

## 5<sup>th</sup> Grade Mathematics

### Course Information:

Grade Level: 5

Length: Full Year

**Essential Understanding:** In 5<sup>th</sup> grade, students will be exposed to: multiplication and division, all operations with fractions, all operations with decimals, conversion of measurements, and simple equations with algebra.

### Course Objectives:

1. Place value skills from billions to thousandths will be emphasized.
2. Multiplication and division skills will be applied.
3. Addition, subtraction, multiplication and division for fractions will be practiced using manipulatives, models and standard algorithms.
4. Addition, subtraction, multiplication, and division with decimals will be taught.
5. Foundation for solving basic algebraic equations will be applied.
6. Geometric shapes will be able to be identified based on attributes.
7. Properties of coordinate planes will be discussed.
8. Measurements will be converted from one unit to another.
9. Volume of a shape will be discovered.
10. Applying all skills learned to solve word problems will be a major focus.

### Student Objectives:

1. I can identify and use place value up to billions and down to thousandths.
2. I can multiply and divide whole numbers.
3. I can add, subtract, multiply, and divide fractions.
4. I can add, subtract, multiply, and divide decimals.
5. I can make and solve algebraic equations.
6. I can identify geometric shapes.
7. I can plot points and lines on a coordinate plane.
8. I can convert measurement.
9. I can find the volume of an object.
10. I can solve word problems using math skills.

## Pacing Guide:

### **Trimester 1**

#### Unit 1-

- a. Place Value 5NBT.1
  - Identification of place value to billions
- b. Whole number approximation 5NBT.4
  - Able to round numbers to any place up to billions
- c. Factors/Multiples, Prime Factorization Prep for Fractions
  - Multiplication Facts
  - identify factors of numbers, common factors between numbers
  - multiples of a single number, shared multiples between numbers
  - break down of numbers to prime factors
  - prime vs. composite
- d.  $\times/\div$  by 10, 100, and 1000 5NBT.2
  - review multiplication facts
  - how to use 0's when multiplying

#### Geometry Shapes

- 2-D Geometric Shapes and Geometric Vocabulary 5G.3-4
  - Vocab: line, angle, plane, ray, line segment, point, obtuse, acute, right angle
  - Shape names up to decagon
  - Use vocabulary to describe 2-D shapes

- Unit 10-Angles/ Degrees in a circle Prep for Field Trip
  - Degrees in a circle
  - Finding degrees in an angle
  - Degrees and directionality i.e. North, South etc.

#### Unit 2

- a. Mental Calculations, Order of Operations 5OA.1
  - Strategies to perform operations mentally
  - The process of solving operations (PEMDAS)
- b. Word Problems 5NF.6
  - How to use all operations to solve real world problems
- c.  $\times$  by a 2-digit whole number 5NBT.5
  - Math fact review
  - Different strategies to perform multiplication: lattice, area, standard, expanded
- d.  $\div$  by a 2 digit whole number 5NBT.6
  - Math fact review
  - Different strategies to solve division: area, partial quotient, on-top, expanded
  -

- Unit 5-Area Prep for Volume
  - what area is/ counting squares

- Standard algorithm:  $L \times W$

Unit 8- Volume 5MD.3,4,5

- What volume is/ counting cubes
- Standard Algorithm:  $L \times W \times H$
- Apply skill to word problems

## Trimester 2

### Unit 3-

a. Fractions, Comparing fractions 5NF.3

- Make equivalent fractions
- Mixed number to improper fractions and vice versa
- Reducing fractions
- Comparing like and unlike fractions, ordering fractions
- Identifying fractions

b. +/- fractions 5NF.1

- How to make like denominators to solve adding and subtracting
- Simplifying final answers
- Using mixed numbers with adding and subtracting

c.  $\times/\div$  fractions 5NF.4-5

- How to multiply fractions
- Use cross reducing
- Simplifying final answers
- Dividing fractions/ using reciprocals
- Applying multiplication strategies to division

d. Conversion of measures with fractions 5MD.2

- Use multiplication to convert fractional measurements

e. Word problems 5NF.2

- Using Addition and Subtraction of fractions and applying them to real world situations

Unit 4- More word Problems 5NF.6-7

- Using Multiplication and Division of fractions and applying them to real world problems

Unit 12- Graphing 5NF. 2, 6, 7

- Using line graphs, pie graphs, and bar graphs to identify information
- Using mean, median, and mode with graphs
- Using these skills and applying them with whole number and fraction skills to use in real world situations

## Trimester 3

### Unit 7-

a. Decimal Place value 5NBT.3

- Ability to name any number with decimals down to thousandths

b. Decimal Rounding 5NBT.4

- Use place value with decimals to round down to hundredths

c. +/- decimals 5NBT.7

- Use place value to line up decimals correctly in order to add or subtract
- Practice borrowing/ carrying skills

d.  $\times/\div$  decimals 5NBT.7

- apply multiplication skills
- able to put decimal in the correct place in product
- use division skills and extend remainder to decimal place value
- able to properly use decimal value in division

Unit 8- Decimal measurement conversions 5MD.1

- Use multiplication with decimals to covert measures

Unit 13-

a. Algebraic Equations 5OA.2

- Understand that a missing value can be represented by a variable
- Create equations using variables
- Solve equations with variables
- Simplify Equations with variables

b. Coordinate planes and graphing 5OA.3, 5G.1-2

- Identifying numbers on a coordinate plane
- Ability to plot a coordinate pair on the plane
- Use an equation to make coordinate pairs, then connect pairs to make a line
- Identifying a pattern in a line to make an equation

**Timeline:**

**Trimester 1**

<i>Content</i>	<i>Length</i>
Unit 1-Place Value	Week: 1
Unit 1-Whole Number Approximation	Week: 2
Unit 1-Factors/Multiples, Prime Factorization	Week: 3-4
Unit 1- $\times/\div$ by 10, 100, and 1000	Week: 5-6
Unit 2 Mental Calculations, Order of Operations	Week: 7-8
Unit 2- $\times$ by 2 digit	Week: 9-10
Unit 2 $\div$ by 2 digit	Week: 10-13

<i>Content</i>	<i>Length</i>
2-D Geometric Shapes	Week: 1-4
Unit 10-Angles/Degrees in a circle	Week: 5-6
Unit 1-Word Problems	Week: 7-10
Unit 5- Area	Week: 11
Unit 8 Volume	Week: 12-13
Unit 2- $\times$ by 2 digit	Week: 9-10
Unit 2 $\div$ by 2 digit	Week: 10-13

**Trimester 2**

<i>Content</i>	<i>Length</i>
Unit 3-Fractions/Comparing Fractions	Week: 14-17 (before xmas)

Unit 3- $\pm$ fractions	Week: (18-19)
Unit 3- $\pm$ Mixed numbers	Week: 20-21

Unit 4- x fractions by whole numbers and fractions	Week: 22-24
Unit 4- $\div$ with fractions	Week: 25-26

<i>Content</i>	<i>Length</i>
Unit 12- Graphing	Week: 14-19

Unit 3- Word Problems	Week: 20-23
Unit 3-Fraction Conversions (must do after xing)	Week: 22-24
Unit 4- More Word problems with $x/\div$	Week: 25-26

### Trimester 3

<i>Content</i>	<i>Length</i>
Unit 8-Decimal Place Value	Week: 26-27
Unit 8- Decimal +/-	Week: 28-29
Unit 8- x by decimal	Week: 30
Unit 8 $\div$ with a decimal	Week: 31
Unit 8- x 10,100,1000	Week: 32
Unit 8- $\div$ 10,100, 1000	Week: 33-34
Unit 8- x by 2 digit (decimal)	Week: 35-36
Unit 8- $\div$ by 2 digit (decimal)	Week: 37-39

<i>Content</i>	<i>Length</i>
Unit 8- Rounding Decimals	Week:26-27
Unit 13-L1/2-Algebraic Equations	Week: 28-31
Unit 8- Decimal Conversions	Week: 32-35
Unit 13-L.3-Coordinate graphs	Week: 36-39

### **Montana Common Core Standards:**

#### *Operations & Algebraic Thinking:*

Standard- 5.OA.1 - Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

\*Standard- 5.OA.2- Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

Standard- 5.OA.3 – Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

#### Number and Operations-Base Ten:

- 5.NBT.1 - Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

5.NBT.2 - Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

5.NBT.3 - Read, write, and compare decimals to thousandths. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form. Compare two decimals to thousandths

based on meanings of the digits in each place, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

5.NBT.4- Use place value understanding to round decimals to the hundredths.

5.NBT.5 - Fluently multiply multi-digit whole numbers using the standard algorithm.

- 5.NBT.6 - Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

5.NBT.7 - Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used

### *Number and Operations-Fractions*

5.NF.1-Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.

5.NF.2-Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers

5.NF.3-Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5NF.4 - Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. Interpret the product  $(a/b) \times q$  as a parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.5 - Interpret multiplication as scaling (resizing), by: Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence.

5.NF.6 - Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.7 - Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. Interpret division of a whole number by a unit fraction, and compute such quotients. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.

### *Measurement & Data*

5.MD.1 - Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems

5.MD.2 - Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots.

5.MD.3 - Recognize volume as an attribute of solid figures and understand concepts of volume measurement. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume. A solid figure which can be packed without gaps or overlaps using  $n$  unit cubes is said to have a volume of  $n$  cubic units.

5.MD.4 - Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units

MD.5 - Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. (A) Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication (B) Apply the formulas  $V = l \times w \times h$  and  $V = b \times h$  for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. (C) Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

### *Geometry*

5.G.1 - Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g.,  $x$ -axis and  $x$ -coordinate,  $y$ -axis and  $y$ -coordinate).

5.G.2 - Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation

5.G.3 - Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.

5.G.4 - Classify two-dimensional figures in a hierarchy based on properties.

**Resources:**

-Singapore Math

-Harcourt Math

-Math-Aids.com

-Arithmetwists

-ixl.com