

East Penn School District
Secondary Curriculum

A Planned Course Statement
for
Geometry (Honors)

Course #350

Grade(s) 9-10

Department: Mathematics

Length of Period (mins.) 42

Total Clock Hours 126

Periods per Week 5

Length of Course (yrs.) 1

Type of Offering: elective (among required credits)

CREDIT 1

Adopted 6/28/10

Developed by:
Todd Burkhardt

Description of Course #350

Course Title: Geometry (Honors)

Description: The course is defined to provide a more challenging approach to Euclidean geometry for those students with an exceptional background in mathematics. Topics are studied in depth. In addition to the topics covered in Plane and Solid geometry, units on analytic proof and logic are included.

Goals:

- To improve the reasoning and problem-solving ability of all students
- To promote spatial perception

Requirements:

Calculator

Algebra II Honors or teacher recommendation

Text: Moise, Downs, Geometry, Addison Wesley, 1991

***** A graded project will be completed during each semester in this course.**

***** Careers that utilize the mathematics taught in this course will be discussed during each semester.**

Key to Levels of Achievement (listed with each learning objective)

Awareness (A)	Students are introduced to concepts, forms, and patterns.
Learning (L)	Students are involved in a sequence of steps and practice activities which involve further development and allow for evaluation of process.
Understanding (U)	Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level.
Reinforcement (R)	Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication.

Unit	Num	Objective	Level	Content	Evaluation	Standard
I. Reasoning	1	Students will differentiate between inductive, intuitive, and deductive reasoning.	U	<ul style="list-style-type: none"> Recognize a good definition Identify the undefined terms of geometry Differentiate between observation and mathematical reasoning Recognize the organizational scheme of definitions, postulates and theorems 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	
II. Sets	2	Students will apply and relate sets, real numbers, and lines.	L	<ul style="list-style-type: none"> Apply the idea of sets to geometric elements Recognize the properties of Real numbers Understand the uses of the absolute value function Analyze the relationships between properties of arithmetic and fundamental concepts of geometry Develop the basic vocabulary of lines, segments, and rays 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.3.8 (A,D) 2.4.11 (C) 2.5.11 (B)
III. Lines, Planes, and Separation	3	Students will identify lines, planes and apply the concept of separation.	L	<ul style="list-style-type: none"> Relationships among point, lines, and planes Convex sets and separation Relationships among points, lines and planes in space Interpret sketches of 3-D figures Topology (optional) 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.4.11 (A,C) 2.5.11 (B,C)

Unit	Num	Objective	Level	Content	Evaluation	Standard
IV. Angles and Triangles	4	Students will define and describe angles and triangles.	L	<ul style="list-style-type: none"> Define the basic terms: angle, triangle, interior, exterior, angle measure, and perpendicular Angle Measurement Postulates Understand and Prove theorems about angle types: right, congruent, complementary, supplementary, and vertical Describe the hypothesis/ conclusion form of a statement Write elementary mathematical proofs 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.3.11 (B) 2.4.11 (A,B,C) 2.5.11 (B,C)
V. Congruence	5	Students will define and use congruence concepts.	L	<ul style="list-style-type: none"> Use of the congruence postulates SAS, SSS, ASA (see end of Ch 6) and C.P.C.T.C Properties of isosceles and equilateral triangles Determine the converse of a theorem Proofs of overlapping triangles Define quadrilaterals, rectangles, and squares 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.4.11 (A,B,C,E) 2.9.11 (A,B,D)
VI. Logic and Types of Proof	6	Students will apply logic to write other types of proofs.	L	<ul style="list-style-type: none"> Write indirect proofs Identify and use laws of logic Understand and apply truth tables Distinguish between existence and uniqueness Use of Auxiliary Sets to facilitate problem solving 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.4.11 (A-E) 2.5.11 (A-D)

Unit	Num	Objective	Level	Content	Evaluation	Standard
VII. Inequalities	7	Students will prove problems using geometric inequalities.	L	<ul style="list-style-type: none"> Appreciates the role of conjectures in mathematics Apply the properties of inequality for geometric situations Prove and use the exterior angle theorem Prove and use the SAA, HL thms. Prove and use theorems about geometric inequalities for one or two triangles Define the altitude of a triangle 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.3.8 (C) 2.4.11 (A,B,C) 2.5.11 (B,C)
VIII. Perpendicular Lines and Planes in Space	8	Students will be able to identify perpendicular lines and planes in space.	L	<ul style="list-style-type: none"> Understand and use the Basic Theorem on Perpendiculars Perpendicular Lines and Planes in space 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.4.11 (A,B,C) 2.5.11 (B,C)
IX. Parallel Lines in a Plane	9	Students will describe and use parallel lines in a plane.	L	<ul style="list-style-type: none"> Identify conditions which guarantee parallelism Appreciate the importance of the "parallel postulate" Write proofs using parallel lines Properties of parallelograms Special Parallelograms: rectangles, rhombuses, and squares Apply ratios involved in 30°-60°,-90° and 45°-45°-90° right triangles Identify the median and centroid of a triangle 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.4.11 (A,B,C,E) 2.5.11 (A-D) 2.9.11 (A,C,D)

Unit	Num	Objective	Level	Content	Evaluation	Standard
X. Parallel Lines and Planes in Space	10	Students will describe relationships between lines and planes in space.	L	<ul style="list-style-type: none"> Relationships among lines and planes in space Define and determine the measure of a dihedral angle Develop the vocabulary and concept of projections 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.3.8 (E) 2.4.11 (A,B,C) 2.5.11 (B,C)
XI. Polygonal Regions and Area	11	Students will identify and use polygonal regions and determine their areas.	L	<ul style="list-style-type: none"> Define a polygonal region Derive the formulae for determining areas Prove and use the Pythagorean Theorem Apply more ratios involved in 30°- 60°,-90° and 45°-45°-90° right triangles 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.3.8 (A-E) 2.4.11 (A,B,C) 2.5.11 (B,C) 2.9.11 (G)
XII. Similarity	12	Students will define and use similarity.	L	<ul style="list-style-type: none"> Define ratio and proportion Know properties of proportions including geometric means Define, identify and prove triangle similarity Apply the Basic Proportionality theorem and its converse Develop and apply the Similarity theorems for triangles Apply similarity ideas to right triangles and are problems 	<ul style="list-style-type: none"> Teacher Observation Assignments Quizzes Tests Alternative Assessments 	2.3.8 (E,F,G) 2.4.11 (A-C,E) 2.5.11 (B,C,D) 2.9.11 (B)

Unit	Num	Objective	Level	Content	Evaluation	Standard
XIII. Cartesian Geometry	13	Students will solve problems using coordinate geometry.	L	<ul style="list-style-type: none"> ● See the relationship between algebra and geometry ● Use slope, midpoint, distance, formulae ● Write the equation of a line ● Graph Linear Equations and Inequalities 	<ul style="list-style-type: none"> ● Teacher Observation ● Assignments ● Quizzes ● Tests ● Alternative Assessments 	2.9.11 (B,C,D,G,H) 2.4.11 (E)
XIV. Circles and Spheres	14	Students will define and describe circles and spheres.	L	<ul style="list-style-type: none"> ● Define the basic terms related to circles and spheres: diameter, Test radius, chord, secant, tangent, arc ● Prove and use theorems related to circles and lines ● Prove and use theorems related to arc / angle measurement ● Prove and use the Power Theorems ● Apply coordinate geometry to circles 	<ul style="list-style-type: none"> ● Teacher Observation ● Assignments ● Quizzes ● Tests ● Alternative Assessments 	2.4.11 (A,B,C) 2.5.11 (A,B,C) 2.9.11 (E,F,G)
XV. Characterization Theorems	15	Students will carry out characterizations and constructions.	L	<ul style="list-style-type: none"> ● Apply characterizations in a plane and in space ● Identify and know properties of concurrent lines ● Make elementary constructions (opt.) 	<ul style="list-style-type: none"> ● Teacher Observation ● Assignments ● Quizzes ● Tests ● Alternative Assessments 	2.4.11 (A,B,C) 2.5.11 (A,B,C) 2.9.11 (A,G,H)

Unit	Num	Objective	Level	Content	Evaluation	Standard	Ob
XVI. Areas of Circles and Sectors	16	Students will identify and use areas of circles and sectors.	L	<ul style="list-style-type: none"> • Use angle sum formulae of a polygon • Apply area and circumference formulae • Find arclenght and area of sectors 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.3.8 (A,E,F,G) 2.4.11 (A-C,E) 2.5.11 (B,C) 2.9.11 E,F)	
XVII. Transformational Geometry	17	Students will describe and use symmetry, transformations, and vectors. (Optional)	L	<ul style="list-style-type: none"> • Analyze the concept of motion in geometric terms • Find images based on reflections and translations in coord. Geometry • Relate the idea of symmetry to reflections in the plane 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.9.11 (H,J)	
XVIII. Solids and Volume	18	Students will define solids and evaluate their volumes and surface areas.	L	<ul style="list-style-type: none"> • Surface Area and Volume of prisms and cylinders • Surface Area and Volume of pyramids and cones • Surface Area and Volume of spheres 	<ul style="list-style-type: none"> • Teacher Observation • Assignments • Quizzes • Tests • Alternative Assessments 	2.3.8 (A,E,F,G) 2.4.11 (A-C,E) 2.5.11 (A-C) 2.9.11 (B-F,I)	