

MONROE COUNTY COMMUNITY SCHOOL CORPORATION  
CURRICULUM GUIDE

**GEOMETRY**

**PROFICIENCY 1: THE LEARNER WILL ACQUIRE A FAMILIARITY WITH BASIC FIGURES OF ONE, TWO, AND THREE DIMENSIONAL EUCLIDEAN SPACE**

- 1.1 Identify examples of geometric objects in the physical world
- 1.2 Draw and identify representations of geometric objects
- 1.3 Distinguish among things that can be defined and those which can only be represented
- 1.4 Recognize and/or compose appropriate definitions of basic one, two, and three dimensional figures
- 1.5 Recognize unions and intersections of common geometric objects
- 1.6 Identify the relationships of interior, exterior, and betweenness with respect to points and sets of points in two and three dimensions

**PROFICIENCY 2: THE LEARNER WILL RECOGNIZE AND UTILIZE BASIC PROPERTIES OF POINTS, LINES, ANGLES, AND PLANES IN TWO AND THREE DIMENSIONAL SPACE TO FACILITATE COMMUNICATION AND DECISION MAKING**

- 2.1 Determine the coordinates of a point in one, two, or three dimensional space
- 2.2 Determine the length of a segment in one, two, or three dimensional space
- 2.3 Identify and determine the midpoint of a segment
- 2.4 Compare and order angles by their size and categorize them as straight, right, acute, and obtuse
- 2.5 Identify and discriminate among the following kinds of angles: complementary, supplementary, adjacent, vertical, linear pairs
- 2.6 Describe and use relationships between circles and angles to define degree as an appropriate measure of angle, and use degrees, radians, or arbitrary units to measure simple and directed angles
- 2.7 Use the angle addition postulate and construction to determine sums and differences of angles
- 2.8 Determine or describe lines in space as perpendicular, parallel, or skew

- 2.9 Use the relationships that exist between special pairs of angles formed by parallel lines and transversals
- 2.10 Use ideas of coordinate geometry to determine slopes, parallelism, perpendicularity, and equations of given lines

**PROFICIENCY 3: THE LEARNER WILL IDENTIFY POLYGONS AND UTILIZE THEIR PROPERTIES TO REPRESENT AND SOLVE PROBLEMS**

- 3.1 Model, identify, and describe convex, concave, and regular polygons
- 3.2 Use measures of interior and exterior angles of triangles and other polygons to represent and solve problems
- 3.3 Use properties of congruent and similar polygons to represent and solve problems
- 3.4 Apply properties of transformations (slides, flips, turns, and dilations) to polygons to determine congruence, similarity, symmetry, and tessellations
- 3.5 Use concepts of symmetry to represent and solve problems
- 3.6 Apply similarity to indirect measurement and scale modeling
- 3.7 Use coordinate geometry to verify properties of polygons such as regularity, congruence, and similarity
- 3.8 Find and use measures of sides, perimeters, and areas of polygons, and relate these measurements to each other through formulas
- 3.9 Use areas to solve problems involving geometric probability
- 3.10 Draw size change transformation images of figures
- 3.11 Recognize and apply properties of size change and similar figures

**PROFICIENCY 4: THE LEARNER WILL USE DEFINING PROPERTIES TO CLASSIFY QUADRILATERALS AND SOLVE PROBLEMS**

- 4.1 Use properties of quadrilaterals to classify and distinguish among the following: trapezoids, kites, parallelograms, rectangles, rhombi, and squares
- 4.2 Use properties of congruent and similar quadrilaterals to represent and solve problems
- 4.3 Find and use measures of sides, perimeters, and areas of quadrilaterals, and relate these measures to each other through formulas
- 4.4 Use coordinate geometry to verify properties of quadrilaterals such as regularity, congruence, and similarity

**PROFICIENCY 5: THE LEARNER WILL DEVELOP AND USE THE PROPERTIES OF TRIANGLES TO SOLVE PROBLEMS AND WRITE PROOFS**

- 5.1 Use properties of triangles to classify and distinguish among the following: isosceles, scalene, equilateral, equiangular, right, acute, and obtuse
- 5.2 Define and distinguish among altitudes, medians, mid-segments, and angle bisectors
- 5.3 Construct or draw altitudes, medians, angle bisectors, and perpendicular bisectors to determine and interpret points of concurrence
- 5.4 Construct congruent triangles using congruency postulates and theorems and construct a triangle congruent to a given triangle
- 5.5 Use properties of congruent and similar triangles to represent and solve problems
- 5.6 Apply theorems involving segments of similar triangles divided proportionally
- 5.7 Demonstrate a similarity or congruency of triangles, through a variety of proof formats
- 5.8 Find measures of lengths and areas of triangles and relate these measures to each other through formulas
- 5.9 Apply similarity of triangles to indirect measurement and scale modeling
- 5.10 Apply the inequality theorems: triangle inequality, inequality in one triangle, hinge theorem
- 5.11 Use coordinate geometry to verify properties of triangles such as regularity, congruence, and similarity

**PROFICIENCY 6: THE LEARNER WILL INVESTIGATE, EXPLORE, DEVELOP, AND UTILIZE THE PROPERTIES OF RIGHT TRIANGLES TO SOLVE PROBLEMS**

- 6.1 Use relationships of special right triangles (30-60 and 45-45) to solve problems
- 6.2 Use the Pythagorean Theorem and its converse to solve problems of applications
- 6.3 Use the Pythagorean concept to describe relationships between length and area
- 6.4 State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle
- 6.5 Define, illustrate, and apply the fundamental trigonometric relations to the solution of a triangle
- 6.6 State and apply the law of cosines and the law of sines to the solution of application problems

**PROFICIENCY 7: THE LEARNER WILL IDENTIFY CHARACTERISTICS AND PROPERTIES OF CIRCLES TO SOLVE APPROPRIATE PROBLEMS**

- 7.1 Identify and use the definition of a circle and sets of points related to the circle
- 7.2 Find the center of a circle and construct the circle which contains three non-collinear points
- 7.3 Define the following objects and identify relationships among them: radius, diameter, arc, measure of an arc, chord, secant, tangent
- 7.4 Define the following objects and determine measures of arcs and related angles: central, inscribed, intersections of secants and tangents
- 7.5 Discuss relationships of congruent, similar, and concentric circles
- 7.6 Define and determine measures of the following: circumference, arc length, areas of circles and sectors; use these relationships to solve applications
- 7.7 Use areas of circles to solve problems involving geometric probability
- 7.8 Describe the equation of a circle in the coordinate plane in terms of its center and radius

**PROFICIENCY 8: THE LEARNER WILL IDENTIFY, CLASSIFY, AND MEASURE CHARACTERISTICS OF POLYHEDRA AND OTHER SOLIDS IN ORDER TO SOLVE PROBLEMS REQUIRING SPATIAL VISUALIZATION**

- 8.1 Examine physical objects and describe them in relation to their geometric components
- 8.2 Model and describe regular and non-regular polyhedra
- 8.3 Describe symmetries of geometric solids
- 8.4 Describe a three-dimensional object given its net and conversely
- 8.5 Draw a two-dimensional picture of a three-dimensional object
- 8.6 Describe a three-dimensional object from a two-dimensional drawing
- 8.7 Identify congruent and similar solids
- 8.8 Describe relationships of sets of points to spheres (great circles, chords, tangents, etc.)
- 8.9 Describe relationships involving faces, edges, and vertices of various polyhedra
- 8.10 Determine the volume and surface area of geometric solids including prisms, pyramids, cylinders, cones, and spheres
- 8.11 Use the ratio of similarity to determine ratios of surface areas and volumes of similar solids and apply them to the solution of problems

**PROFICIENCY 9: THE LEARNER WILL DEVELOP MEANS OF ARRIVING AT AN INTUITIVE CONJECTURE, AND DEVELOP APPROACHES TO TEST OR PROVE ITS TRUTHFULNESS**

- 9.1 Develop and use a variety of problem solving techniques including draw a picture, make a table, guess and check
- 9.2 Use technology or experimentation to formulate conjectures involving geometric ideas
- 9.3 Identify the structure of geometric deductive reasoning (undefined terms, postulates, and theorems)
- 9.4 Write and interpret statements in “if-then” and in “if and only if” form
- 9.5 State and use converse, inverse, and contrapositive of a conditional statement
- 9.6 Use and evaluate a variety of formats to present deductive proofs, such as flow charts, paragraph, two column, and indirect

**PROFICIENCY 10: THE LEARNER WILL ACQUIRE AN APPRECIATION OF THE MAJOR INTEGRATIVE IDEAS THAT HAVE DRIVEN THE DEVELOPMENT AND APPLICATIONS OF GEOMETRY**

**PROFICIENCY 11: THE LEARNER WILL SOLVE PROBLEMS INVOLVING PROBABILITY**

- 11.1 Find the probabilities of independent events by multiplying probabilities
- 11.2 Find the probabilities of mutually exclusive events by adding probabilities
- 11.3 Use tree diagrams to model situations involving both the multiplication and addition principles
- 11.4 Understand the meaning of probabilistic statements