# School District of Marshfield Mathematics Standards –

## 6th Grade

*MATHEMATICS – Counting and Cardinality, Operations and Algebraic Thinking, Number and Operations in Base Ten, Measurement and Data, and Geometry*

| ***Wisconsin Academic Standards***<br>*Specific knowledge and skills that students will know and be able to do by the end of 6th Grade* | ***Marshfield Student Learning Target ("I can …")***<br>*These learning targets could be taught in the context of whole group, mini lessons, small groups and conferences.* |
|---|---|
| **Ratios and Proportional Relationships** | |
| ***Understand Ratio Concepts and Use Ratio Reasoning to Solve Problems***<br>• 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.1**<br>• 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."*[1] **6.RP.2**<br>• Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. **6.RP.3**<br>a. 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.3A**<br>b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* **6.RP.3B**<br>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. **6.RP.3C**<br>d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. **6.RP.3D** | ***Understand Ratio Concepts and Use Ratio Reasoning to Solve Problems***<br>• I can use what I know about ratios to describe the relationship between two quantities.<br>• I can understand how to find a rate when given a specific ratio. (Ex: We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger).<br>• I can use reasoning to solve word problems involving rate and ratios.<br>• I can make tables of equivalent ratios, find missing values in the tables and use the tables to compare ratios.<br>• I can plot ratios on a coordinate plane.<br>• I can solve unit rate problems. (Ex: If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were the lawns being mowed?).<br>• I can find a percent of a quantity as a rate per 100. (Ex: 30% of a quantity means 30/100 times the quantity).<br>• I can solve problems involving finding the whole if I am given a part and the percent.<br>• I can use what I know about ratios to convert units of measurement.<br>• I can change units of measurement correctly when multiplying or dividing quantities. |

[1] Expectations for unit rates in this grade are limited to non-complex fractions.

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|---|---|
| **The Number System** | |
| ***Apply and Extend Previous Understandings of Multiplication and Division to Divide Fractions by Fractions***<br>• 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. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?* **6.NS.1** | ***Apply and Extend Understanding of Multiplication and Division to Divide Fractions by Fractions***<br>• I can divide two fractions.<br>• I can solve word problems involving the division of fractions by fractions. |
| ***Compute Fluently with Multi-Digit Numbers and Find Common Factors and Multiples***<br>• Fluently divide multi-digit numbers using the standard algorithm. **6.NS.2**<br>• Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **6.NS.3**<br>• 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.4** | ***Compute Fluently with Multi-Digit Numbers and Find Common Factors and Multiples***<br>• I can divide multi-digit numbers.<br>• I can add, subtract, multiply and divide multi-digit numbers involving decimals.<br>• I can find the greatest common factor of two whole numbers less than or equal to 100.<br>• I can find the least common multiple of two whole numbers less than or equal to 12.<br>• I can use the distributive property to show the sum of two whole numbers (1-100) in different ways. (Ex: show 36 + 8 as 4(9 +2)). |
| ***Apply and Extend Previous Understandings of Numbers to the System of Rational Numbers***<br>• 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, credits/debits, 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.5** | ***Apply and Extend Previous Understandings of Numbers to the System of Rational Numbers***<br>• I can identify positive and negative numbers to describe amounts having opposite values.<br>• I can use positive and negative numbers to show amounts in real-world situations and explain what the number 0 means in those situations. |

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|---|---|
| **The Number System** | |
| ***Apply and Extend Previous Understandings of Numbers to the System of Rational Numbers***<br>• 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.6**<br>a. 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.6A**<br>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.6B**<br>c. 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.6C**<br>• Understand ordering and absolute value of rational numbers. **6.NS.7**<br>a. 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.7A**<br>b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3˚C > –7˚C to express the fact that –3˚C is warmer than –7˚C.* **6.NS.7B**<br>c. 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.7C**<br>d. 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 dollars.* **6.NS.7D** | ***Apply and Extend Previous Understandings of Numbers to the System of Rational Numbers***<br>• I can identify a rational number as a point on a number line.<br>• I can extend number line diagrams to show positive and negative numbers on the line.<br>• I can extend coordinate axes to show positive and negative numbers in the plane.<br>• I can recognize opposite signs of numbers as showing places on opposite sides of 0 on the number line.<br>• I can recognize that the opposite of the opposite of a number is actually the number itself. (Ex: -(-3) = 3).<br>• I can recognize that 0 is its own opposite.<br>• I can understand that the signs (- or +) of numbers in ordered pairs indicate locations in quadrants of the coordinate plane.<br>• I can recognize two ordered pairs with differing signs as reflections of each other across one or both axes.<br>• I can find and place integers and other rational numbers on a number line diagram.<br>• I can find and place ordered pairs on a coordinate plane.<br>• I can order rational numbers.<br>• I can understand absolute value of rational numbers.<br>• I can understand statements of inequality (ex: -3 > -7) and explain their positions and distances apart on a number line.<br>• I can write, understand and explain how the order of rational numbers applies in real-world situations. (Ex: -3˚C > -7˚C to show that -3˚ is warmer than -7˚C).<br>• I can relate absolute values to real-world situations. (Ex: for an account of -30 dollars, write (-30) = 30 to describe the size of the debt in dollars).<br>• I can tell the difference between comparisons of absolute value from statements of order. (Ex: An account balance less than -30 dollars is a debt greater than 30 dollars). |

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|---|---|
| **The Number System** | |
| ***Apply and Extend Previous Understandings of Numbers to the System of Rational Numbers***<br>• Solve real-world and mathematical problems 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.NS.8** | ***Apply and Extend Previous Understandings of Numbers to the System of Rational Numbers***<br>• I can graph points in all four quadrants of the coordinate plane to help me solve real-world and mathematical problems.<br>• I can use what I know about coordinates and absolute values to figure out the distance between points with the same first coordinate or the same second coordinate. |
| **Expressions and Equations** | |
| ***Apply and Extend Previous Understandings of Arithmetic to Algebraic Expressions***<br>• Write and evaluate numerical expressions involving whole-number exponents. **6.EE.1**<br>• Write, read, and evaluate expressions in which letters stand for numbers. **6.EE.2**<br>a. 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.2A**<br>b. 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.2B**<br>c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* **6.EE.2C**<br>• Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.* **6.EE.3**<br>• 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.4** | ***Apply and Extend Previous Understandings of Arithmetic to Algebraic Expressions***<br>• I can write and evaluate numerical expressions that have whole-number exponents.<br>• I can write, read and evaluate expressions in which letters stand for numbers.<br>• I can write expressions with numbers and letters.<br>• I can name the parts of an expression using mathematical words (sum, term, product, factor, quotient, coefficient).<br>• I can write parts of an expression in different ways. (Ex: 8 + 7 can be seen as the addition sentence or as the number 15).<br>• I can figure out different answers to expressions when given specific values for the variable.<br>• I can solve real-world math problems involving expressions by using formulas.<br>• I can solve math problems including those with exponents, by using the Order of Operations.<br>• I can apply what I know about the properties of operations (associative, commutative and distributive) to create equivalent (or equal) expressions.<br>• I can recognize when two expressions are equivalent. |

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|---|---|
| **Expressions and Equations** | |
| ***Reason About and Solve One-Variable Equations and Inequalities***<br>• 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.5**<br>• 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.6**<br>• 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.7**<br>• 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. **6.EE.8** | ***Reason About and Solve One-Variable Equations and Inequalities***<br>• I can understand that solving an equation or inequality means that I find out which values can make the equation or inequality true.<br>• I can try different numbers in place of a variable to figure out which makes the equation or inequality true.<br>• I can use variables to represent numbers and write expressions to solve real-world problems.<br>• I can understand that a variable can stand for an unknown number or any number in a given set of numbers.<br>• I can solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q (where p, q and x are all nonnegative rational numbers).<br>• I can write an inequality (x > c or x < c) to stand for a real-world or mathematical problem that has infinite solutions.<br>• I can represent the answers to inequality problems on number lines. |
| ***Represent and Analyze Quantitative Relationships Between Dependent and Independent Variables***<br>• Use variables to represent two quantities in a real-world problem 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.* **6.EE.9** | ***Represent and Analyze Quantitative Relationships Between Dependent and Independent Variables***<br>• I can use variables that change in relationship to one another to represent two quantities in a real-world problem.<br>• I can write an equation to show one quantity (the dependent variable) in terms of the other quantity (the independent variable).<br>• I can use graphs and tables to show the relationship between dependent and independent variables. |

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|---|---|
| **Geometry** | |
| ***Solve Real-World and Mathematical Problems Involving Area, Surface Area, and Volume***<br>• Find the 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. **6.G.1**<br>• 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.2**<br>• 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. **6.G.3**<br>• 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. **6.G.4** | ***Solve Real-World and Mathematical Problems Involving Area, Surface Area, and Volume***<br>• I can put together and take apart shapes to help me find the area of right triangle, other triangles, special quadrilaterals and polygons.<br>• I can apply what I know about taking apart and putting together shapes to find the area of objects or places in real world situations.<br>• I can use unit cubes to find the volume of any right rectangular prism.<br>• I can understand that the mathematical formula (V = l w h or V = b h) will give me the same result as using unit cubes to figure out the volume.<br>• I can use the mathematical formulas V=l w h or V = b h to determine the volume of real world objects.<br>• I can use coordinates to find the length of a side of a polygon joining points with the same first coordinate or the same second coordinate.<br>• I can apply what I have learned about polygons on coordinate planes to real world and mathematical situations.<br>• I can represent and figure out the surface area of a three dimensional shape by using nets made up of rectangles and triangles.<br>• I can apply my skills involving finding surface area with nets in real world and mathematical problems. |
| **Statistics and Probability** | |
| ***Develop Understanding of Statistical Variability***<br>• 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.1**<br>• Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. **6.SP.2**<br>• Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number. **6.SP.3** | ***Develop Understanding of Statistical Variability***<br>• I can recognize a statistical question as one that expects variability (multiple responses) in the data related to the question.<br>• I can understand that a set of data collected to answer a statistical question has a distribution that can be described by its center, spread and overall shape when plotted on a graph.<br>• I can understand that a set of numerical data has a measure of center (median and/or mean) that summarizes all of its values with a single number. |

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|---|---|
| **Statistics and Probability** | |
| ***Summarize and Describe Distributions***<br>• Display numerical data in plots on a number line, including dot plots, histograms, and box plots. **6.SP.4**<br>• Summarize numerical data sets in relation to their context, such as by: **6.SP.5**<br>a. Reporting the number of observations. **6.SP.5A**<br>b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. **6.SP.5B**<br>c. 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.5C**<br>d. 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. **6.SP.5D** | ***Summarize and Describe Distributions***<br>• I can understand that a distribution of a variable is the description of the relative number of times each possible outcome will occur.<br>• I can show numerical data in plots on a number line (including dot plots, histograms and box plots).<br>• I can summarize sets of numerical data in relation to their circumstances.<br>• I can summarize data by stating the number of observations.<br>• I can summarize data by describing the characteristics of what is being investigated, including how it was measured.<br>• I can summarize data by giving numerical measures of center and variability.<br>• I can summarize data by describing the overall pattern of the data and noticing unusual deviations from the overall pattern.<br>• I can summarize data by explaining how the distribution of the data on a graph relates to the choice of measures of center and variability. |