

6th Grade American Online School

MATHEMATICS CURRICULUM

Structure, Patterns, and Mathematical Thinking in the Real World

Version May/2025

1. Introduction

The Role of Mathematics Education in 6th Grade

In 6th grade, students transition from concrete arithmetic toward abstract reasoning and algebraic thinking. This curriculum builds a deep understanding of number systems, ratios and rates, algebraic expressions, geometry, and data interpretation. Students apply problem-solving strategies, communicate mathematical ideas, and explore connections between math and real life through structured units and performance-based assessments.

By the end of this course, students will:

- ✓ Apply operations with decimals, fractions, and integers with confidence.
- ✓ Solve real-world and mathematical problems involving ratios and percentages.
- ✓ Understand and use expressions, equations, and inequalities.
- ✓ Analyze data and understand basic probability concepts.
- ✓ Explore geometry with focus on area, volume, and coordinate plane.
- ✓ Demonstrate mathematical reasoning, fluency, and perseverance.

2. Core Competence Areas

MTH.1 Number Systems and Operations

Learning Outcomes

By the end of this course, students will be able to:

- ✓ Perform multi-digit operations with decimals and whole numbers.
- ✓ Understand the structure and properties of numbers.
- ✓ Recognize and apply divisibility, factors, and multiples.

Competencies

MTH.1.A.1 – Mastering place value, operations, and number sense.

- Use the standard algorithm to multiply/divide decimals and whole numbers.
- Identify greatest common factor (GCF) and least common multiple (LCM).

MTH.1.A.2 – Understanding the numbers system.

- Compare and order rational numbers including negative values.
- Plot and interpret values on a number line, including opposites and absolute value.

MTH.2 Fractions, Ratios, and Percents

Learning Outcomes

By the end of this unit, students will be able to:

- ✓ Solve problems involving addition, subtraction, multiplication, and division of fractions.
- ✓ Understand ratios and use them to solve real-world problems.
- ✓ Convert between fractions, decimals, and percentages fluently.

Competencies

MTH.2.A.1 – Building algebraic fluency.

- Model and solve fraction operations using visual and numeric methods.
- Apply fraction arithmetic to word problems and proportional contexts.

MTH.2.A.2 – Reasoning with ratios, rates, and percents.

- Understand unit rates and construct ratio tables.
 - Calculate percentages of numbers and apply percent increase/decrease.
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MTH.3 Integers and Rational Numbers

Learning Outcomes

By the end of this unit, students will be able to:

- ✓ Interpret and use positive and negative numbers in real-life contexts.
- ✓ Graph, compare, and perform operations with integers.
- ✓ Use rational numbers to describe quantities and changes.

Competencies

MTH.3.A.1 – Representing and reasoning with signed numbers.

- Plot points on horizontal and vertical number lines.
- Apply absolute value and distance concepts between integers.

MTH.3.A.2 – Operating with rational numbers.

- Solve problems involving gains/losses, elevation, and temperature changes.
 - Use four operations with positive and negative numbers in context.
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MTH.4 Algebraic Expressions and Equations

Learning Outcomes

By the end of this unit, students will be able to:

- ✓ Write and interpret expressions, variables, and formulas.
- ✓ Solve one-step and two-step equations and inequalities.
- ✓ Represent real-world problems with algebraic expressions.

Competencies

MTH.4.A.1 – Understanding and building algebraic expressions.

- Use order of operations with variables and numerical expressions.
- Write expressions to model verbal descriptions.

MTH.4.A.2 – Solving and reasoning with equations.

- Use substitution and inverse operations to solve for unknowns.
 - Apply bar models and visual aids for algebraic reasoning.
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MTH.5 Geometry and Measurement

Learning Outcomes

By the end of this unit, students will be able to:

- ✓ Find area, surface area, and volume of geometric figures.
- ✓ Graph points in the coordinate plane to solve problems.
- ✓ Understand and use basic geometric concepts and terminology.

Competencies

MTH.5.A.1 – Applying formulas and solving geometric problems.

- Use area and volume formulas for rectangles, triangles, and prisms.
- Understand nets and surface area in 3D shapes.

MTH.5.A.2 – Understanding the coordinate plane.

- Plot ordered pairs in all four quadrants.
 - Solve real-world problems involving distance and shapes on the coordinate plane.
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MTH.6 Statistics, Data, and Probability

Learning Outcomes

By the end of this unit, students will be able to:

- ✓ **Collect, represent, and interpret numerical data.**
- ✓ **Analyze measures of center and variability.**
- ✓ **Explore simple probability and conduct experiments**

Competencies

MTH.6.A.1 – Analyzing and summarizing data sets.

- Use dot plots, histograms, and box plots.
- Calculate mean, median, mode, and range.

MTH.6.A.2 – Modeling probability and outcomes.

- Determine likelihoods using ratios, fractions, and percentages.
- Run simple probability experiments and analyze results.

3. Assessment and Evaluation

Formative Assessments – Ongoing Feedback for Learning

- ✓ **Daily warm-ups and skill checks.**
- ✓ **Concept maps and exit tickets.**
- ✓ **Peer review and discussion.**

Summative Assessments – Demonstrating Understanding

- ✓ **End-of-unit exams.**
- ✓ **Cumulative midterm and final assessments.**
- ✓ **Analytical math journal entries.**

Authentic Assessment – Application in Real-World Contexts

- ✓ Grocery Shopping Challenge: Unit rates and decimals
 - ✓ Volume Build Project: 3D models and calculations
 - ✓ Weather Data Tracker: Graphing and statistical summaries.
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4. Instructional Strategies for Online Learning

Inquiry-Based Learning

- ✓ Encourage exploration of patterns, conjectures, and generalizations.
- ✓ Pose real-world scenarios for collaborative problem solving.

Concrete-to-Abstract Instruction

- ✓ Budget planning using percentages and ratios.
- ✓ Create a scaled 3D architectural model.
- ✓ Statistical studies and survey analysis.

Technology-Integrated Learning

- ✓ GeoGebra and Desmos for modeling and visualization.
- ✓ Google Sheets for spreadsheet calculations and data interpretation.
- ✓ Personalized practice and online classroom with tutoring.

Inclusive Learning Environment

- ✓ Foster a growth mindset around mistakes and perseverance.
- ✓ Encourage multiple solution paths and justification of reasoning.
- ✓ Build mathematical confidence through mastery-based practice.