

COURSE PROFICIENCY OUTLINE

GEOMETRY – 3315

General Studies

5 Credits

Purpose

This course is designed to integrate a basic understanding of the deductive reasoning process and as a foundation for Algebra II. The students will work with key concepts in geometry and will be expected to integrate their understanding of basic algebraic concepts to geometric relationships. This course will contain a review of basic concepts from Algebra I and will develop an understanding of the properties of geometry. This course will also serve to prepare students for HSPA in content area.

Geometry holds an important role in high school mathematics, primarily through its focus on deductive reasoning. In addition, geometry helps us represent and describe the world in which we live; it includes categorizations and properties of shapes and their relationships. Developing skills in deductive reasoning and understanding geometric properties are important outcomes of the high school geometry course. Equally important, however, is the continued development of visualization skills, pictorial representations, and applications of geometric ideas to describe and answer questions about natural, physical, and social phenomena.

Deductive reasoning is highly dependent upon communication skills. In fact, mathematics can be considered as a language, a language of patterns. Communication and language play a critical role in helping students to construct links between their informal, intuitive geometric notions and the more abstract language and symbolism of high school geometry.

I. New Jersey Core Curriculum Standards for Mathematics

- 4.1 Number and Numerical Operations
- 4.2 Geometry and Measurement
- 4.3 Patterns and Algebra
- 4.4 Data Analysis, Probability, and Discrete Mathematics
- 4.5 Mathematical Processes

II. Content Clusters

- Unit 1 – Angles, Points, Lines, Planes, and Deductive Reasoning
- Unit 2 – Triangles, Distance Formula, Symmetry, and Reflections
- Unit 3 – Quadrilaterals, Dilations, and Similar Figures
- Unit 4 – Polygons, Area, Surface Area and Volume
- Unit 5 – Right Triangles, Trigonometry, and Circles

III. Student Outcomes

Unit 1 – Angles, Points, Lines, Planes, and Deductive Reasoning

(4.1 A, 4.2 A,C,E, 4.3 A,B,D, 4.4 A,C, 4.5 A,B,C,D,E)

Students will be able to:

1. Sketch points, lines, planes, and their intersections.
2. Measure segments and add their lengths.
3. Measure angles and classify them based on their measures.
4. Analyze segment bisectors and angle bisectors.
5. Identify complementary angles, supplementary angles, vertical angles, and linear pairs.
6. Use the properties of equality and congruence to justify mathematical statements.
7. Identify relationships between the angles formed by two lines and a transversal, especially when the two lines are parallel.
8. Use the properties of parallel and perpendicular lines to find angle measures.
9. Explore translations.

Unit 2 – Triangles, Distance Formula, Symmetry and Reflections

(4.2 B,E, 4.3 B, 4.5 A,B,C,D,E)

Students will be able to:

1. Classify triangles according to angle measures and side lengths.
2. Use the Triangle Sum Theorem, the Base Angles Theorem, the Pythagorean Theorem, and the Triangle Inequality Theorem.
3. Discover the relationship between the medians of a triangle and its centroid.
4. Identify corresponding parts of congruent triangles.
5. Show triangles are congruent using the SSS, SAS, and ASA Congruence Postulates, and the AAS and HL Congruence Theorems.
6. Use angle bisectors and perpendicular bisectors to compute angle measures and segment lengths in situations involving triangles.
7. Reflect figures over lines and use reflections to discover lines of symmetry in a figure.

Unit 3 – Quadrilaterals, Dilations, and Similar Figure

(4.2 A,B,E, 4.5 A,B,C,D,E)

Students will be able to:

1. Classify a triangle by its sides.
2. Recognize the properties of the angles formed when parallel lines are cut by a transversal.
3. Calculate angle measures in a triangle.
4. Use ratios and solve proportions, especially as they relate to similar polygons.
5. Identify similar polygons, and use postulates and theorems to show that two triangles are similar.
6. Identify and draw dilations of polygons.

Unit 4 – Area, Surface Area and Volume

(4.2A,E; 4.5 A,B,C,D,E)

Students will be able to

1. Find the measures of interior and exterior angles of polygons.
2. Find the area of squares, rectangles, triangles, parallelograms, and trapezoids.
3. Find the circumference and area of circles.
4. Identify and name solid figures.
5. Find the surface area and volume of prisms, cylinders, pyramids, cones and spheres.

Unit 5 – Right Triangles, Trigonometry and Circles

(4.2 A,E; 4.5 A,B,C,D,E)

Students will be able to

1. Find the sine, cosine and tangent ratios of the acute angles in a right triangle.
2. Solve right triangles.
3. Identify parts of a circle, such as arcs, and their properties.
4. Identify inscribed angles and intersecting chords in circles, and use the properties related to them.
5. Identify rotational symmetry and rotations in a plane.

Materials

- A. Texts: McDougal Little Geometry Concepts and Skills
Additional materials will be supplemented when necessary.
- B. Notebook Guide: McDougal Little
- C. Compass, protractor, straight edge, notebook, paper, pencil, and eraser must be provided by the student.
- D. Calculators will be provided when necessary. Students may purchase their own personal calculator as research supports the fact that the more familiar they are with the calculator, the better their performance.
- E. Additional Resource: www.classzone.com

Evaluation

- A. The student will be expected to complete classwork, homework, keep a notebook and take tests and quizzes. These will be checked and reviewed by the teacher.
- B. The student will be expected to demonstrate an acceptable level of proficiency in the objectives and content of this course.
- C. The student will be expected to demonstrate at all times appropriate classroom behavior such as self-control, respect for others, respect for property and a mature attitude.
- D. The student will be expected to adhere to the school rules and regulations for behavior and the district policy for attendance.
- E. Students will be required to successfully pass the High School Proficiency Assessment as mandated in the graduation law (N.J.S.A. 6:8-4.2).
- F. Students who fail the HSPA examination will be placed in a Basic Skills Math class as required by N.J.S.A. 6:8-4.2. There will be no exceptions to this requirement.
- G. The student will be expected to take a comprehensive final exam covering the entire school year's work. This exam will count at 1/5 of the final grade.

Previously Fundamentals of Geometry
Renamed: August 2009