

Hamburg Area School District

Course Guide

Name:	Plane Geometry (1225)
Grade(s):	10-11
Length:	Place an X next to the correct option
X	Full-Year (180 Sessions)
	Semester (90 Sessions)
	Quarter (45 Sessions)
	Other (Specify):
Text:	Geometry Concepts & Applications, Cummins, Kanold, Kenney, Malloy, Majica. Glencoe/McGraw-Hill, 2001.
Approved on:	2015 (Reviewed 2021-2022)

Description:

Plane Geometry is a course designed to present the essentials of geometry. Basic constructions will be included in course concepts. Students study the properties of congruence, angles, and polygons. Similarity, analytic geometry, and measurements (in the form of circumference, area, perimeter) are stressed. The study of triangles is also stressed. The concepts of parallel and perpendicular lines and the Pythagorean Theorem are included in this course.

Unit: Points, Lines, Planes, and Angles

Unit Length: <u>4.5 weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Concept of equidistant, point, and line	Understand the term equidistant. Use the terms point and line and draw representations of each.	2.9.5.A
Points, lines, and planes	Use the undefined terms point, line, and plane and draw representations of each. Use the terms collinear, coplanar, intersection, ray, line, and line segment	2.9.5.A
Segments, rays, and distance	Use symbols for lines, rays, segments, and distances. Calculate distance using absolute value. State and use the Segment Addition Postulate. Differentiate between midpoints and bisectors of segments. Understand the concept of congruence. Calculate the distance formula.	2.9.11 M11.C.3.1.1 2.9.8.F 2.9.5.A
Angles	Name angles and find their measures. Differentiate between types of angles. State and use the Angle Addition Postulate. Recognize what can be concluded from a diagram.	M11.B.2.1.1 2.9.11 2.4.11.B
Postulates theorems relating points, lines, and planes	Recognize the postulates and theorems relating points, lines, and planes within examples. Apply postulate or theorem based on given information.	2.9.11 2.4.11.A

Unit: Deductive Reasoning Unit Length: <u>4.5 weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Properties from algebra	Recognize and apply properties of equality and congruence. Supply reasons for statements in an algebraic proof. Write proofs containing the Segment Addition and Angle Addition Postulates.	2.8.11 2.4.11.A
Midpoint/Angle Bisectors	Use the Midpoint Theorem and Angle Bisector Theorem. Recognize the types of reasons that may be used in a proof.	2.9.11 2.4.11.A
Hypothesis and Conclusion	Determine converse, inverse, and contrapositive of statements. Use inductive and deductive reasoning to make conclusions.	2.4.11.A 2.4.11.C 2.4.11
Special pairs of angles	Apply the definitions of complementary and supplementary angles. Apply the theorem about vertical angles. Solve application problems.	2.9.8.B M11.D.2.1.3
Perpendicular lines	Apply the definition and theorems about perpendicular lines. Make conclusions based on a diagram. Apply the theorems about angles supplementary to, or complementary to, congruent angles. Calculate equations of lines perpendicular to a given equation and point.	2.4.11.A 2.9.11 2.9.8.B

Unit: Parallel Lines and Planes

Unit Length: <u>4.5 Weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Definitions for parallel lines and planes	Distinguish between intersecting lines, parallel lines, and skew lines. Understand the relationship between two parallel planes that are cut by a third plane. Identify corresponding, alternate interior, and same-side interior angles.	2.9.8.E 2.9.11
Properties of parallel lines	Apply the theorems about parallel lines being cut by a transversal (corresponding, alternate interior, and same-side interior angles). Apply the theorem about parallel lines being cut perpendicularly. Calculate equations of parallel lines to a given equation and point.	2.9.8.E 2.4.11.A
Proving lines parallel	Demonstrate the five ways that can be used to prove that two lines are parallel.	2.4.11.A 2.9.8.E
Angles of a triangle	Classify triangles according to sides and angles. Understand the relationships about the sum of the measures of the angles of a triangle. Relate the measure of an exterior angle of triangle to the sum of the measures of the remote interior angles. Solve for the lengths of the sides of an isosceles or equilateral triangle.	M11.C.1.2.1 M11.C.1.2.3 2.4.11.A
Angles of a polygon	Recognize and name convex polygons and regular polygons. Find the measures of interior and exterior angles of convex polygons.	M11.C.1.3.1

Plane Geometry

Unit: Congruent Triangles

Unit Length: <u>4.5 weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Congruent figures	Identify the corresponding parts of congruent figures. Plot given points on graph paper and find other locations that form congruent triangles. Locate corresponding parts of congruent figures.	M11.C.1.2.1
Triangles congruent with SSS, SAS, and ASA postulates	Identify two triangles congruent by using the SSS, ASA, and SAS postulates. Calculate area and perimeter of triangles.	M11.C.1.2.1
Using congruent triangles	Deduce information about segments and angles of two triangles that are congruent.	M11.C.1.2.1
Isosceles triangles	Apply the Isosceles Triangle Theorem and its converse.	M11.C.1.2.1 M11.C.1.2.3
Triangles congruent with the AAS and HL theorems	Identify two triangles congruent by using the AAS and HL theorems. Show that two overlapping triangles are congruent.	M11.C.1.2.1 2.4.11.A
Using more than one pair of congruent triangles	Show two triangles congruent by first identifying that two other triangles are congruent.	M11.C.1.2.1 2.4.11.A
Medians, altitudes, and perpendicular bisectors	Apply the definitions of the median and altitude of a triangle and the perpendicular bisector of a segment. Distinguish between the altitudes of right, acute, and obtuse triangles. Draw medians, altitudes, and perpendicular bisectors. State and apply the theorem about a point on the perpendicular bisector of a segment, and its converse. State and apply the theorem about a point on the bisector of an angle and its converse.	M11.C.1.2.1

Unit: Quadrilaterals Unit Length: <u>5 weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Properties of parallelograms	Apply the definition of a parallelogram. Discover and apply the properties of parallelograms.	M11.C.1.2.2 2.4.11.A
Properties of quadrilaterals and parallelograms	State and use the five ways (based on sides, angles, and diagonals) to show that certain quadrilaterals are parallelograms.	M11.C.1.2.2
Theorems involving parallel lines	Apply the theorems about equidistance in parallel lines and congruent segments on transversals. Apply the midpoint theorems for triangles. Calculate area and perimeter of rectangles.	2.9.11 M11.C.1.2.1 M11.C.1.2.2 2.4.11.A
Special parallelograms	Discover the definitions of rectangles, rhombuses, and squares. Explore the special properties of rectangles, rhombuses, and squares. Ascertain when a parallelogram is a rectangle, rhombus, or square.	M11.C.1.2.2
Trapezoids	Utilize and identify the definitions and properties of trapezoids and isosceles trapezoids.	M11.C.1.2.2

Plane Geometry

Unit:Ratio, Proportion, and SimilarityUnit Length:<u>5 weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Ratio and proportion	Express a ratio in simplest form. Solve for an unknown term in a given proportion. Express a given proportion in an equivalent form. Use proportions to solve application problems.	M11.A.2.1.1 M11.A.2.2.1 M11.A.2.2.2 M11.A.2.1.3 M11.A.2.1.2
Similar polygons	Discuss the concept of similarity. Understand the idea of "drawn to scale". State and apply the properties of similar polygons (congruent angles and proportional sides).	M11.A.2.1.3 M11.C.1.3.1 M11.C.1.2.1 M11.C.1.2.3
Similar triangles	Identify similar triangles using the AA, SAS, and SSS Similarity Postulate/Theorems. Show that triangles are similar using AA, SAS, and SSS, the Means-Extremes Property, and properties of proportions.	M11.A.2.1.3 M11.C.1.2.1 M11.C.1.2.3 2.4.11.A

Plane Geometry

Unit:Right TrianglesUnit Length:<u>4.5 weeks</u>

ESSENTIAL QUESTION- ESSENTIAL CONTENT	PERFORMANCE OBJECTIVES	STANDARDS/ ANCHORS
Right triangle similarity	Simplify radicals. Determine the geometric mean between two numbers. Memorize and utilize the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.	M11.A.1.1.1 M11.C.1.2.1 M11.C.1.3.1
Pythagorean Theorem	Explore the use of the Pythagorean Theorem, its converse, and related theorems about acute and obtuse triangles. Recognize the conditions necessary to form a triangle. Determine Pythagorean triples.	M11.C.1.2.1 M11.C.1.4.1