

## Course/Grade Level: **Geometry Curriculum** (year course)

**Focus:** Students will explore and apply geometric relationships involving points, lines, planes, angles, triangles, quadrilaterals, polygons, parallel and perpendicular lines and circles. Students will apply the deductive reasoning process using theorems and properties to formulate and prove conjectures. Students will solve problems by using perimeter, circumference, area, surface area, and volume formulas for plane and solid figures.

### **M.G.1 Students will recognize, describe, and apply algebraic and geometric properties and patterns in a variety of situations. Students will...**

- M.G.1.1 ▲ name, use, and describe these properties with the real number system and demonstrate their meaning including the use of concrete objects:
- c. symmetric property of equality (if  $a = b$ , then  $b = a$ )
  - d. addition and multiplication properties of equality (if  $a = b$ , then  $a + c = b + c$  and if  $a = b$  then  $ac = bc$ ) and inequalities (if  $a > b$ , then  $a + c > b + c$  and if  $a > b$  and  $c > 0$  then  $ac > bc$ )
- (HS 1.2.K3 c,d)**
- M.G.1.2 use and describe these properties with real number system.
- a. transitive property (if  $a = b$  and  $b = c$ , then  $a = c$ )
  - b. reflexive property ( $a = a$ )
- (HS 1.2.K4 a, b)**
- M.G.1.3 identify, state, and continue the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written.
- a. arithmetic and geometric sequences using real numbers and/or exponents; e.g., radioactive half-lives
  - b. patterns using geometric figures.
- (HS 2.1.K1 a, b)**

**M.G.2 Students will analyze relationships involving geometric figures to solve a variety of problems and justify conclusions. Students will...**

- M.G.2.1 solve real-world problems by:
- using the properties of corresponding parts of similar and congruent figures. e.g., scale drawings, map reading, or proportions.
  - ▲ applying the Pythagorean Theorem. e.g., When checking the square corners on concrete forms for a foundation, determine if a right angle is formed by using the Pythagorean Theorem.
  - using properties of parallel lines. e.g., street intersections.
- (HS 3.1.A1 a,b,c)
- M.G.2.2 discuss properties of regular polygons related to:
- angle measures
  - diagonals
- (HS 3.1.K2 a, b)
- M.G.2.3 recognize that similar figures have congruent angles, and their corresponding sides are proportional. (HS 3.1.K4)
- M.G.2.4 use the Pythagorean Theorem to:
- determine if a triangle is a right angle
  - find a missing side of a right triangle
- (HS 3.1.K5 a, b)
- M.G.2.5 recognize and describe:
- congruence of triangles using: Side-Side-Side (SSS), Angle-Side-Angle (ASA), Side-Angle-Side (SAS), and Angle-Angle-Side (AAS)
  - the ratios of the sides in special right triangles:  
30° -60° -90° and 45° -45° -90°
- (HS 3.1.K6 a, b)
- M.G.2.6 recognize, describe, and compare the relationships of the angles formed when parallel lines are cut by a transversal. (HS 3.1.K7)
- M.G.2.7 recognize and identify parts of a circle: arcs, chords, sectors of circles, secant and tangent lines, central and inscribed angles. (HS 3.1.K8)
- M.G.2.8 recognize and apply properties of corresponding parts of similar and congruent figures to find measurements of missing sides. (HS 3.2.K6)
- M.G.2.9 use the Pythagorean Theorem to find distance (may use the distance formula). (HS 3.4.K5)

**M.G.3 Students will estimate, measure, and apply geometric formulas to solve for perimeter, area, surface area, and volume of plane and solid figures. Students will...**

- M.G.3.1 state, recognize, and apply formulas for:
- perimeter and area of squares, rectangles, and triangles
  - circumference and area of circles; volume of rectangular solids (HS 3.2.K4 a, b)
- M.G.3.2 use given measurement formulas to find perimeter, area, volume, and surface area of two- and three-dimensional figures (regular and irregular). (HS 3.2.K5)
- M.G.3.3 describe and perform single and multiple transformations on two- and three-dimensional figures: reflection, rotation, translation, reduction (contraction/shrinking), enlargement (magnification/growing). (HS 3.3.K1)
- M.G.3.4 ▲ analyze the impact of transformations on the perimeter and area of circles, rectangles, and triangles, and volume of rectangular prisms and cylinders. e.g., reducing by a factor of \_\_\_ multiplies an area by a factor of \_\_\_ and multiplies the volume by a factor of  $1/8$ , whereas, rotating a geometric figure does not change perimeter or area. **(HS 3.3.A1)**

**M.G.4 Students will use an algebraic perspective to organize, display, explain, and interpret graphs and equations and recognize relationships to make and justify predictions. Students will...**

- M.G.4.1 ▲ use data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these **data displays**:
- frequency tables and line plots
  - bar, line, and circle graphs
  - Venn diagrams or other pictorial displays
  - charts and tables
  - stem-and-leaf plots (single and double)
  - scatter plots
  - box-and-whiskers plots
  - histograms
- (HS 4.2.A1)**
- M.G.4.2 ▲ find and explain the relationship between the slopes of parallel and perpendicular lines. e.g., The equation of a line  $2x + 3y = 12$ . The slope of this line is  $-2/3$ . What is the slope of a line perpendicular to this line? **(HS 3.4.K4)**
- M.G.4.3 ▲ recognize the equation of a line and transform the equation into slope-intercept form in order to identify the slope and y-intercept and use this information to graph the line. **(HS 3.4.K6)**

**M.G.5 Students will apply probability theory to draw conclusions, make predictions and decisions, and analyze decisions including the use of concrete objects in a variety of situations. Students will ...**

- M.G.5.1 find the probability of two independent events in an experiment, simulation, or situation. (HS 4.1.K1)
- M.G.5.2 find the conditional probability of two dependent events in an experiment, simulation, or situation. (HS 4.1.K2)
- M.G.5.3 ▲ explain the relationship between probability and odds and compute one given the other. **(HS.4.1.K3)**