Montgomery County Framework Scope and Sequence of Indicators
Geometry

Goal 2 Geometry, Measurement, And Reasoning
The student will demonstrate the ability to solve mathematical and real-world problems using measurement and geometric models and will justify solutions and explain processes used.

2.1 Expectation: The student will represent and analyze two- and three-dimensional figures using tools and technology when appropriate.

Indicators (Note: *Italics* designates an honors level indicator.)

2.1.1 The student will analyze properties of geometric figures.

The student will:
2.1.1.a identify and describe the basic undefined terms of geometry.
2.1.1.b represent and analyze line/segment/plane relationships including parallel, perpendicular, intersecting, bisecting, midpoint, median, and altitude.
2.1.1.c represent and analyze point relationships including collinear and coplanar.
2.1.1.d represent and analyze angles and angle relationships including vertical, adjacent, complementary, supplementary, obtuse, acute, right, interior, and exterior.
2.1.1.e represent and analyze angle relationships with parallel lines.
2.1.1.f represent and analyze polygons including regular, non-regular, composite, equilateral, and equiangular.
2.1.1.g represent and analyze geometric solids including cones, cylinders, prisms, pyramids, and composite figures.
2.1.1.h represent and analyze circles and spheres including radius, diameter, chord, tangent, secant, central/inscribed angle, inscribed and circumscribed.

2.1.1.1 determine the sum of the measures of the interior and exterior angles of a convex polygon.
2.1.1.2 determine the measure of each interior angle, each exterior angle and the number of sides, given a regular convex polygon,
2.1.1.3 analyze the relationship between the length of the sides of a triangle and the size of the angles.

2.1.2 The student will identify and/or verify properties of geometric figures using the coordinate plane and concepts from algebra.

Properties and relationships include:

2.1.2.a line/segment relationships including parallel, perpendicular, intersecting, bisecting, midpoint, median, and altitude.
2.1.2.b collinear point relationships
2.1.2.c angles and angle relationships including obtuse, acute and right.
2.1.2.d polygons including regular, non-regular, equilateral, and equiangular.
2.1.2.e circle including radius, diameter, tangent, and chord.

2.1.2.1 apply properties of transformation using coordinate geometry.

2.1.3 The student will use transformations to move figures create designs, and/or demonstrate geometric properties.

Properties and relationships include:
2.1.3.a reflections, rotations, translations and dilations
2.1.3.b congruence, similarity and symmetry

2.1.3.1 describe the solid figure formed when a plane figure is rotated about a line.

2.1.4 The student will construct and/or draw and/or validate properties of geometric figures using appropriate tools and technology.

Properties and relationships include:
2.1.4.a line/segment relationships including parallel, perpendicular, intersecting, bisecting, midpoint, median, and altitude.
2.1.4.b collinear point relationships
2.1.4.c angles and angle relationships including obtuse, acute and right.
2.1.4.d polygons including regular, non-regular, equilateral, and equiangular.

2.1.4.1 solve problems using constructions
2.1.4.2 define and illustrate locus of points in both two and three dimensions.

2.2. Expectation: The student will apply geometric properties and relationships to solve problems using tools and technology when appropriate.

Indicators

2.2.1 The student will identify and/or verify congruent and similar figures and/or apply equality or proportionality of their corresponding parts.

The student will:
2.2.1.a identify and/or verify congruent figures and/or apply equality of their corresponding parts.
2.2.1.b identify and/or verify similar figures and/or apply proportionality of their corresponding parts.
2.2.1.c apply the properties of similar figures to area and volume problems.

2.2.2 The student will solve problems using two-dimensional figures and/or right-triangle trigonometry.

The student will:

2.2.2.a identify and evaluate the sine, cosine and tangent ratios for an acute angle of a right triangle

2.2.2.b apply right triangle trigonometry to solve real world problems.

2.2.2.c solve problems using the Pythagorean Theorem

2.2.2.d solve problems involving special right triangles including the relationships (30°; 60°; 90°) and (45°; 45°; 90°).

2.2.2.1 apply the Law of Sines and the Law of Cosines to solve problems involving oblique triangles.

2.2.2.2 determine the sine, cosine and tangent for a rotational angle.

2.2.2.3 solve problems using vectors.

2.2.3 The student will use inductive or deductive reasoning.

The student will:

2.2.3.a define and apply deductive reasoning.

2.2.3.b define and apply inductive reasoning.

2.2.3.c distinguish between inductive and deductive reasoning.

2.2.3.d develop direct proofs using a paragraph, flowchart, or 2-column format.

2.2.3.e develop indirect proofs using a paragraph or 2column format.

2.2.3.1 prove properties of triangles and quadrilaterals using coordinate geometry.

2.2.3.2 construct a logical argument.

2.2.3.3 determine the validity of a logical argument using truth tables.

2.2.3.4 solve problems deductively or inductively using the structure of logic.

2.2.3.5 write and interpret conditional statements including the converse, inverse and contrapositive.

2.3 Expectation: The student will apply concepts of measurement using tools and technology when appropriate.

Indicators

2.3.1 The student will use algebraic and/or geometric properties to measure indirectly.

The student will:

2.3.1.a apply properties of proportionality and similarity to solve problems involving indirect measurements.

2.3.1.1 determine the positive geometric mean between two numbers.

2.3.1.2 apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.

2.3.2 The student will use techniques of measurement and will estimate, calculate, and/or compare perimeter, circumference, area, volume, and/or surface area of two-and three-dimensional figures and their parts.

The student will:

2.3.2.a apply techniques of measurement involving two-dimensional shapes, including polygons, circles and composite figures.

2.3.2.b apply techniques of measurement involving three-dimensional shapes, including cubes, prisms, pyramids, cylinders, cones, spheres, and composite figures.

2.3.2.c apply geometric properties and relationships.

2.3.2.1 calculate the length of a given arc of a circle.

2.3.2.2 solve problems using the areas of segments and sectors of circles.