

6th Grade Math

Overview

Course Description: Mathematical Content in the sixth grade can be broken down in five areas of concentration.

1. Ratios and proportional relationships – understanding ratio concepts and using ratio reasoning to solve problems.
2. The number system – multiplying, dividing, adding, and subtracting decimals, fractions and multi-digit numbers as well as finding factors, common factors, multiples and common multiples. It is also important to extend previous understanding of numbers to the system of rational numbers.
3. Expressions and Equations – write simple algebraic expressions and equations as well as solving one variable equations.
4. Geometry – real world problems concerning area, surface area and volume.
5. Statistics and probability – use measures of center to describe data distributions.

The 6th grade math curriculum is aligned both with the Common Core Standards and the Michigan Curriculum Framework Document.

Students will learn:

To make sense of problem and persevere in solving them.

Reason abstractly.

Model mathematics.

Construct realistic arguments and evaluate the learning of others.

Use math tools to solve mathematical problems.

Be accurate in their math solutions.

Organize their mathematical thoughts.

Look for patterns when reasoning.

Prerequisite Class/Skill: Successful completion of 5th grade math curriculum with the common core as a foundation is required to take this class.

Other: 3 Trimesters

Units of Study

<u>Unit Title</u>	<u>Length of Study</u>
The Number Systems	6+ weeks
Geometry	5 to 6 weeks
Equations and Expressions	6 weeks
Statistics and Probability	6 weeks
Ratios and Proportions	5 to 6 weeks

Mathematics Core Units

Course Title: 6th Grade Math

Unit Title: The Number System

Length of Unit 6+ weeks

Grade Level: 6th grade

Unit 1 of 9

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>6.NS.1 Interpret and compute quotients of fractions, and solve problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.</p> <p>6.NS.2 Fluently divide multi-digit numbers using a standard algorithm for each operation.</p> <p>6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.</p> <p>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.</p> <p>6.NS.5 Understand that positive and negative number are used together to describe quantities having opposite directions or values, use positive and negative numbers to represent quantities in real-world contexts explaining the meaning of 0 in each situation.</p> <p>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.</p> <p>a. Recognize opposite signs of numbers as indicating locations on opposite sides of) on the number line: recognize that the opposite of the opposite is the number itself.</p>	<p>I Can...</p> <p>...divide fractions.</p> <p>...solve word problems involving the divisions of fractions by fractions.</p> <p>...divide multi-digit numbers.</p> <p>...add, subtract, multiply and divide multi-digit numbers involving decimals.</p> <p>...find the greatest common factor of tow whole numbers less than or equal to 100.</p> <p>...find the least common multiple of two whole numbers less than or equal to 12.</p> <p>...use the distributive property to show the sum of two whole numbers 1-100 in different ways.</p> <p>...understand that positive and negative numbers are used to describe amount having opposite values.</p> <p>...use positive and negative numbers to show amounts in real-world situations and explain what the number 0 means in those situations.</p> <p>...understand that a rational number is a point on a number line.</p> <p>...extend number line diagrams to</p>	<p>Absolute value</p> <p>Compatible numbers</p> <p>Coordinate plane</p> <p>Distributive property</p> <p>Dividend</p> <p>Divisor</p> <p>Exponent</p> <p>Expression</p> <p>Factor</p> <p>Inequality</p> <p>Integer</p> <p>Least common multiple</p> <p>Multiple</p> <p>Negative number</p> <p>Opposites</p> <p>Order of operations</p> <p>Ordered pair</p> <p>Origin</p> <p>Positive numbers</p> <p>Quadrant</p>	<ol style="list-style-type: none"> 1. Quizzes 2. Tests 3. Trimester Exam (on file in middle school office) 4. Use of thermometers, money, etc. to work with opposite integers 5. White board review 6. Graphing your location after dividing the classroom into four quadrants 7. Number line construction for use of integer operations 8. Model building 	<p>Print Material</p> <ul style="list-style-type: none"> • Middle School Math (Scott Foresman—Addison Wesley) • Common Core Coach Mathematic 6 (Dr. Jerry Kaplan) • Spectrum Math Grade 6 • Common Core Mathematics Grade 6 (April Barth) <p>Web Resources & Technology</p> <p>Curriculum Crafter (Website)</p> <p>Ed Helper (website)</p>

<p>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.</p> <p>c. Find and position integer 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.</p> <p>6.NS.7 Understand ordering and absolute value of rational numbers.</p> <p>a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.</p> <p>b. Write, interpret, and explain states of order for rational numbers in real-world contexts.</p> <p>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.</p> <p>d. Distinguish comparisons of absolute value from statements about order.</p> <p>6.NS.8 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 of the same second coordinate.</p>	<p>show positive and negative numbers on the line and in the plane.</p> <p>...recognize opposite signs of number as indicating places on opposite of 0 on the number line.</p> <p>...understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane.</p> <p>...place integers and other numbers on a number line diagram.</p> <p>...place ordered pairs on a coordinate plane.</p> <p>...order positive and negative numbers.</p> <p>...understand the distance between two number on a number line.</p> <p>...write and explain what rational number mean in real-world situations.</p> <p>...understand absolute values as the number's distance from 0 on the number line.</p> <p>...understand absolute values as they apply to real world situations.</p> <p>...tell the difference between comparing absolute values and ordering positive and negative numbers.</p> <p>...graph in all four quadrants of the coordinate plane to help me solve real-world and mathematical problems.</p> <p>...determine the distance between points in the same first coordinate of the same second coordinate.</p>	<p>Rational number</p> <p>Reciprocal</p> <p>Remainder</p> <p>x-axis</p> <p>y-axis</p> <p>y-coordinate</p> <p>x-coordinate</p>		
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Mathematics Core Units

Course Title: 6th Grade Math

Unit Title: Geometry

Length of Unit 5 to 6 weeks

Grade Level: 6th grade

Unit 3 of 9

COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>6.G.1. Find the area of right triangles, other triangles, special quadrilaterals and polygon by composing into rectangles or decomposing into triangles and other shapes: apply these techniques in the context of solving real-world and mathematics problems.</p> <p>6.G.2. Find the volume of a right rectangular prism with fractional edge length by packing it with unit cubes of the appropriate unit fraction edge length, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V=lwh$ and $V=Bh$ to find the volumes of right rectangular prisms with fractional edge lengths in the contest of solving real-world and mathematical problems.</p> <p>6.G.3. Draw polygons in the coordinate plane given coordinates to find the length of a side joining points with the same first coordinate of the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.</p> <p>6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nest to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.</p>	<p>I Can...</p> <p>...put together and take apart shapes to help me find the area of right triangles, other triangles, special quadrilaterals and polygons. I can make a line plot to display data sets of measurements in fractions.</p> <p>...apply what I know about taking apart and putting together shapes to find the area in real world situations.</p> <p>...use unit cubes to find the volume of a right rectangular prism and I understand that the mathematical formula $V=lwh$ or $V=Bh$ will give the same result.</p> <p>...use the mathematical formulas $V=lwh$ or $V=Bh$ to determine the volume of real world objects.</p> <p>...draw polygons in the coordinate plane when I am given the coordinates for the vertices.</p> <p>...use the coordinates of the vertices of a polygon on the coordinate plane to find the length of a side, joining points with the same first coordinate or the same second coordinate.</p> <p>...apply what I have learned about polygons on coordinate planes to real world and mathematical situations.</p> <p>...show how three dimensional</p>	<p>Pyramid Quadrilateral Rectangular prism Rectangular pyramid Volume Two-dimensional figure Triangular prism triangle Trapezoid Three-dimensional figure Surface area Right triangle Net Parallelogram Coordinate pair</p>	<ol style="list-style-type: none"> 1. Quizzes 2. Tests 3. Trimester Exam (on file in the middle school office)- Up (collected) 4. String activities to decompose polygons 5. Use nets to find surface area 6. Use nets to build solids 7. Fill boxes of varying size with unit cubes 	<p>Print Material</p> <ul style="list-style-type: none"> • Middle School Math (Scott Foresman—Addison Wesley) • Common Core Coach Mathematic 6 (Dr. Jerry Kaplan) • Common Core Mathematics Clinics (Options1) <p>Web Resources & Technology</p> <ul style="list-style-type: none"> • Curriculum Crafter (Website) • Ed Helper (website) • Dad’s Worksheets (website)

figures can be made using two dimensional nets.

...figure out the surface area of a three dimensional shape by using a net.

Mathematics Core Units

Course Title: 6th Grade Math

Unit Title: Equations and Expressions

Length of Unit 6 weeks

Grade Level: 6th grade

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COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.</p> <p>6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>a. Write expressions that record operations with numbers and with letters standing in for numbers.</p> <p>b. Identify parts of an expressions using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.</p> <p>c. Evaluate expressions at specific values. 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.</p> <p>6.EE.3 Apply the properties of operations to generate equivalent expressions. Example use the distributive property to generate $3(x+9)$ is the equivalent expression $3x+27$. Combine like terms, for example $y+y+y$ is the equivalent expression $3y$.</p> <p>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 expression $y+y+y$ and $3y$ are equivalent because they name the same number regardless of which number stands for.</p> <p>6.EE.5 Understand solving an equation or inequality as a process of answering a question; which values from a</p>	<p>I can...</p> <p>...write and understand numerical expressions involving whole number exponents.</p> <p>...write, read and figure out expression in which letters stand for numbers.</p> <p>...write expressions using numbers and letters (with the letters standing for numbers.)</p> <p>...identify the parts of an expression using mathematical words)sum, term, product, factor, quotient, coefficient.)</p> <p>...understand that in $2(8+7)$. $(8+7)$ can be thought of as two separate numbers or as 15.</p> <p>...determine the answer to expressions when given a specific value of a variable.</p> <p>...use my knowledge of order of operations to evaluate expressions.</p> <p>...use my knowledge of the order of operations to create equivalent expressions.</p> <p>...identify when two expressions are equivalent.</p> <p>...understand that solving an equation or inequality is like</p>	<p>Algebraic expression</p> <p>Coefficient</p> <p>Dependent variable</p> <p>Distributive property</p> <p>Equation</p> <p>Expression</p> <p>Independent variable</p> <p>Inequality</p> <p>Order of operations</p> <p>Inverse operations</p> <p>Term</p> <p>Variable</p> <p>Factor</p> <p>Coefficient</p> <p>Quotient</p> <p>Product</p> <p>Exponent</p>	<ol style="list-style-type: none"> 1. Quizzes 2. Tests 3. Trimester Exam (on file in middle school office) 4. White board assessments (on going) 5. Input/Output Exit Slips 6. Equation Balance 	<p>Print Material</p> <ul style="list-style-type: none"> • Middle School Math (Scott Foresman—Addison Wesley) • Common Core Coach Mathematic 6 (Dr. Jerry Kaplan) <p>Web Resources & Technology</p> <ul style="list-style-type: none"> • Curriculum Crafter (Website) • Ed Helper (website) • Dad’s Worksheets (website)

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; understanding 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 $c+p=q$ 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.

6.EE.9 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.

answering a question.

...use variables to represent numbers and write expressions when solving real-world problems.

...solve real-world mathematical problems by writing and solving equations.

...write an inequality when has many solutions and represent these solutions on a number line (where $x>c$ or $x<c$).

...use variables to represent two quantities in a real-world problems and write an equation to express the quantities.

...use graphs and tables to show the relationship between dependent and independent variables.

Mathematics Core Units

Course Title: 6th Grade Math

Unit Title: Statistics and Probability

Length of Unit 6 weeks

Grade Level: 6th grade

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COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>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 answer.</p> <p>6.SP.2 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.</p> <p>6.SP.3 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.</p> <p>6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</p> <p>6.SP.5 Summarize numerical data sets in relation to their context, such as by:</p> <ol style="list-style-type: none"> Reporting the number of observations. Describing the nature of the attribute under investigation, including how it was measured and in its units of measure. Giving quantitative measures of center and variability, as well as, describing any overall pattern with reference to the context in which the data were gathered. 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. 	<p>I can...</p> <p>...understand that the data in question involving statistics is varied as it relates to the question and answer.</p> <p>...understand that a set of data collected to answer a statistical question has an overall shape, including a center and spread, when plotted on a graph.</p> <p>...understand that a set of numerical data has a measure of center that summarizes all of its values with a single number.</p> <p>...understand that in a set of numerical data, the measure of variation describes how its values vary with a single number.</p> <p>...show numerical data on a number line.</p> <p>...summarize sets of numerical data that are different.</p> <p>...summarize data by stating the number of observations.</p> <p>...summarize data by describing the characteristics of what is being investigated, including how it was measured.</p> <p>...summarized data by giving numerical measures of center and</p>	<p>Mode</p> <p>Median</p> <p>Range</p> <p>Mean</p> <p>Outlier</p> <p>Trend (upward and downward)</p> <p>Histogram</p> <p>Box plot</p> <p>Bar graph</p> <p>Line graph</p> <p>Circle graph</p> <p>Dot plot</p> <p>Scale</p> <p>Broken scale</p> <p>Upper quartile</p> <p>Lower quartile</p> <p>Third quartile</p>	<ol style="list-style-type: none"> Quizzes Tests Trimester Exam (on file in middle school office) Sticky note how many pets do you have at home to create a line plot and dot plot Mean evening out cube tower Median paper plate numbers Outlier cards affect the mean Class discussion Summary's 	<p>Print Material</p> <ul style="list-style-type: none"> Middle School Math (Scott Foresman—Addison Wesley) Common Core Coach Mathematic 6 (Dr. Jerry Kaplan) Common Core Mathematic Clinics Statistics and Probability (Russell Kahn) <p>Web Resources & Technology</p> <ul style="list-style-type: none"> Curriculum Crafter (Website)

<p>variability.</p> <p>...summarize data by describing the overall pattern of the data and noting unusual deviations from the overall pattern.</p> <p>...summarize data by explaining how the distribution of the data on a graph determines its measure of center.</p>			
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Mathematics Core Units

Course Title: 6th Grade Math

Unit Title: Ratios and Proportions

Length of Unit 5 to 6 weeks

Grade Level: 6th grade

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COMMON CORE STANDARDS COVERED	UNIT BENCHMARKS What do you want students to know, do, and be like?	KEY VOCABULARY	SUGGESTED ASSESSMENTS How will you know if benchmarks have been achieved?	POSSIBLE RESOURCES What possible instructional resources could be used?
<p>6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.</p> <p>6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b not equal to 0, and use rate language in a the context of a ratio relationship.</p> <p>6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g. , by reasoning about tables of equivalent ratios, tap diagrams, double number line diagrams and equations.</p> <p>a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot pairs of values on the coordinate plane. Use tables to compare ratios.</p> <p>b. Solve unit rate problems including those involving unit pricing and constant speed.</p> <p>c. Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given part and the percent.</p> <p>d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying quantities.</p>	<p>I can...</p> <p>...understand ratios and the language used to describe two amounts.</p> <p>...understand how to find a rate when given a specific ratio.</p> <p>...solve word problems related to ratios in order to figure out the rate.</p> <p>...make tables of equivalent ratios, find missing values in the tables, plot those values on a coordinate plane, and use the tables to compare ratios.</p> <p>...solve unit rate problems.</p> <p>...find a percent of a quantity as a rate per 100.</p> <p>...solve problems finding the whole id I am given a part and the percent.</p> <p>...use what I know about ratio to convert units of measurement.</p>	<p>Equivalent ratio</p> <p>Percent</p> <p>Rate</p> <p>Ratio</p> <p>Unit rate</p>	<ol style="list-style-type: none"> 1. Student computation of test grades 2. Quizzes 3. Tests 4. Trimester Exam (on file in middle school office) 5. Comparison shopping (unit rate) 6. Arm span and height (coordinate graphing) 	<p>Print Material</p> <ul style="list-style-type: none"> • Middle School Math (Scott Foresman—Addison Wesley) • Common Core Coach Mathematic 6 (Dr. Jerry Kaplan) • Common Core Mathematic Clinics Ratio/Proportional Relationships and Expressions/Equations (Option) • Teacher created materials (Mark Eyre) <p>Web Resources & Technology</p> <ul style="list-style-type: none"> • Curriculum Crafter (Website) • Ed Helper (Website)

