Grade 3 - Geometry

Essential Questions:

1. Why are geometry and geometric figures relevant and important?
2. How can geometric ideas be communicated using a variety of representations?

******(i.e maps, grids, charts, spreadsheets)

3. How can geometry be used to solve problems about real-world situations, spatial relationships, and logical reasoning?

Essential Vocabulary - quadrilateral, square, rhombus, rectangle, area, equal, part, whole, fraction, numerator, denominator, area

We want students to understand that geometry is all around us in 2 or 3D shapes. Geometric shapes have certain properties and can be moved, compared, measured, and represented.

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.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Shapes 2. Categories of shapes (e.g., quadrilaterals) 3. Categories of shapes may share attributes (e.g., number of sides) 4. Some shapes do not belong to any subcategories but is still part of the larger category (e.g., a four-sided plane figure that is not a square, rectangle, or rhombus, but is still a quadrilateral).	1. Attributes and categories of geometric shapes	1. Students will be able to identify attributes of shapes (e.g., number of sides). 2. Students will be able to identify categories and subcategories of shapes based on attributes (e.g., four straight sides is a quadrilateral, when all sides are the same length, shape is a square). 3. Students will draw examples of shapes that do not belong to any subcategory. Example: 

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 as 1/4 of the area of the shape.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Shapes 2. Fractions as part of a whole 3. Numerator 4. Denominator	1. Using shapes as a model for representing fractions 2. Using shapes to understand area	1. Students will divide shapes into parts with equal areas. 2. Students will describe the area of each part using fractional denotation (e.g., ¼ of a shape divided into four equal pieces.)

Grade 3 - Measurement

Essential Questions:

1. How does estimation help you find a reasonable measurement?
2. How do you determine the tool and unit to help you accurately measure?
3. When do you need to measure?
4. Why do we need a standard unit of measurement?

Essential Vocabulary - minute, addition, subtraction, number line diagram, volume, capacity, mass, gram, kilogram, liter, metric system, standard unit, picture graph, scale, bar graph, key, title, heading, horizontal, vertical, axis, more than, less than, various American Indian vocabulary per the cultural context provided, line plot graph, inch, quarter inch, half inch, three-quarters inch, scale, horizontal, ruler, data, area, plane figure, square unit, Distributive Property of Multiplication, rectilinear figure, rectangle, tiling, product, factors, square unit, centimeter, meter, foot, perimeter, area, polygon, rectangle,

We want students to understand when to measure, what tool and unit to use, and how to use estimation to find a reasonable measurement.

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 on a number line diagram.)

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Time to the minute 2. Addition of time 3. Subtraction of time 4. Number line diagram	1. Telling time to the minute 2. Elapsed time in minutes 3. Adding and subtracting time in context of real –world problem	1. Tell time to the minute. 2. Write time to the minute. 3. Measure time intervals in minutes (e.g., 12:15 to 12:22 is 7 minutes). 4. Solve word problems involving addition and subtraction of time intervals in minutes by possibly using a number line.

3.MD.2.: Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). 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.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. How to measure volume and mass 2. How to use measurement tools accurately 3. How to estimate liquid volume and masses of objects 4. When to use mass or volume units of measure 5. Add, subtract, multiply, and divide units of measure in a story problem	1. Volume as a measure of liquids 2. Mass as a measure of solid objects 3. Standard units, including gram, kilogram, and liter 4. Purpose of estimating in measurement of volume and mass 5. Application of measurement of volume and mass to real world problems	1. Measure liquid volume using standard unit liter. 2. Estimate liquid volume using standard unit liter. 3. Measure masses of objects using standard units of grams and kilograms. 4. Estimate masses of objects using standard units of grams and kilograms.

6. How to depict problem using visual representation		5. Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units by using drawings.

3.MD.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories within cultural contexts including Montana American Indians. 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.*

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. How to draw a scaled picture graph, including a key and all its components 2. How to draw a scaled bar graph, including all its components 3. Montana is home to American Indians. 4. Information can be presented in various formats.	1. Data can be represented in multiple formats 2. How to design and interpret scaled graphs 3. A part of the cultural context of Montana American Indians 4. Graphs are visual representations of data that are often used in the real world	1. Draw a scaled picture graph and a scaled bar graph. 2. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.

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.

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. How to measure with a ruler 2. How to measure to the quarter inch 3. How to draw a line plot graph and all its components	1. Data can be represented in multiple formats 2. How to measure to the nearest quarter inch accurately using a ruler 3. Read and interpret a line plot	1. Accurately measure lengths to the nearest quarter inch using a ruler. 2. Draw a line plot with appropriate units. a. LINE PLOT EXAMPLE: X X X X X ¼ ½ ¾

3.MD.5.: Recognize area as an attribute of plane figures and understand concepts of area measurement.

A square with side length 1 unite, called "a square unit," is said to have "one square unit" of area, and can be used to measure area.

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.

Grade 3 Enduring Understandings		
Students will know…	***Students will understand…***	***Students will be able to…***
1. Plane figures 2. Area 3. A square unit 4. How to measure area using square units	1. Area as a measurement of space within plane figures 2. How square units are applied to measuring area in real world context	1. Measure area of a plane figure using square units

3.MD.6.: Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

Grade 3 Enduring Understandings		
Students will know…	***Students will understand…***	***Students will be able to…***
1. Area 2. A square unit 3. How to measure area using square unit	1. Area as a measurement of space 2. How square units are applied to measuring area in real world context	1. Measure area using square units

3.MD.7.: Relate area to the operations of multiplication and addition.

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.

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.

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 x b and a x c. Use area models to represent the distributive property in mathematical reasoning.

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 including those of Montana American Indians.

Grade 3 Enduring Understandings		
Students will know…	***Students will understand…***	***Students will be able to…***
1. Multiplication 2. Addition 3. Area 4. Properties of a rectangle 5. Distributive Property of Multiplication 6. A part of the culture of the Montana American Indians	1. Area as a measurement of space 2. Multiplication as it applies to area 3. How models assist in problem solving 4. Area is additive when rectilinear figures are broken into parts 5. American Indians are part of our community	1. Use tiling to find area of a rectangle 2. Use multiplication to find area 3. Use models to find area of a rectangle 4. 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 areas or with the same area and different perimeters.		
Grade 3 Enduring Understandings		
Students will know… 1. Perimeter 2. Polygon 3. Properties of a rectangle 4. Area	***Students will understand…*** 1. Relationship between area and perimeter 2. Properties of polygons	***Students will be able to…*** 1. Solve real world problems 2. Find perimeter with known and unknown side lengths 3. Construct rectangles with varying area and perimeters

Grade 3 – Number Base Ten

Essential Questions:

1. Why do we use numbers, what are their properties, and how does our number system function?
2. Why do we use estimation and when is it appropriate?
3. What makes a strategy effective and efficient and the solution reasonable?
4. How do numbers relate and compare to one another?

Essential Vocabulary – round, estimate, greater than, less than, place value, whole numbers, order property of addition, grouping property of addition, identity property of addition, inverse operations, regroup, redistribute, place value, addend, subtrahend, sum, difference, commutative property of multiplication, associative property of multiplication, identity property of multiplication, distributive property of multiplication, place value, factor, product, multiple,

We want students to understand that all numbers have parts, values, uses, types, and we use operations and patterns to work with them

3.NBT.1.: Use place value understanding to round whole numbers to the nearest 10 or 100.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Place Value 10s, 100s 2. Whole Numbers 3. Rounding 4. Greater than, Less than 5. The student identifies place value positions for 4-6 digit numbers (thousands). 6. The student uses appropriate tools when comparing numbers to 1000-999,999 (base ten blocks, number lines, pictures, stamps...).	1. the purpose of rounding to the nearest 10 2. the purpose of rounding to the nearest 100	1. I can apply place value understanding (such as expanded notation). 2. I can round whole numbers to nearest 10s. 3. I can round whole numbers to nearest 100s. 4. I can apply greater than and less than 5 to round numbers. 5. I can explain the process, and apply to real world situations.

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.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Basic addition facts 2. Basic subtraction facts 3. Properties of operations 4. Place Value to 1,000 5. Addition and Subtraction are inversely related operations.	1. the purpose of adding 2. the purpose of subtracting	1. I can fluently (accurately and efficiently) add basic facts. 2. I can fluently (accurately and efficiently) subtract basic facts. 3. I can regroup when subtracting 4-digit numbers.

6. Regrouping and redistributing. 7. The student adds and subtracts 3 digit numbers with regrouping.		4. I can redistribute when adding 4-digit numbers. 5. I can apply the properties and relationships of adding. 6. I can apply the properties and relationships of subtracting.
<u>3.NBT.3.</u>: Multiply one-digit whole numbers by multiples of 10 in the range of 10 – 90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.		
Grade 3 Enduring Understandings		
Students will know… 1. Counting by 6s, 7s, 8s, 9s, and 10s and uses that knowledge with multiplication facts 2. Basic multiplication facts 0-9 (connected to repeated addition, model in variety of ways) 3. Multiples of 10s 4. Place Value 5. Properties of multiplication	***Students will understand…*** 1. the product of a multiple of 10 is 10 times more than the basic fact product (ex. 5 x 8=40 and 5 x 80=400) 2. the purpose of multiplication	***Students will be able to…*** 1. I can fluently multiply basic facts. 2. I can count by 10s. 3. I can compute multiplication facts with multiples of 10. 4. I can apply the properties and relationships of multiplication.

Grade 3 – Number Sense/Fractions

Essential Questions:

1. Why do we use numbers, what are their properties, and how does our number system function?
2. Why do we use estimation and when is it appropriate?
3. What makes a strategy effective and efficient and the solution reasonable?
4. How do numbers relate and compare to one another?

Essential Vocabulary - fraction, part, whole, equivalent, numerator, denominator, fraction, number line diagram line diagram, fraction model, equal to, less than, greater than, whole number

We want students to understand that all numbers have parts, values, uses, types, and we use operations and patterns to work with them.

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 by *a* parts of 1/b.

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Simple fractions with common denominators and money (tenths and hundredths). 2. Fraction as equal parts of a whole 3. Fraction as equal parts of a group	1. Numerator as parts of a whole 2. Denominator as total parts of the whole	1. I can describe quantities by using simple fractions with common denominators. 2. I can write a fraction using numerator and denominator correctly.

3.NF.2.: Understand a fraction as a number on the number line; represent fractions on the number line diagram.
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 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
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 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. A number line diagram 2. Fraction as equal parts of a whole on a number line diagram 3. Fraction as equal parts of a group on a number line diagram	1. Numerator as parts of a whole 2. Denominator as total parts of the whole 3. How to use a number line diagram to represent and locate fractions	1. I can describe quantities by using simple fractions with common denominators using a number line diagram. 2. I can compare quantities by using simple fractions with common denominators using a number line diagram. 3. I can locate and represent a fraction on a number line diagram.

3.NF.3.: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.

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.

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.

Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer 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 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Fraction as equal parts of a whole 2. Fraction as equal parts of a group 3. Equivalent fractions as the same size or point on a number line 4. Fractions can be represented by using a visual fraction model 5. Fractions are equivalent to whole numbers 6. Fractions can only be compared when the two fractions refer to the same whole. 7. Fractions are related to division. 8. When comparing fractions with 1 as the numerator, the smaller the denominator the larger the fraction. 9. Equal to, Greater than, and less than and the correct symbols	1. Equivalent fractions 2. The size of the whole effects the size of the fraction 3. The relationship between fractions and whole numbers 4. Fractions as an expression of division 5. When and how to use a visual fraction model	1. I can use visual fraction models and number lines to explore the idea of equivalent fractions. 2. I can use visual fraction models and number lines to explain, compare, write, and identify equivalent fractions, including half. 3. I can compare two fractions with the same numerator or same denominator by using visual fraction models and number line diagrams. 4. I can record the results of comparisons with the symbols <, >, or =, and justify the conclusions.

Grade 3 – Algebraic Thinking

Essential Questions:

1. How do you use patterns to understand mathematics and model situations?
2. What is algebra?
3. How are the horizontal and vertical axes related?
4. How do algebraic representations relate and compare to one another?
5. How can we communicate and generalize algebraic relationships?

Essential Vocabulary - multiplication, groups, model, product, factor, division, groups, model, quotient, dividend, divisor, division, groups, model, quotient, dividend, divisor, multiplication, factor, product, array, equation, equal to symbol (=), Identity Property of Multiplication, Zero Property of Multiplication, Associative Property of Multiplication, Commutative Property of Multiplication, Distributive Property of Multiplication, inverse operation, estimation, mental computation, variable, reasonableness, pattern, properties of operations, odd, even, divisibility, prime, composite, double, sum, difference, product, factor, quotient, dividend, divisor, addend, subtrahend, minuend,

We want students to understand how we use patterns and relationships of algebraic representations to generalize, communicate, and model situations in mathematics.

3.OA.1.: Interpret products of whole numbers, e.g., interpret 5 x 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 x 7.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Purpose of multiplication	1. What multiplication represents	1. Represent multiplication with a model 2. Solve the represented multiplication model

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.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Purpose of division	1. What division represents	1. Represent division with a model 2. Solve the represented division model

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.

Grade 3 Enduring Understandings

Students will know…	*Students will understand…*	*Students will be able to…*
1. Purpose of division 2. Purpose of multiplication 3. Representational models, including groups, arrays, and measurement quantities	1. Understand models can help solve multiplication and division problems 2. Symbols can represent an unknown number	1. Represent division with a model 2. Represent multiplication with a model 3. Solve the represented division model 4. Solve the represented multiplication model

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 x ? = 48, 5 = _ ÷ 3, 6 x 6 = ?

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Multiplication and Division Fact Families 2. How to work backwards in a multiplication or division problem 3. Purpose of multiplication 4. Purpose of division	1. Relationship between multiplication and division 2. The equal to symbol (=) means the same as	1. Find the unknown number in a multiplication or division equation

3.OA.5.: Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative Property of Multiplication). 3 x 5 x 2 = can be found by 3 x 5 = 15 , then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative Property of Multiplication). Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive Property of Multiplication).

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Properties of operations 2. Properties of multiplication	1. Relationship between parts of an equation (factors and product) 2. Application of the properties of multiplication	1. Solve multiplication and division equations by applying knowledge of properties of operation.

3.OA.6.: Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Multiplication and division fact families	1. Relationship between parts of an equation (factors and product, quotient and dividend) 2. Relationship between multiplication and division 3. Purpose of multiplication 4. Purpose of division	1. Solve for the quotient thinking of it (quotient) as an unknown factor in the related multiplication fact

3.OA.7.: Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Multiplication and division facts within 100	1. Relationship between parts of an equation (factors and product, quotient and dividend) 2. Relationship between multiplication and division	1. Fluently multiply and divide facts within 100 2. Use strategies, including the relationship between multiplication and division or properties of operations, to find answers

3.OA.8.: Solve two-step word problems using the four operations within cultural contexts, including those of Montana American Indians. 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.(Note: this standard is limited to problems posed within 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.)

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. A part of the culture of Montana American Indians 2. A letter can represent a number 3. Estimation strategies 4. Process for solving word problems 5. Addition, Subtraction, Multiplication, and Division	1. Montana American Indians are a part of our community 2. Application of addition, subtraction, multiplication, and division to solve word problems 3. Reasonableness of answers 4. Steps to solve a word problem	1. Solve two-step word problems 2. Use strategies, including mental math and estimation, to assess reasonableness of the answer

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.

Grade 3 Enduring Understandings

Students will know…	***Students will understand…***	***Students will be able to…***
1. Patterns 2. Addition facts 3. Multiplication facts 4. Properties of operations 5. Properties of numbers (ex. odd, even, divisibility, prime, composite, etc.)	1. How numbers are related to each other in a variety of way	2. Identify arithmetic patterns 3. Explain patterns using properties of operations