MATHEMATICS DEPARTMENT **GEOMETRY (AE): COURSE #322**

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.

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Course Frequency: Full-year course, five times per week
Credits Offered: Five
Prerequisites: C- in Algebra I

Background to the Curriculum

This course use the 2000 edition of the Jurgensen, Brown, and Jurgensen textbook, Geometry, published by Houghton Mifflin. Previous editions of this book by these authors have been used for approximately the past 40 years. 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 for a high school Geometry course. 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

Deductive reasoning
Parallel lines and planes
Congruent and similar triangles
Quadrilaterals
Geometric Inequalities
Right Triangles
Circles
Areas of plane figures
Solid Geometry
Coordinate Geometry
Introduction to Transformations

Course-End Learning Objectives

Students will be able to:

1] Identify points, lines, and planes.
2] Apply theorems about segments, angles, and parallel lines.
3] Write geometric proofs.
4] Apply the Parallel Postulate.
5] Identify the hypothesis and conclusion of a statement and form the converse, inverse, contrapositive.
6] Prove two triangles are congruent.
7] Use corresponding parts of congruent triangles.
8] Identify medians, altitudes, perpendicular bisectors, and all points of concurrency.
9] Classify the types of quadrilaterals.
10] State and use properties of quadrilaterals.
11] Prove triangles are similar.
12] Use corresponding parts of similar triangles.
13] Apply the Pythagorean Theorem.
14] Apply properties of special right triangles.
15] Understand the terminology of geometry within a circle.
16] Perform calculations for arcs, angles, segments within a circle.
17] Perform a variety of constructions.
18] Apply area formulae for triangles, quadrilaterals, polygons, and circles.
19] Apply formulae from solid geometry to find surface areas and volumes.
20] Contrast inductive and deductive reasoning.
21] Apply principles of mathematical logic.
22] Write truth tables to verify propositions.
23] Apply inequality theorems.
24] Illustrate locus for given conditions.
25] Use trigonometric ratios.
26] Apply techniques from coordinate geometry.
27] Distinguish between different types of transformations.

Assessment

Students are generally assessed by in-class tests and quizzes, which are administered regularly throughout a marking period. Generally, two quizzes are equivalent to a test. 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. In addition, an outside project may be assigned (for example, a drawing project to illustrate similar figures) to further assess the students' understanding.

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] Geometer's Sketchpad computer software is used to perform analyses of concepts learned.

Materials and Resources

Text: Jurgensen, Brown, and Jurgensen, Geometry. Houghton Mifflin, 2000.

Teachers use other texts for supplementary ideas, such as Discovering Geometry by Michael Serra, and also current mathematical periodicals, such as "Mathematics Teacher." Review materials that match both departmental examinations are used by all teachers of the course.