimeter of a figure on a coordinate plane. • Solve real-world and mathematical problems involving special types of triangles. • Use the properties of special types of triangles and the principles of 30-60-90 and 45-45-90 triangles to find missing values.
Unit 5: Solid Figures Gas-powered engines are driven by little explosions that move pistons up and down in cylinders. When you add up the volume of all the cylinders, you get the displacement of the engine. For instance, each cylinder in a fourcylinder, 1000 cc engine has a volume of 250 cubic centimeters. Engineers and mechanics must accurately compute volume when they build or maintain engines. • Volume and Capacity • Volumes of Prisms and Cylinders • Volumes of Pyramids and Cones • Surface Area • Surface Areas of Prisms and Cylinders	7.GA.3 7.GB.6	Student will . . . • Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. • Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Unit 6: Counting and Probability How many apples have mass between 100 and 200 grams? How many are bruised? How many are not yet ripe? Checking every single apple would probably be pretty impractical, but if you understand probability and sampling, you could make a good estimate. • Counting Principles • Permutations • Combinations • Probability • Mutually Exclusive Events • Samples and Prediction	7.SP.A.1 7.SP.A.2 7.SP.B.3 7.SP.B.4 7.SP.C.5 7.SP.C.6 7.SP.C.7.a 7.SP.C.7.b 7.SP.C.8.a 7.SP.C.8.b 7.SP.C.8.c	Student will . . . • Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. • Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. • Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. • Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. • Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. • Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. • Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. • Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. • Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. • Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. • Design and use a simulation to generate frequencies for compound events.
Unit 7: Statistics Data are everywhere. When you look at a group of people, you could use many numbers to describe them. How tall are they? How long is their hair? How old are they? What is their gender? What color are their eyes? Statistics helps you make sense of data.	7.SP.A.1 7.SP.A.2 7.SP.B.3 7.SP.B.4 7.SP.C.5 7.SP.C.6 7.SP.C.7.a 7.SP.C.7.b	Student will . . . • Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

• Graphs • Measures of Center • Stem-and-Leaf Plots • Box-and-Whisker Plots • Frequency Tables and Histograms	7.SP.C.8.a 7.SP.C.8.b 7.SP.C.8.c	• Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. • Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. • Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. • Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. • Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. • Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. • Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. • Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. • Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. • Design and use a simulation to generate frequencies for compound events.
Unit 8: Semester Review and Test • Semester Review • Semester Test		