

# SPRINGFIELD PUBLIC SCHOOLS GEOMETRY HONORS

## Course Description

Geometry will emphasize skills necessary for problem-solving and continued growth in mathematics for those students who desire a more challenging curriculum. Students will apply concepts from the study of two and three-dimensional figures. Strong emphasis is placed on using deductive reasoning in the analysis of topics such as: parallel lines, triangle congruence, similarity, area, and volume. Content will include both coordinate and transformational geometry. Prerequisite: A or B in Algebra I and teacher recommendation.

## Course Rationale

Geometry Honors is for students who wish to pursue advanced levels of thinking and reasoning skills. These students should be academically prepared to handle an in-depth investigation of geometric principles. Students who are planning to study mathematics, science, advanced technology or related fields in college will find this course beneficial. The student will also gain logic and problem-solving skills needed for success on the Missouri Assessment Program test, ACT, SAT, and other standardized achievement tests, and in daily life.

## Major Instructional Goals

The intent of the Springfield R-12 Secondary Mathematics Program is to explore, investigate, and understand the importance of mathematics through real-world experiences. In mathematics, students will acquire the knowledge and skills to problem solve, communicate, reason, create models, and make connections. Students will:

1. Apply concepts of **Number and Operations** including:
  - a. Judge the reasonableness of numerical computations and their results. (MA1; 3.8)
  - b. Consistently apply the concept of similarity to solve problems involving proportions. (MA1; MA4; 3.3)
2. Apply concepts of **Algebraic Relationships** including:
  - a. Compare and contrast various forms of representations of patterns. (MA4; 1.6)
  - b. Identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem. (MA4; 1.6, 3.6)
  - c. Analyze and effectively solve geometric problems using algebraic equations and systems of equations. (MA1; MA2; 3.4, 3.8)
  - d. Recognize and appropriately demonstrate geometric concepts using algebraic inequalities. (MA4; 3.2)
3. Apply concepts of **Geometric and Spatial Relationships** including:
  - a. Apply and effectively communicate the basic concepts of geometry including terms, postulates, theorems and symbolic representations. (MA2; 3.4)
  - b. Analyze and solve problems involving angle relationships. (MA2; 1.6)
  - c. Use inductive and deductive reasoning to validate conclusions. (MA2; 3.5)

- d. Classify, analyze, and compare polygons and their properties to solve problems involving their various relationships. (MA2; 1.6, 1.10, 3.7)
  - e. Consistently demonstrate an understanding of congruent triangles utilizing formal proofs and verbal justifications. (MA2; 3.5, 4.1)
  - f. Apply appropriate properties of right triangles to solve problems and analyze real-world situations. (MA2; 1.10, 3.6)
  - g. Consistently and effectively apply circle relationships to solve problems, including real-world situations. (MA2; 1.10)
  - h. Investigate, develop, and apply geometric properties and relationships to solve multi-step problems in two dimensions, including area and perimeter. (MA2; 3.6)
  - i. Investigate, develop, and apply formulas to solve problems involving surface area and volume. (MA2; 3.6)
  - j. Demonstrate an understanding of coordinate geometry by making conjectures and solving problems involving two-dimensional objects represented with Cartesian coordinates. (MA2; 3.2, 3.6, 4.1)
  - k. Use and apply constructions to represent translations, reflections, rotations, and dilations of objects. (MA2; 1.10)
  - l. Identify types of symmetries of two- and three-dimensional figures. (MA2; 1.6, 1.10)
  - m. Design and create visual models to represent and solve problems in two and three dimensions, using a variety of tools. (MA2; 1.4)
  - n. Draw and use vertex-edge graphs or networks to find optimal solutions. (MA6; 3.4)
4. Apply concepts of **Measurement** including:
- a. Consistently and effectively solve problems of angle measure, including those of triangles or other polygons, and parallel lines cut by a transversal. (MA2; 3.1, 3.4)
  - b. Investigate and develop formulas to determine the perimeter, area, surface area and volume of two- and three-dimensional geometric figures. (MA2; 1.10, 3.4)
  - c. Analyze the effects of computation on precision. (MA2; 1.7, 3.8)
5. Apply concepts of **Data Analysis and Probability** including:
- a. Select, create and use appropriate graphical representation of data. (MA6; 1.8, 3.6)
  - b. Given a scatterplot, determine an equation for a line of best fit. (MA3; 1.6)
  - c. Explore and analyze the principles of geometric probability. (MA3; 1.10, 3.4)