

# BPS 6<sup>th</sup> Grade Math Planning Guide

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- **Number Talks Routine:** This routine is part of our BPS Curriculum. Number Talks should be implemented 3-5 days a week for 5-15 minutes each day.
- **Math Practice Standards:** The 8 Mathematical Practice Standards are the vehicle for teaching the Content Standards. These are listed at the end of this planning guide & descriptions can be found in the [BPS Unpacked Standards Document](#) (pgs. 1-2).
- MSA = Math Station Activities      EMGK = Everyday Math Games Kit

## UNIT 1 NUMBERS

[Unit 1 Opener: Careers in Math](#)

### GO MATH! MODULE 1: INTEGERS

6.NS.5, 6.NS.6, 6.NS.7

**Lesson 1.1:** Identifying Integers & Their Opposites 6.NS.5, 6.NS.6a, 6.NS.6b

MSA - Pgs 22-28 6.NS.5

**Lesson 1.2:** Comparing & Ordering Integers 6.NS.7a, 6.NS.7b

**Lesson 1.3:** Absolute Value 6.NS.7c, 6.NS.7d

### Montana Sixth Grade Standards for Mathematics

**6.NS.5:** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

**6.NS.6:** Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

**6.NS.6a:** Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.

**6.NS.6b:** Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

**6.NS.7:** Understand ordering and absolute value of rational numbers.

**6.NS.7a:** Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret  $-3 > -7$  as a statement that  $-3$  is located to the right of  $-7$  on a number line oriented from left to right.

**6.NS.7b:** Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write  $-3^{\circ}\text{C} > -7^{\circ}\text{C}$  to express the fact that  $-3^{\circ}\text{C}$  is warmer than  $-7^{\circ}\text{C}$ .

**6.NS.7c:** Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of  $-30$  dollars, write  $|-30| = 30$  to describe the size of the debt in dollars.

**6.NS.7d:** Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than  $-30$  dollars represents a debt greater than  $\$30$ .

**GO MATH! MODULE 2: FACTORS AND MULTIPLES**

**6.NS.4**

**Lesson 2.1:** Greatest Common Factor **6.NS.4**

**Lesson 2.2:** Least Common Multiple **6.NS.4**

MSA - Pgs 37-43

**Montana Sixth Grade Standards for Mathematics**

**6.NS.4:** Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express  $36 + 8$  as  $4(9 + 2)$ .

**GO MATH! MODULE 3: RATIONAL NUMBERS**

**6.NS.6, 6.NS.7**

**Lesson 3.1:** Classifying Rational Numbers **6.NS.6**

**Lesson 3.2:** Identifying Opposites and Absolute Value of Rational Numbers **6.NS.6a, 6.NS.6c, 6.NS.7c**

**Lesson 3.3:** Comparing and Ordering Rational Numbers **6.NS.7a 6.NS.7b**

MSA - 6.NS.7 Pgs 22-28

## Montana Sixth Grade Standards for Mathematics

**6.NS.6:** Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

**6.NS.6a:** Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.

**6.NS.6c:** Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

**6.NS.7:** Understand ordering and absolute value of rational numbers.

**6.NS.7a:** Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret  $-3 > -7$  as a statement that  $-3$  is located to the right of  $-7$  on a number line oriented from left to right.

**6.NS.7b:** Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write  $-3^\circ \text{C} > -7^\circ \text{C}$  to express the fact that  $-3^\circ \text{C}$  is warmer than  $-7^\circ \text{C}$ .

**6.NS.7c:** Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of  $-30$  dollars, write  $|-30| = 30$  to describe the size of the debt in dollars.

### Unit 1 Closer (Review & Performance Tasks)

## UNIT 2 NUMBER OPERATIONS

### Unit 2 Opener: Careers in Math

### GO MATH! MODULE 4 :OPERATIONS WITH FRACTIONS

**6.NS.4, 6.NS.1**

**Lesson 4.1:** Applying GCF and LCM to Fraction Operations **6.NS.4**

**Lesson 4.2:** Dividing Fractions **6.NS.1**

**Lesson 4.3:** Dividing Mixed Numbers **6.NS.1**

**Lesson 4.4:** Solving Multistep Problems with Fractions & Mixed Numbers **6.NS.1**

MSA - Pgs 37-43 **6.NS.4**

MSA - Pgs 44-50 **6.NS.1**

## Montana Sixth Grade Standards for Mathematics

6th Grade BPS Suggested Planning Guide

**6.NS.4:** Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express  $36 + 8$  as  $4(9 + 2)$ .

**6.NS.1:** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

**GO MATH! MODULE 5: OPERATIONS WITH DECIMALS**

5.NS.2, 5.NS.3

**Lesson 5.1:** Dividing Whole Numbers **6.NS.2**

**Lesson 5.2:** Adding and Subtracting Decimals **6.NS.3**

**Lesson 5.3:** Multiplying Decimals **6.NS.3**

**Lesson 5.4:** Dividing Decimals **6.NS.3**

**Lesson 5.5:** Applying Operations with Rational Numbers **6.NS.3**

**Montana Sixth Grade Standards for Mathematics**

**6.NS.2:** Fluently divide multi-digit numbers using the standard algorithm.

**6.NS.3:** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

**Unit 2 Closer (Review and Performance Task)**

End of 1st Quarter

**UNIT 3 PROPORTIONALITY: RATIOS & RATES**

**Unit 3 Opener: Careers in Math**

**GO MATH! MODULE 6: REPRESENTING RATIOS & RATES**

6.RP.1, 6.RP.2, 6.RP.3

**Lesson 6.1:** Ratios **6.RP.1, 6.RP.3, 6.RP.3a**

**Lesson 6.2:** Rates **6.RP.2, 6.RP.3, 6.RP.3b**

**Lesson 6.3:** Using Ratios and Rates to Solve Problems **6.RP.3, 6.RP.3a**

**Montana Sixth Grade Standards for Mathematics**

6th Grade BPS Suggested Planning Guide

**6.RP.1:** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."

**6.RP.2:** Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is  $3/4$  cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger." (Note: Expectations for unit rates in this grade are limited to non-complex fractions.)

**6.RP.3:** Use ratio and rate reasoning to solve real-world and mathematical problems from a variety of cultural contexts, including those of Montana American Indians, , e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

**6.RP.3a:** Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

**6.RP.3b:** Solve unit rate problems including those involving unit pricing and constant speed.

**GO MATH! MODULE 7: APPLYING RATIOS & RATES**

**6.RP.3**

**Lesson 7.1:** Tables & Graphs **6.RP.3, 6.RP.3a, 6.RP.3b**

**Lesson 7.2:** Solving Problems with Proportions **6.RP.3, 6.RP.3b**

**Lesson 7.3:** Converting Within Measurement Systems **6.RP.3d**

**Lesson 7.4:** Converting Between Measurement Systems **6.RP.3, 6.RP.3b, 6.RP.3d**

**Montana Sixth Grade Standards for Mathematics**

**6.RP.3:** Use ratio and rate reasoning to solve real-world and mathematical problems from a variety of cultural contexts, including those of Montana American Indians, , e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

**6.RP.3a:** Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

**6.RP.3b:** Solve unit rate problems including those involving unit pricing and constant speed.

**6.RP.3d:** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

**GO MATH! MODULE 8: PERCENTS**

**6.RP.3**

**Lesson 8.1:** Understanding Percent **6.RP.3c**

**Lesson 8.2:** Percents, Fractions, and Decimals **6.RP.3**

**Lesson 8.3:** Solving Percent Problems **6.RP.3, 6.RP.3c**

### Montana Sixth Grade Standards for Mathematics

**6.RP.3:** Use ratio and rate reasoning to solve real-world and mathematical problems from a variety of cultural contexts, including those of Montana American Indians, , e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

### Unit 3 Closer (Review & Performance Task)

END of 2nd Quarter

## UNIT 4 EQUIVALENT EXPRESSIONS

### Unit 4 Opener: Careers in Math

### GO MATH! MODULE 9: GENERATING EQUIVALENT NUMERICAL EXPRESSIONS

6.EE.1

**Lesson 9.1:** Exponents **6.EE.1**

**Lesson 9.2:** Prime Factorization **6.EE.1**

**Lesson 9.3:** Order of Operations **6.EE.1**

### Montana Sixth Grade Standards for Mathematics

**6.EE.1:** Write and evaluate numerical expressions involving whole-number exponents.

### GO MATH! MODULE 10: GENERATING EQUIVALENT ALGEBRAIC EXPRESSIONS

6.EE.2, 6.EE.3, 6.EE.4, 6.EE.6

**Lesson 10.1:** Modeling and Writing Expressions **6.EE.2a, 6.EE.2b, 6.EE.4, 6.EE.6**

**Lesson 10.2:** Evaluating Expressions **6.EE.2c**

**Lesson 10.3:** Generating Equivalent Expressions **6.EE.2b, 6.EE.3, 6.EE.4**

MSA - Pgs 64-67 **6.EE.2**

EMGK Algebra Election (pg. 29) **6.EE.2**

EMGK Multiplication Wrestling (pg. 124) **6.EE.3**

MSA - Pgs 75-81 **6.EE.3**

### Montana Sixth Grade Standards for Mathematics

**6.EE.2:** Write, read, and evaluate expressions in which letters stand for numbers.

**6.EE.2a:** Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation “Subtract  $y$  from 5” as  $5 - y$ .

**6.EE.2b:** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression  $2(8 + 7)$  as a product of two factors; view  $(8 + 7)$  as both a single entity and a sum of two terms.

**6.EE.3:** Apply the properties of operations as strategies to generate equivalent expressions. For example, apply the distributive property to the expression  $3(2 + x)$  to produce the equivalent expression  $6 + 3x$ ; apply properties of operations to  $y + y + y$  to produce the equivalent expression  $3y$ .

**6.EE.4:** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions  $y + y + y$  and  $3y$  are equivalent because they name the same number regardless of which number  $y$  stands for.

**6.EE.6:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

#### Unit 4 Closer (Review & Performance Tasks)

## UNIT 5 EQUATIONS & INEQUALITIES

#### Unit 5 Opener: Careers in Math

### GO MATH! MODULE 11: EQUATIONS AND RELATIONSHIPS

#### 6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8

**Lesson 11.1:** Writing Equations to Represent Situations 6.EE.5, 6.EE.5, 6.EE.7

**Lesson 11.2:** Addition and Subtraction Equations 6.EE.5, 6.EE.5, 6.EE.7

**Lesson 11.3:** Writing Equations From Tables 6.EE.5, 6.EE.6, 6.EE.7

**Lesson 11.4:** Writing Inequalities 6.EE.5, 6.EE.6, 6.EE.8

MSA - Pgs 71, 73, 74 6.EE.5

MSA - Pgs 82-90 6.EE.8

### Montana Sixth Grade Standards for Mathematics

**6.EE.5:** Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

**6.EE.6:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

**6.EE.7:** Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

**6.EE.8:** Write an inequality of the form  $x > c$  or  $x < c$  to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form  $x > c$  or  $x < c$  have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

### GO MATH! MODULE 12: RELATIONSHIPS IN TWO VARIABLES

6.EE.5, 6.EE.5, 6.EE.7, 6.EE.8

**Lesson 12.1:** Graphing on the Coordinate Plane 6.EE.6, 6.EE.6b

**Lesson 12.2:** Independent and Dependent Variables in Tables and Graphs 6.EE.9

**Lesson 12.3:** Writing Equations From Tables 6.EE.9

**Lesson 12.4:** Representing Algebraic Relationships in Tables and Graphs 6.EE.9

### Montana Sixth Grade Standards for Mathematics

**6.EE.6:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

**6.EE.9:** Use variables to represent two quantities in a real-world problem from a variety of cultural contexts, including those of Montana American Indians, that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation  $d = 65t$  to represent the relationship between distance and time.

### Unit 5 Closer (Review and Performance Task)

End of 3rd Quarter

## UNIT 6 RELATIONSHIPS IN GEOMETRY

### Unit 6 Opener: Careers in Math

### GO MATH! MODULE 13: AREA & POLYGONS

6.G.1, 6.EE.7

**Lesson 13.1:** Area of Quadrilaterals 6.G.1

**Lesson 13.2:** Area of Triangles 6.G.1

**Lesson 13.3:** Solving Area Equations 6.G.1, 6.EE.7

**Lesson 13.4:** Area of Polygons 6.G.1

**Montana Sixth Grade Standards for Mathematics**

**6.G.1:** Find area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems within cultural contexts, including those of Montana American Indians. For example, use Montana American Indian designs to decompose shapes and find the area.

**6.EE.7:** Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

**GO MATH! MODULE 14: DISTANCE AND AREA IN THE COORDINATE PLANE**

**6.NS.6, 6.NS.8, 6.G.3**

**Lesson 14.1:** Distance in the Coordinate Plane **6.NS.6b, 6.NS.8**

**Lesson 14.2:** Polygons in the Coordinate Plane **6.G.3**

**Montana Sixth Grade Standards for Mathematics**

**6.NS.6:** Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

**6.NS.8:** Solve real-world and mathematical problems from a variety of cultural contexts, including those of Montana American Indians, by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

**6.G.3:** Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

**GO MATH! MODULE 15: SURFACE AREA AND VOLUME OF SOLIDS**

**6.G.2, 6.G.4, 6.EE.7**

**Lesson 15.1:** Nets and Surface Area **6.G.4**

**Lesson 15.2:** Volume of Rectangular Prisms **6.G.2**

**Lesson 15.3:** Solving Volumen Equations **6.EE.7, 6.G.2**

MSA - pg. 91 **6.G.2**

MSA - pg. 98 **6.G.4**

### Montana Sixth Grade Standards for Mathematics

**6.G.2:** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas  $V = l w h$  and  $V = b h$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

**6.G.4:** Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems within cultural contexts, including those of Montana American Indians.

**6.EE.7:** Solve real-world and mathematical problems by writing and solving equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$  and  $x$  are all nonnegative rational numbers.

#### [Unit 6 Closer \(Review and Performance Task\)](#)

## UNIT 7 MEASUREMENT AND DATA

#### [Unit 7 Opener: Careers in Math](#)

### GO MATH! MODULE 16: DISPLAYING, ANALYZING, AND SUMMARIZING DATA

#### 6.SP.1, 6.SP.2, 6.SP.3, 6.SP.4, 6.SP.5

[Lesson 16.1:](#) Measures of Center [6.SP.3](#), [6.SP.5a](#), [6.SP.5b](#), [6.SP.5c](#), [6.SP.5d](#)

[Lesson 16.2:](#) Mean Absolute Deviation [6.SP.5c](#)

[Lesson 16.3:](#) Box Plots [6.SP.4](#), [6.SP.5c](#)

[Lesson 16.4:](#) Dot Plots and Data Distribution [6.SP.1](#), [6.SP.2](#), [6.SP.4](#), [6.SP.5c](#), [6.SP.5d](#)

[Lesson 16.5:](#) Histograms [6.SP.4](#), [6.SP.5](#)

MSA - pg. 118 [6.SP.1](#)

MSA - pg 116 [6.SP.2](#)

MSA - Pgs 138-139, 147 [6.SP.3](#)

MSA - Pg 133 [6.SP.5](#)

SUPP Graphing Native American Populations (IEFA) [6.SP.2](#)

### Montana Sixth Grade Standards for Mathematics

**6.SP.1:** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

**6.SP.2:** Understand that a set of data collected (including Montana American Indian demographic data) to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

**6.SP.3:** Recognize that a measure of center for a numerical data set summarizes all of its values using a single number, while a measure of variation describes how its values vary using a single number.

**6.SP.4:** Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

**6.SP.5:** Summarize numerical data sets in relation to their context, such as by:

**6.SP.5a:** Reporting the number of observations.

**6.SP.5b:** Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

**6.SP.5c:** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

**6.SP.5d:** Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

[Unit 7 Closer \(Review and Performance Task\)](#)

END of 4th Quarter

**Mathematical Practice Standards: Vehicle for All Content**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.