Curriculum Map: Riverview 6th Grade Mathematics

Course: Math (6)

Grade(s): 6

Course Description:

In 6th Grade, the content focuses on procedures, concepts, and applications in eight critical areas

Course Student Learning Outcomes:

1. **Data Displays and Number Systems -** The students will:

- Create dot plots and use mean and median for data sets
- Explore mean as a balance point for data sets
- Determine whether to use mean, median, or mode to summarize data sets
- Analyze persuasive graphs and describe their features
- Get introduced to histograms
- Identify integers and rational numbers, plot them on a number line
- Find fractions between fractions

2. **Fraction Operations and Ratios-** The students will:

- Find factors and the greatest common factor of two or more numbers
- Find the least common multiple and use it to solve problems
- Find fractions of fractions
- Multiply and divide fractions
- Explore ratios and ratio notation
- Analyze, construct, and use tape diagrams to solve ratio problems
- Use pictures to model and solve ratio problems

3. **Decimal Operations and Percent-** The students will:

- Identify fraction-decimal equivalencies
- Use expanded form for decimals to explore decimal place value
- Review decimal addition, subtraction, and multiplication
- Review traditional long division, then learn decimal division
- Estimate and represent percent using 10 x 10 grids
- Explore the connection between ratios and percent
- Introduction to box plots

4. **Algebraic Expressions and Equations-** The students will:

- Review parentheses and exponents with calculators
- Apply the order of operations to solve the four 4's problem
- Write numerical expressions for special cases of patterns
- Write and evaluate algebraic expressions
- Explore the structure of the distributive property
- Use inequalities to represent real world situations
- Find and graph solution sets to inequalities

- Explore absolute value as a distance from zero
- Calculate mean absolute deviation

5. **Area and Volume Explorations-** The students will:

- Draw polygons on a coordinate grid and find side lengths
- Develop the formula for finding the area of a parallelogram
- Derive a formula for finding the area of a triangle
- Decompose complex polygons into smaller polygons to find area
- Sketch and use nets to find surface area of prisms and pyramids
- Review strategies for finding the volume of rectangular prisms
- Explore volume of rectangular prisms with fractional edge lengths

6. **Equivalent Expressions and Solving Equations**- The students will:

- Use substitution and trial and error to approximate solutions
- Write solutions to equations using set notation
- Use bar models to solve equations
- Use pan-balance models to solve equations
- Use the distributive property to combine like terms in algebraic expressions
- Use inverse operations to solve equations
- Use and compare a variety of strategies for solving equations

7. **Variables and Algebraic Relationships**- The students will:

- Write and interpret inequalities, then graph the solutions
- Set up spreadsheets for situations with changing values
- Use spreadsheets to solve more complicated problems
- Find unit rates to solve problems
- Convert among units of measure and compare rates
- Represent a growing pattern using numbers, symbols, words, and graphs
- Analyze relationships between independent and dependent variables
- Use diagrams, formulas, and graphs to make predictions and draw conclusions
- Match graphs with real-world situations

8. **Applications; Ratios, Expressions, and Equations**- The students will:

- Use area and ratios to double the yield of a garden
- Interpret the scale drawing of a gallery wall to find the dimensions of artwork
- On a coordinate grid, students enlarge the dimensions of scale drawings
- Use proportional reasoning to compare the sizes of planets to Earth and create a scale model
- Find population density for a variety of areas
- Solve equations to balance mobiles
- Use one body measure to predict another

Course Big Ideas:	1. Data Displays and Number Systems: Students will explore categories of numbers, including fractions and negative numbers. 2. Fraction Operations and Ratios: Students will find the greatest common factor, least common multiple, and develop skills with fraction multiplication and division. 3. Decimal Operations and Percent: Students will explore equivalent expressions as numbers written in different forms, perform arithmetic operations, and consider real-world applications. 4. Algebraic Expressions and Equations: Students will consider patterns, equations, properties, and inequalities as a means to introduce algebraic thinking. 5. Area and Volume Explorations: Students will graph polygons on coordinate grids, decompose parallelograms, triangles, and other polygons to find area, surface area, and volume. 6. Equivalent Expressions and Solving Equations: Students will develop a sense of how to recognize, understand, and manipulate both expressions and equations. 7. Variables and Algebraic Relationships: Students deepen their experience with inequalities by exploring how they represent real-world situations. They begin work with dependent and independent variables. 8. Applications of Ratios, Expressions, and Equations: Students apply their prior explorations of proportional reasoning, ratios, and rates to solving problems.
Course Textbooks, Workbooks, Materials, Citations:	6th Grade Math Textbook: Everyday Mathematics www.everdaymath.com
Course Academic Vocabulary:	**Academic Vocabulary for 6th Grade Math:** • **Absolute value** • **Additive identity** • **Additive inverse** • **Adjacent angles** • **Algebraic expressions** • **Area model** • **Associative property** • **Benchmark** • **Bin** • **Box plot** • **Capacity** • **Coefficient** • **Commutative property**

- **Composite number**
- **Conjecture**
- **Coordinate grid**
- **Data**
- **Decompose**
- **Dependent variable**
- **Distributive Property**
- **Dividend**
- **Divisor**
- **Dot plot**
- **Edge**
- **Equation**
- **Equivalent fractions**
- **Expanded notation**
- **Exponential notation**
- **Face**
- **Factors**
- **Formula**
- **Function**
- **Greatest common factor**
- **Grouping symbols**
- **Histogram**
- **Improper fraction**
- **Independent variable**
- **Integer**
- **Inverse operations**
- **Irrational numbers**
- **Landmarks**
- **Least common multiple**
- **Line plot**
- **Mean absolute deviation**
- **Net**
- **Order of operations**
- **Outlier**
- **Percent**
- **Prime factorization**
- **Quadrant**
- **Quotient**
- **Rate**
- **Ratio**
- **Repeating decimal**
- **Scale factor**
- **Scientific notation**
- **Statistical question**
- **Surface area**
- **Tape diagram**
- **Terminating decimal**
- **Unit rate**
- **Variable**

Course Assignments:	6th Grade Math Course Assignments are usually the homelinks that go with each lesson accompanied by the corresponding math box.
Course Long Term Transfer Goals:	**Students will be able to independently use their learning to:**

Students will be able to independently use their learning to:

•Apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.

•Make sense of and persevere in solving complex and novel mathematical problems.

•Use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.

•Communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.

•Make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies.

•Apply mathematical concepts to real life situations.

Academic Standards:

M06.A-N.1.1.1 Interpret and compute quotients of fractions (including mixed numbers), and solve word problems involving division of fractions by fractions.

M06.A-N.2.1.1 Solve problems involving operations (+, −, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems.

M06.A-N.2.2.1 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.

M06.A-N.2.2.2 Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.

M06.A-N.3.1.1 Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge).

M06.A-N.3.1.2 Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., $-(-3) = 3$; 0 is its own opposite).

M06.A-N.3.1.3 Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.

M06.A-N.3.2.1 Write, interpret, and explain statements of order for rational numbers in real-world contexts.

M06.A-N.3.2.2 Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation.

M06.A-N.3.2.3 Solve real-world and mathematical problems by plotting 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.

M06.A-R.1.1.1 Use ratio language and notation (such as 3 to 4, 3:4, 3/4) to describe a ratio relationship between two quantities.

M06.A-R.1.1.2 Find the unit rate a/b associated with a ratio a:b (with b ≠ 0) and use rate language in the context of a ratio relationship.

M06.A-R.1.1.3 Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.

M06.A-R.1.1.4 Solve unit rate problems including those involving unit pricing and constant speed.

M06.A-R.1.1.5 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 percentage.

M06.B-E.1.1.1 Write and evaluate numerical expressions involving whole-number exponents.

M06.B-E.1.1.2 Write algebraic expressions from verbal descriptions.

M06.B-E.1.1.3 Identify parts of an expression using mathematical terms (e.g., sum, term, product, factor, quotient, coefficient, quantity).

M06.B-E.1.1.4 Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems.

M06.B-E.1.1.5 Apply the properties of operations to generate equivalent expressions.

M06.B-E.2.1.1 Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

M06.B-E.2.1.2 Write algebraic expressions to represent real-world or mathematical problems.

M06.B-E.2.1.3 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 non-negative rational numbers.

M06.B-E.2.1.4 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.

M06.B-E.3.1.1 Write an equation to express the relationship between the dependent and independent variables.

M06.B-E.3.1.2 Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation.

M06.C-G.1.1.1 Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid). Formulas will be provided.

M06.C-G.1.1.2 Determine the area of irregular or compound polygons.

M06.C-G.1.1.3 Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided.

M06.C-G.1.1.4 Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). Formulas will be provided.

M06.C-G.1.1.5 Represent three-dimensional figures using nets made of rectangles and triangles.

M06.C-G.1.1.6 Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided.

M06.D-S.1.1.1 Display numerical data in plots on a number line, including line plots, histograms, and box and whisker plots.

M06.D-S.1.1.2 Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation).

M06.D-S.1.1.3 Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered.

M06.D-S.1.1.4 Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Course Pacing Calendar:	The Course Pacing Calendar can be filled out online by each individual 6th Grade math teacher. They simply need to log onto the EDM4 website and click on "Planner."

Course Interdisciplinary Connections/ Project Based Learning:

6th Grade Math Optional Projects from the online grade level resources:

- Making a cutaway globe
- Which soft drink is the best buy?
- Numbers, Mayan Style
- The Sieve of Eratosthenes
- Deficient, Abundant, and Perfect Numbers
- An Ancient Multiplication Algorithm
- "Magic" Computation Tricks
- How Would You Spend $1,000,000?
- Sports Areas
- Pendulums
- Exploring the Solar System
- Modeling the Solar System
- Distances in the Solar System
- Movements of the Planets
- Will It Be Possible to Travel to Other Planets in Your Lifetime?
- Anthropometry Project
- Paper Throwing Experiments

Course Notes: Any and all information related to 6th Grade Math can be found at:

https://connected.mcgraw-hill.com