Mapleton Public Schools

Math
Power Standards: Geometry

Congruence:

HS.G-CO.B Understand congruence in terms of rigid motions.

- Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. (CCSS: HS.G-CO.B.6)
- Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. (CCSS: HS.G-CO.B.7)
- Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. (CCSS: HS.G-CO.B.8)

HS.G-CO.C Prove geometric theorems.

- Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. (CCSS: HS.G-CO.C.9)
- Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. (CCSS: HS.G-CO.C.10)
- Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. (CCSS: HS.G-CO.C.11)

Similarity, Right Triangles, and Trigonometry:

HS.G-SRT.A Understand similarity in terms of similarity transformations.

- Verify experimentally the properties of dilations given by a center and a scale factor. (CCSS: HS.G-SRT.A.1)
- Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. (CCSS: HS.G-SRT.A.2)
- Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. (CCSS: HS.G-SRT.A.3)

HS.G-SRT.B Prove theorems involving similarity.

- Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. (CCSS: HS.G-SRT.B.4)
- Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. (CCSS: HS.G-SRT.B.5)

HS.G-SRT.C Define trigonometric ratios and solve problems involving right triangles.

- Explain that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. (CCSS: HS.G-SRT.C.6)
- Explain and use the relationship between the sine and cosine of complementary angles. (CCSS: HS.G-SRT.C.7)
- Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems (CCSS: HS.G-SRT.C.8)

Expressing Geometric Properties with Equatons:

HS.G-GPE.B Use coordinates to prove simple geometric theorems algebraically

- **Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0,2). (CCSS:HS.G-GPE.B.4)**
- **Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). (CCSS:HS.G-GPE.B.5)**
- **Find the point on a directed line segment between two given points that partitions the segment in a given ratio. (CCSS: HS.G-GPE.B.6)**
- **Use coordinates and the distance formula to compute perimeters of polygons and areas of triangles and rectangles (CCSS: HS.G-GPE.B.7)**

Modeling with Geometry:

HS.G-MG.A Apply geometric concepts in modeling situations.

- **Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder) (CCSS:HS.G-MG.A.1)**
- **Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). (CCSS: HS.G-MG.A.2)**
- **Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios) (CCSS: HS.G-MG.A.3)**