Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Math
Course ID	CAEL77954	Grade Level	3
Course Name	Essential Math 3 B	# of Credits	0.5
SCED Code	NoCourseSCED	Curriculum Type	Connections Academy

COURSE DESCRIPTION

In Essential Math 3 B, the student will learn mathematical concepts related to 2-D shapes, area, perimeter, fractions, interpreting data, time, mass, and capacity. Concepts are developed using mathematical processes of problem-solving, reasoning, communicating, representing, and making connections. Building both conceptual knowledge and procedural fluency supports the student's development of mathematical thinking and reasoning in solving various problems of authentic contexts.

In this course, the needs of the essential student are addressed in various ways, while still maintaining the integrity of the content. Special attention is paid to the reading level of the student-facing content to ensure comprehension. Each lesson includes a connection to prior knowledge and concrete examples to help your student relate to the new material. Hands-On Activities are included in every lesson and are customized for the essential learner. Practice, reinforcement, and error correction are encouraged throughout the course as your student works with small sets of problems at a time. Taken as a whole, these modifications give your student access to all grade-level content in a way that is conducive to your student's learning style.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
MP1	Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.
MP2	Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
MP3	Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

MP4	Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
MP5	Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.
MP6	Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.
MP7	Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression x^2 + 9x + 14, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see 5 – 3(x – y)^2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.
MP8	Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (y – 2)/(x –1) = 3. Noticing the regularity in the way terms cancel when expanding (x – 1)(x + 1), (x – 1)(x^2 + x + 1), and (x – 1)(x^3 + x^2 + x + 1) might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.
3.OA.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.
3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.
3.OA.3	Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
3.OA.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = __÷ 3, 6 × 6 = ?.
3.OA.5	Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15 then 15 × 2 = 30, or by 5 × 2 = 10 then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) (Students need not use formal terms for these properties.)
3.OA.6	Understand division as an unknown-factor problem. For example, divide 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers.
3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)
3.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.
3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.
3.NBT.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (A range of algorithms may be used.)
3.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. (A range of algorithms may be used.)
3.NF.1	Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.2	Understand a fraction as a number on the number line; represent fractions on a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.2a	Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.2b	Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.3a	Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.3b	Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3), Explain why the fractions are equivalent, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.3c	Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.NF.3d	Compare two fractions with the same numerator or the same denominator, by reasoning about their size, Recognize that valid comparisons rely on the two fractions referring to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)
3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
3.MD.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of “times as much.”)
3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.
3.MD.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.
3.MD.5	Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.
3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
3.MD.7	Relate area to the operations of multiplication and addition.
3.MD.7a	Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
3.MD.7b	Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

3.MD.7c	Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.
3.MD.7d	Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
3.MD.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter.
3.G.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
Unit 1: Welcome to Math 3 This unit will introduce your student to the Math 3 course. In this unit, he will meet Clara, an animated character who will guide him through the course. Clara will pose math problems, work with your student to solve the problems, and provide tips and tricks. Your student will also become familiar with the instructional routines presented throughout the course, so that he is ready to begin learning with the first lesson. This unit also contains important information for the Learning Coach, which will be useful throughout the course.		• Introduce your student to the avatar companion, who will serve as an instructional helper throughout the course • Provide information about the types of lesson slides your student will encounter and what to expect to find on each • Introduce your student to the different types of assessments that appear throughout the course • Familiarize your student with the various icons used throughout the course and what types of assets they precede
Unit 2: Attributes of Two-Dimensional Shapes In this unit, your student will learn to identify, describe, and classify two-dimensional objects, referred to as shapes or polygons, based on the similarities and differences between their attributes. This unit will focus on the mathematical practice standard of precision.	MP-4, MP-1, MP-7, G.3.1, MP-6, OA.3.3, OA.3.8	• Identify quadrilaterals and use attributes to describe them • Classify shapes according to their attributes • Analyze and compare quadrilaterals and group them by their attributes • Solve math problems precisely, efficiently, and accurately by using appropriate tools and mathematical vocabulary
Unit 3: Connect Area to Multiplication and Addition In this unit, your student will explore the concept of area, which is the space inside a plane shape. Your student will solve problems involving area and represent the answer using square units. He will learn the process of estimating and finding the area of regular and irregular shapes. He will recognize that utilizing a standard measurement aids in consistency in finding and communicating measurements. He will learn various ways to find the area of a shape including adding separate parts and multiplying side lengths. This unit will focus on the mathematical practice standard of "looking for and using structure."	MP-1, MP-4, MP-5, MP-7, MP-8, OA.3.2, OA.3.3, OA.3.5, OA.3.6, OA.3.7, MD.3.5, MD.3.5(a), MD.3.5(b), MD.3.6, MD.3.7(a), MD.3.7(b), MD.3.7(c), MD.3.7(d)	• Use unit squares and standard units to find and measure the area of a shape • Use unit squares and multiplication to find the areas of squares and rectangles • Use areas of rectangles to model the Distributive Property of multiplication • Use areas of rectangles to find the area of irregular shapes • Solve problems by breaking apart or changing the problem into simpler problems
Unit 4: Solve Perimeter Problems In this unit, your student will learn that the distance around a plane shape is its perimeter. She will explore several strategies for calculating perimeter. Your student will investigate how to make a shape with a given perimeter and how different shapes can have the same perimeter. She will also investigate the relationship between the perimeter and shape of a figure. This unit will focus on the mathematical practice standard of "reasoning."	MP-4, MP-5, MP-1, MP-2, MP-7, MD.3.1, MD.3.2, MD.3.8	• Find the perimeter of different polygons with common shapes • Use the given sides of a polygon and the known perimeter to find the unknown side length • Explore the relationship between shapes with the same perimeter and different areas • Explore the relationship between shapes with the same area and different perimeters • Understand the relationship between numbers in order to simplify and solve problems involving perimeter

Unit 5: Solve Problems with Whole Numbers In this unit, your student will begin to use formal algebraic language to represent problems involving addition and subtraction with an unknown value. Your student will begin using diagrams to show relationships in a problem to help him identify the operation needed to solve each step of the problem. He will then extend this understanding to write an equation that represents the relationship. This unit will focus on the mathematical practice standard of “critique reasoning.”	MP-1, MP-3, MP-4, MP-6, OA.3.2, OA.3.3, OA.3.7, OA.3.8, NBT.3.2	• Draw diagrams and write equations to solve two-step problems involving addition and subtraction of whole numbers • Draw diagrams and write equations to solve two-step problems involving multiplication and division of whole numbers • Examine relationships between quantities in a two-step word problem by writing an equation for each step • Choose and apply the operations needed to solve the problem • Critique the reasoning of others by asking questions, identifying mistakes, and providing suggestions for improvement
Unit 6: Understand Fractions as Numbers In this unit, your student will use manipulatives to understand the relationship between the parts of a fraction. She will investigate unit fractions and how to find the whole when given a part. Your student will use her understanding of graphing whole numbers on a number line to graph fractions on a number line. This will lead to measuring lengths to the nearest one-half or one-fourth of an inch using a ruler. This unit will focus on the mathematical practice standard of "make sense and persevere."	MP-1, MP-4, MP-7, NF.3.1, NF.3.3(c), NF.3.2(a), NF.3.2(b), G.3.2, OA.3.2, OA.3.7, MD.3.7(b)	• Understand how to read and write unit fractions for equal-size parts of a region • Use a fraction to represent multiple copies of a unit fraction • Determine and draw the whole when given one part • Represent fractions, both less than one and greater than one, on a number line • Determine when a problem has either extra or missing information
Unit 7: Fraction Equivalence and Comparison In this unit, your student will use manipulatives to represent fractions of a region and fractions of a set. The use of manipulatives will help your student understand how to identify, compare, and order fractions. Your student will use models, pictures, fractions strips, and number lines to find and compare equivalent fractions. Future math courses will use the basic fractions skills presented in this unit and apply them throughout all branches of mathematics, including measurement, geometry, probability, and statistics. Relating fractions to as many real-life examples as possible will help your student gain familiarity with the concepts presented in this unit. This unit will focus on the mathematical practice standard of “construct arguments.”	MP-1, MP-3, MP-4, MP-6, MP-7, NF.3.1, NF.3.3(a), NF.3.3(b), NF.3.3(c), NF.3.3(d), NF.3.2(a), NF.3.2(b), G.3.2, NBT.3.2, OA.3.8	• Find equivalent fractions that name the same part of the whole and represent them on a number line • Use models such as fraction strips to compare fractions that refer to the same whole and have the same denominator or numerator • Use benchmark numbers or a number line to compare fractions • Use fraction names to represent whole numbers • Construct math arguments using fractions
Unit 8: Represent and Interpret Data In this unit, your student will learn that certain types of graphs are appropriate for certain types of data. Your student will use frequency tables, picture graphs, and bar graphs to compare and interpret data. She will then use the graphs to solve problems and precisely share her findings. This unit will focus on the mathematical practice standard of “precision.”	MP-1, MP-4, MP-5, MP-7, MD.3.3, MD.3.4	• Use graphs, including frequency tables and picture graphs, to compare and interpret data • Use scaled bar graphs to represent data sets • Use graphs to solve problems • Use words, symbols, and numbers to accurately and precisely solve math problems

Unit 9: Time, Mass, Capacity In this unit, your student will solve many real-life problems involving time, capacity, and mass. Your student will learn how to tell time to the half hour, quarter hour, and to the minute on both analog and digital clocks. Your student will also convert units of time and determine elapsed time. Your student will also learn to estimate, measure, and select appropriate tools and units for volume and mass in the metric system. This unit will focus on the mathematical practice standard of reasoning.	MP-1, MP-4, MP-5, MP-7, MD.3.1, MD.3.2	• Show and tell time to the nearest minute and measure time intervals in minutes, using analog and digital clocks • Solve word problems involving addition and subtraction to measure quantities of time • Use standard units to estimate liquid volume and masses of solid objects • Use a pan balance with metric weights to measure the mass of objects in grams and kilograms • Use pictures to help solve problems about mass and volume
Unit 10: Step Up to Grade 4 The topics in this unit will help prepare your student for Grade 4. Your student will explore place-value relationships by analyzing the value of digits within a given number. She will then multiply by multiples of 10, 100, and 1,000 while looking for relationships in the products. Your student will use mental math to multiply multiples of 10 and use models to multiply 2-digit numbers by 10.	MP-1, MP-4, MP-6, MP-7, OA.4.2, OA.4.3, NBT.4.1, NBT.4.5	• Explore place-value relationships between the digits of 2- and 3-digit numbers • Use mental math to multiply by 10, 100, and 1,000 and look for patterns in the products • Multiply multiples of 10 using basic facts, place-value patterns, and other strategies • Use models to multiply 2-digit numbers by multiples of 10