

The Department's Educational Philosophy

The study of mathematics will enhance the ability of all students to problem solve and to reason. Through a strong standardized departmental program that emphasizes problem solving, communicating, reasoning and proof, making connections, and using representations, students will develop self-confidence and a positive attitude towards mathematics.

Our curriculum matches that of the Massachusetts Mathematics Curriculum Framework, and we are philosophically aligned with the National Council of Teachers of Mathematics Standards.

Guiding Principles

- Mathematical ideas should be explored in ways that stimulate curiosity, create enjoyment of mathematics, and develop depth of understanding.
- Effective mathematics programs focus on problem solving and require teachers who have a deep knowledge of the discipline.
- Technology is an essential tool in a mathematics education, and all students should gain facility in using it where advantageous.
- All students should have a high-quality mathematics program.
- Assessment of student learning in mathematics should take many forms to inform instruction and learning.
- All students should understand the basic structure of mathematics.
- All students should recognize that the techniques of mathematics are reflections of its theory and structure.
- All students should gain facility in applying mathematical skills and concepts.
- All students should understand the role of inductive and deductive reasoning in mathematic and real life situations.

FOUNDATIONS FOR ALGEBRA (SP): COURSE #315

Course Frequency: Full-year course, five times per week

Credits Offered: Five

Prerequisites: None

Background to the Curriculum

This course existed in the 1970s and 1980s as a Pre-Algebra course but had been cancelled due to insufficient enrollment. It was reinstated in 1997 and has been taught every year since then except for 1998, due to lack of enrollment. Currently the text Mathematical Connections (1997), published by Houghton Mifflin, is in use. This course is the bridge to Algebra 1 and eventually Geometry. This text matches both the 2000 edition of the National Council of Teachers of Mathematics curriculum standards and the 2000 edition of the Massachusetts State Framework recommendations. The course is, therefore, well aligned with national and state guidelines. Teachers bring in other material where appropriate and make minor changes as to the specific sections taught each year after consultation with the RDL.

Core Topics/Question/Concepts/Skills

Introduction to Algebra

Computing with integers

Solving linear equations

Fraction concepts

Ratio, proportion, percent

Rational numbers

Graphing on the coordinate plane

Course-End Learning Objectives

Students will be able to:

- 1] Use arithmetic to simplify expressions.
- 2] Apply order of operations.
- 3] Simplify expressions involving variables.
- 4] Use the distributive property.
- 5] Simplify algebraic expressions.
- 6] Perform all operations with positive and negative integers.
- 7] Evaluate expressions involving absolute value.
- 8] Graph points on a coordinate plane.
- 9] Solve linear equations.
- 10] Write variable expressions.
- 11] Write equations to model a given situation.
- 12] Solve equations using a four-part procedure.
- 13] Apply formulas.
- 14] Represent data in bar graphs or line graphs.
- 15] Find the mean, median, mode of a set of data.
- 16] Simplify fractional expressions in arithmetic.
- 17] Simplify fractional expressions in algebra.
- 18] Compare fractions.
- 19] Convert fractions to decimals and vice versa.
- 20] Solve equations involving fractions.
- 21] Use ratios and rates.
- 22] Solve proportions.
- 23] Solve problems involving percents.
- 24] Graph equations in two variables.
- 25] Solve inequalities in one variable algebraically.

Assessment

Students are generally assessed by in-class quizzes, which are administered regularly throughout a marking period. The students' attitude, effort, and quality of homework preparation will also impact their term grade to a small degree. Teachers informally assess students every day by asking pivotal questions, as well as questions involving mechanics or concepts, and the students' term grades may be positively affected to a small degree based on their responses. A standardized midyear examination and final examination are administered to all students in this course in order to assess their long-term retention of the course material.

Technology Learning Objectives Addressed in This Course

(This section is for faculty and administrative reference; students and parents may disregard.)

Course activity: skills &/or topics taught

- 1] The ability to use a four-function calculator to aid in complex computations.

Materials and Resources

Text: Mathematical Connections. Houghton Mifflin, 1997.

Teachers use other resources, such as the “Algebra with Pizzazz” series for motivating puzzle worksheets. In addition, current mathematical periodicals, such as “Mathematics Teacher,” are utilized by teachers of this course. Review materials that match both departmental examinations are used by all teachers of the course.