Based on the NCTM Curricular Focal Points, Math Foundations II is designed to expedite student progress in acquiring 6th- to 8th-grade skills. The course is appropriate for use as remediation at the high school level or as middle school curriculum. The program simultaneously builds the computational skills and conceptual understanding needed to undertake high school-level math courses with confidence.

The course's carefully paced, guided instruction is accompanied by interactive practice that is engaging and accessible. Formative assessments help students to understand areas of weakness and improve performance, while summative assessments chart progress and skill development. Early in the course, students develop general strategies for honing their problem-solving skills. Subsequent units provide a problem-solving strand that asks students to practice applying specific math skills to a variety of real-world contexts.

This course is built to state standards and informed by the National Council of Teachers of Math (NCTM) standards and Curricular Focal Points for Prekindergarten through Grade 8 Mathematics: A Quest for Coherence.

Length: Two Semesters

Unit 1: Integers and Operations

- Negative Numbers
- Absolute Value
- Adding and Subtracting Integers
- Multiplying and Dividing Integers
- Properties of Operations
- Order of Operations
- Number Lines and Inequalities
- Problem Solving
- Integers and Operations Wrap-Up

Unit 2: Fractions and Operations

- Fraction Fundamentals
- Introduction to Fraction Arithmetic
- Equivalent Fractions
- Simplifying Fractions
- Improper Fractions and Mixed Numbers
- Dividing Fractions
- Adding and Subtracting Fractions
- The Set of Rational Numbers
- Problem Solving
- Fractions and Operations Wrap-Up

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Unit 3: Decimals and Operations

- Decimal Fundamentals
- Multiplying Decimals
- Multiplying Decimals and Adding Zeros
- Repeating Decimals
- Dividing Decimals
- Adding and Subtracting Decimals in Word Problems
- Word Problems with Decimals - All Operations
- Estimating Sums and Differences with Decimals
- Estimating Products and Quotients of Decimals
- Problem Solving
- Decimals and Operations Wrap-Up

Unit 4: Percents, Ratios, Proportions, and Rates

- The Meaning of Percent
- Estimating Percent
- Working with Percents
- Relating Fractions, Decimals, and Percents
- Common Fractions, Decimals, and Percents
- Introduction to Ratios
- Comparing Ratios
- Proportions
- Rates
- Similarity and Scale Factors
- Problem Solving
- Percents, Ratios, Proportions, and Rates Wrap-Up

Unit 5: The Language of Algebra

- What is a Variable?
- Finding and Naming Variables
- Units and Reasonable Values
- Graphs, Tables, and Equations
- Solving Problems with Tables and Graphs
- Variable Expressions
- Mathematical Sentences
- Problem Solving
- The Language of Algebra Wrap-Up

Unit 6: Solving Equations with Addition and Subtraction

- Simplifying and Evaluating Expressions
- Solving Mathematical Sentences
- Solving Equations Graphically
- Solving Equations with Larger Numbers
- Solving x + a = b

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- Solving with a Number Line
- Solving Inequalities
- Variations of Equations and Inequalities
- Problem Solving
- Solving Equations with Addition and Subtraction Wrap-Up

Unit 7: Solving Equations with Multiplication and Division

- Solving ax = b
- Solving x/a = b
- Inequalities
- Problem Solving
- Solving Equations with Multiplication and Division Wrap-Up

Unit 8: Exponents

- Definitions and Examples of Exponents
- Exponents and the Order of Operations
- Laws of Exponents
- Scientific Notation
- Exponents in Geometry
- Square Roots
- Radical Notation
- Problem Solving
- Exponents Wrap-Up

Unit 9: Solving Equations with Roots and Powers

- Solving |x| = b
- Solving x² = b
- Solving √x = b
- Inequalities and Absolute Value
- Inequalities and x²
- Inequalities and <rt>√x</rt>
- Problem Solving
- Solving Equations with Roots and Powers Wrap-Up

Unit 10: Multi-Step Equations

- Solving ax + b = c
- Collecting Like Terms
- Using the Distributive Property
- Variables on Both Sides of the Equation
- Problem Solving
- Multi-Step Equations Wrap-Up

Unit 11: Linear Equations

- Cartesian Coordinate Systems
- Lines in the xy-plane

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- Slope
- Parallel and Perpendicular Lines
- Slope and Equations
- Slope-Intercept Form
- Point-Slope Form
- Linear Inequalities
- Problem Solving
- Linear Equations Wrap-Up

Unit 12: Systems of Linear Equations

- Graphing Two Variable Systems
- Solving Two Variable Systems with Substitution
- Solving Two Variable Systems by Elimination
- Two Variable Systems of Inequalities
- Problem Solving
- Systems of Linear Equations Wrap-Up

Unit 13: Distance and Angles

- Lines, Segments and Rays
- Angles
- Angles of a Triangle
- Similar Triangles
- The Pythagorean Theorem
- The Distance Formula
- Problem Solving
- Distance and Angles Wrap-Up

Unit 14: Area, Surface Area, and Volume

- Review of Perimeter, Area, and Volume
- Area of Triangles
- The Number Pi
- The Area of a Circle
- Surface Area of Prisms and Cylinders
- Volume of Prisms and Cylinders
- Problem Solving
- Area, Surface Area, and Volume Wrap-Up

Unit 15: Data Analysis and Probability

- Review of Data Analysis
- Populations and Samples
- Mean, Median, and Mode
- Quartiles and Box and Whisker Plots
- Two Variable Data Sets and the Line of Best Fit
- Introduction to Probability
- Problem Solving

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- Data Analysis and Probability Wrap-Up

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