



## Foundations of Algebra

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# Hazelwood School District

## Mission Statement

We are a collaborative learning community guided by a relentless focus to ensure each student achieves maximum growth.

## Vision Statement

HSD will foster lifelong learners, productive citizens and responsible leaders for an ever-evolving society.

Board of Education on January 5, 2010

## Goals

Goal #1: Hazelwood students will meet or exceed state standards in all curricular areas with emphasis in reading, writing, mathematics, science and social studies.

Goal #2: Hazelwood staff will acquire and apply skills necessary for improving student achievement.

Goal #3: Hazelwood School District, the community and all families will support the learning of all children.

## Curriculum Overview

The HSD Foundations of Algebra curriculum has not been updated in more than 7 years. Since that time, mathematics standards, learning progressions and best practices informed by research has drastically changed. This rewrite is to comply with MSIP V and to help ensure that all HSD students are receiving a high quality mathematics education.

In this course, students will learn a unique and practical focus on real-world problem solving while mastering the basic concepts and skills needed to apply to their daily life. Students will engage in activities that require them to identify, analyze, and solve problems involving the following topics: fractions, decimals, integers, proportions, one-step and two-step equations, coordinate graphing, percent's, converting phrases to numerical/algebraic expressions [words to symbols and vice versa], and geometry to include perimeter, area, and volume. The course emphasizes the need for students to comprehend and assume a basic knowledge of arithmetic.

This course is taught to make arithmetic approachable, even if students have no exposure to algebra or little confidence in their current mathematics skills. The first semester develops ideas in arithmetic, algebra, and geometry; the second semester develops ideas around mathematics that students will use outside the classroom.

The curriculum contains unit assessments that are rigorous and outline clear expectations. As the curriculum is implemented and taught, the assessments will be revised. **The assessments are required;** the learning activities are suggested. Teachers are encouraged to select the learning activities which meet the needs of their students. Some of the learning activities are very sequential and, when all of them are used, a student should be able to successfully complete the unit assessment. Other activities provide a menu of suggestions, and the teacher should select from those offered or design his/her own.

The plan for professional development includes multiple opportunities for training to help ensure that the high school mathematics curricula are implemented effectively and with fidelity. Initial training will be provided during district professional development opportunities to cover content and pedagogy. In addition to professional development days, ongoing training will be provided during Professional Learning Community (PLC) meetings to assist with upcoming skills and nuances in learning objectives. The Mathematics District Curriculum Coach and District Coordinator will provide teachers training to familiarize them with curriculum activities and expectations. Finally, ongoing training during PLC meetings will assist teachers with upcoming skills and with nuances in the learning objectives.

COURSE TITLE: Foundations of Algebra

GRADE LEVEL: 9

CONTENT AREA: Mathematics

**Course Description:**

Foundations of Algebra is designed to prepare students who have not mastered the algebra readiness topics. Students will be placed into this class, before Algebra 1, based on state and district assessment data. Topics include number systems and operations, properties of numbers, proportional thinking, properties and classification of geometric figures, measurement, Pythagorean relationships, data analysis, probability, simplifying and solving algebraic equations, patterns, and functions. One elective credit will be given to students who need extended time to complete Foundations of Algebra.

**Course Rationale:**

This course is taught to make arithmetic approachable, even if students have no exposure to algebra or little confidence in their current mathematics skills. The first semester develops ideas in arithmetic, algebra, and geometry; the second semester develops ideas around mathematics that students will use outside the classroom.

**Course Scope and Sequence**

Unit 1: Arithmetic, Calculators, and Problem Solving (Approx. 12 class periods)	Unit 2: Set of Numbers (Approx. 6 class periods)	Unit 3: Percentage and Problem Solving (Approx. 12 class periods)
Unit 4: Introduction to Algebra (Approx. 6 class periods)	Unit 5: Introduction to Geometry (Approx. 12 class periods)	Unit 6: Graphs and Functions (Approx. 12 class periods)
Unit 7: Statistics and Probability (Approx. 12 class periods)		

## Essential Terminology/Vocabulary

Add, Subtract, Multiply, Divide, Rational, Ratio, Proportion, Fraction, Numerator, Denominator, Equation, Expression, Sum, Difference, Quotient, Product, Factor, Natural, Whole, Integer, Rational, Irrational, Real, Complex, Base, Exponent, Equivalent, Polynomial, Binomial, Monomial, Quadratic, Equation, Inequality, Circle, Radius, Diameter,  $\pi$ , Circumference, Perimeter, Area, Volume, Surface Area, Sphere, Prism, rectangular Solid, Cylinder, Pyramid, Cone, Frustum, Right Pyramid, Right Cone, Right Frustum, Collinear, Function, Central Tendency, Mean, Median, Mode, Variance, Deviation, Standard Deviation, Normal Distribution, Bell Curve.

### Unit Objectives:

#### Unit 1: Arithmetic, Calculators, and Problem Solving

- Apply and extend previous understanding of operations with fractions to add, subtract, multiply, divide rational numbers
- Apply and extend previous understanding of arithmetic to algebraic expressions
- Compute fluently with multi-digit numbers and find common factors and multiples

#### Unit 2: Sets of Numbers

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, divide rational numbers
- Use properties of operations to generate equivalent expressions
- Know that there are numbers that are not rational, and approximate them by rational numbers

#### Unit 3: Percentage and Problem Solving

- Understand ratio concepts and use ratio reasoning to solve problems
- Analyze proportional relationships and use them to solve real-world and mathematical problems
- Understand similarity in terms of similarity transformations
- Understand and apply the Pythagorean Theorem

#### Unit 4: Introduction to Algebra

- Extend the properties of exponents to rational exponents
- Perform arithmetic operations on polynomials
- Solve equations and inequalities in one variable

#### Unit 5: Introduction to Geometry

- Solve real-world and mathematical problems involving area, surface area, and volume
- Draw, construct, and describe geometrical figures and describe the relationships between them.
- Explain volume formulas and use them to solve problems.
- Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

#### Unit 6: Graphs and Functions

- Apply and extend previous understanding of numbers to the system of rational numbers
- Understand the concept of a function and use function notation
- Represent and solve equations and inequalities graphically.

**Unit 7: Statistics and Probability**

- Summarize, represent, and interpret data on a single count or measurement variable
- Draw informal comparative inferences about two populations.
- Summarize, represent, and interpret data on two categorical and quantitative variables.
- Investigate chance processes and develop, use, and evaluate probability models.

**Proposed Course Materials and Resources:**

*Mathematics, Its Power and Utility*

10<sup>th</sup> Edition

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