

Passaic County Technical Institute

GEOMETRY HONORS

September 2012

Course Description

The Geometry honors curriculum is design for academically motivated students who are proficient in mathematics. This course takes a different approach than the standard Geometry course, requiring students to perform at a high level of abstraction. There will be substantially more rigorous questions, mathematical analysis, projects, and real-life problems. This course should bring students to a high level of confidence in their ability to derive and effectively use some of the most fundamental relationships of mathematics. Student's GPA for this course is calculated as 1 point more than a regular course.

Geometry is the analysis of the characteristics and properties of two and three dimensional geometric shapes and the development of mathematical arguments about geometric relationships. It involves the ability to specify locations and describe spatial relationships using coordinate geometry and other representational systems. It also encompasses the ability to apply transformations and to use symmetry to analyze mathematical situations. It requires the use of visualization, spatial reasoning and geometric modeling to solve problems.

COURSE OBJECTIVES/OUTLINE

I. Essentials of Geometry (Chapter 1)

1. Identify points, lines and planes (G-CO 1)
2. Use segments and congruence (G-CO 1)
3. Use midpoint and distance formulas (A.CED.1; G-GFE.7; G-MG.3)
4. Measure and classify angles, constructions (G –CO1, 12)
5. Describe angle relationships (G-CO 1)
6. Classify polygons (G-GMG 1)

II. Reasoning and Proof (Chapter 2)

1. Use inductive reasoning (G – SRT 5; N.Q.1;A.SSE.2)
2. Analyze conditional statements (G- SRT 5; A.SSE.2; G-CO1)
3. Apply deductive reasoning (G-SRT 5; A.SSE.2)
4. Use postulates and diagrams (G-CO 9; G – GMD 4; N.Q.1)
5. Using properties from algebra (A.REI.1; A-APR 1; A.SSE.2)
6. Prove statements about segments and angles (G- CO 6, 9; A.SSE.2)
7. Prove angle pair relationships (G-CO 9; N.RN.2)

III. Parallel and Perpendicular Lines (Chapter 3)

1. Identify pairs of lines and angles (G-CO 1; N.Q.1; A.CED.2)
2. Use parallel lines and transversals (G -CO 9; N.Q.1; A.CED.2)
3. Prove lines parallel (G-CO 9; N.Q.1; A.CED.2)
4. Prove theorems about perpendicular lines (G-CO 9, 12; N.Q.1; A.CED.2)

END OF MARKING PERIOD 1

IV. Right Triangles and Trigonometry (Chapter 7)

1. Apply the Pythagorean Theorem (G-SRT 8; A-SSE 1; A-REI 4; F-TF 8; N-RN 2)
2. Use the Converse of the Pythagorean Theorem (G-SRT 8; N-RN 2; A-SSE 4; A-REI 4)
3. Use similar right triangles (G-SRT 4, 5, 6, 8; N-RN 2)
4. Special Right triangles (G-SRT 8; N-RN 2)
5. Apply the Tangent ratio (G-SRT 6, 8; A-SSE 1; A-REI 4)
6. Apply the Sine and Cosine ratios (G-SRT 6, 8, 10, 11; A-SSE 1)
7. Solve right triangles (G-SRT 8, 11; A-REI 4)

V. Quadrilaterals (Chapter 8)

1. Find angle measures in polygons (G-MG 1; G –CO 10)
2. Use properties of parallelograms (G-CO 11)
3. Show that a quadrilateral is a parallelogram (G-CO 11)
4. Properties of rhombuses, rectangles and squares (G-CO 11)
5. Use properties of trapezoids and kites (G-SRT 5; G-CO 11)
6. Identify special quadrilaterals (G-CO 11)

V I. Properties of Transformations (Chapter 9)

1. Translate figures and use vectors (G-CO 4, 5)
2. Matrices and Vectors (CC 9-12; N.VM.6,7,8)
3. Perform reflections (G-CO 3, 5)
4. Perform rotations (G-CO 4, 5)
5. Apply compositions of transformations (G-CO 5)
6. Identify symmetry (G -SRT 1A; G-CO 3, 5)
7. Identify and perform dilations (G-SRT 1A)

END OF MARKING PERIOD 2

VII. Congruent Triangles (Chapter 4)

1. Apply triangle sum properties (G-CO 10)
2. Apply congruence and triangles (G-CO 7; G-SRT.5)
3. Relate transformations and congruence (G-CO 2, 6, 7)
4. Prove triangles congruent by SSS (G-CO 8; G-SRT.5)
5. Prove triangles congruent by SAS and HL (G-CO 8; G-SRT.5)
6. Prove triangles congruent by ASA and AAS (G-CO 8)
7. Use congruent triangles (G- CO 10; G-SRT.5)
8. Use isosceles and equilateral triangles (G-CO 10)
9. Perform congruence transformations (G-CO 2, 5, 6)

VIII. Relationships within Triangles (Chapter 5)

1. Midsegment Theorem and coordinate proof (G-CO 10; A.REI.1; G-GPE.4)
2. Use perpendicular bisectors (G-CO 9, 10)
3. Use angle bisectors of triangles (G-CO 10; G-C 3)
4. Use medians and altitudes (G-CO 10)
5. Use inequalities in a triangle (G – CO 10; A.REI.1, 3)
6. Inequalities in two triangles and indirect proof (G – CO 10; A.REI.1,3)

X I. Similarity (Chapter 6)

1. Use similar polygons (G-SRT 2, 5)
2. Relate transformations and similarity (G-SRT 2)
3. Prove triangles similar by AA (G-SRT 3, 5)
4. Prove triangles similar by SSS and SAS (G-SRT 3, 4, 5)
5. Use proportionality theorems (G-SRT 4, 5; G-GPE.6)
6. Perform similarity transformations (G-SRT 5; G- CO2)

END OF MARKING PERIOD 3

X. Properties of Circles (Chapter 10)

1. Use properties of tangents (G –CO 1)
2. Find arc measures (G-CO 1; N-Q 3)
3. Apply properties of chords (G-CO 2)
4. Use inscribed angles and polygons (G-CO 3, 13)
5. Apply other angles relationships in circles (G-CO 2)
6. Find segment lengths in circles (G –C 2; N-Q 3)
7. Write and graph equations of circles (G -GPE 1; N-Q 1; G-C 1)

XI. Measurements of Figures and Solids (Chapter 11)

1. Circumference and arc length of circles (G-CO 1, 5; N-Q 3; A-CED.4)
2. Areas of circles and sectors (G-GMD 1; N-Q 3; A-SSE 3; A-CED 4)
3. Areas of regular polygons (N – Q 1, 3; A –SSE 3; A-CED 4; G-GPE 7)
4. Use geometric probability (S-CP 9)
5. Explore solids (G-GMD 4; A-SSE 3)
6. Volume of prisms and cylinders (G-GMD 1; N-Q 3; A-SSE 3; A-CED 4)
7. Volume of pyramids and cones (G-GMD 1; N-Q 3; A-SSE 3; A-CED 4)
8. Surface area and volume of spheres (G-GMD 3; N-Q 3; A-SSE 3; A-CED 4)
9. Explore similar solids (G-GMD 3, G-SRT 2)

END OF MARKING PERIOD 4

INSTRUCTIONAL, RESOURCE AND SOFTWARE MATERIALS

Student Textbook: Geometry
Larson, Boswell, Kanold, and Stiff
ISBN 978-0547-64714-2
© 2012 Holt McDougal, Larson

Resources:	Chapter Resource Book © 2012 Holt McDougal, Larson	Remediation Book © 2012 Holt McDougal, Larson
	Chapter Transparency Book © 2012 Holt McDougal, Larson	Assessment Book © 2012 Holt McDougal, Larson
	Notetaking Guide © 2012 Holt McDougal, Larson	Benchmark Tests © 2012 Holt McDougal, Larson
	Practice Workbook © 2012 Holt McDougal, Larson	Teacher Tools Transparencies © 2012 Holt McDougal, Larson

Websites: kutasoftware.com; brainpop.com; mathforum.org; discoveryeducation.com
linkstolearning.com; edhelper.com; onlinemathlearning.com/geometry

Software: The Geometers Sketchpad
Calculators: TI 84 or TI-83 or TI-Nspire
Test generator CD

Evaluation:

The students will be evaluated using the following criteria:

1. Tests
2. Quizzes
3. Homework
4. Class participation
5. Notebook
6. Projects

INSTRUCTIONAL STRATEGIES

Various teaching methods are used in this course. Instruction will be given using class notes, power point presentations, use of SmartBoard, hands on manipulatives, exercises from textbook, prepared worksheets and a graphing calculator. Classroom demonstrations and group/cooperative learning activities will be included. Constructions, using a straight edge and a compass will help the students understand the underlying basis for the geometrical concepts. Projects geared to the topics at hand will continue to help students master the concepts. Simple proofs will enhance their ability to use logic. Vocabulary words and word problems will be infused within each lesson.

GEOMETRY OVERVIEW

In this course students will learn the basics of Euclidean geometry with two and three dimensional shapes. They will understand similarity and congruency in polygons and find area and volume in solids. Students will also understand and apply theorems about circles, and find arc lengths and areas of sectors. They will also use constructions and logic to prove theorems. Students will also apply geometric concepts in modeling situations.

PROFICIENCIES

Upon successful completion of the requirements of this course, the student will be able to:

- A) Define and identify basic geometric terms relating to lines, segments and angles.
- B) Work with conditional statements and use deductive reasoning to prove statements about segments and angles.
- C) Identify and work with parallel and perpendicular lines
- D) Identify types of triangles and prove triangles congruent.
- E) Identify perpendicular bisectors, angle bisectors, altitudes and medians of triangles.
- F) Identify and work with special quadrilaterals.
- G) Perform transformations and dilations
- H) Work with similar polygons
- I) Use the Pythagorean Theorem and other properties of right triangles.
- J) Identify the parts of a circle and calculate the measure of angles, chords, arcs.
- K) Find the area and perimeter/circumference of polygons and circles
- L) Find the surface area and volume of solids
- M) Apply matrices and use vectors.