Michigan Center School District
Math Department Curriculum

Grade Level/Course Geometry

Sequence of Units

- **Unit 1** Language of Geometry

    o **Power Strands**

    1. **G.CO.1:** Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

    2. **GPE.B.7.** Use coordinates to compute perimeters of polygons and areas for triangles and rectangles, e.g. using the distance formula.

    o **Vocabulary/Key Concepts**

    1. Be able identify precise definitions

    2. Be able to demonstrate knowledge of specific terms

    3. Be able to apply vocabulary in a particular situation.

    4. Know how to apply the distance formula to a particular instance.

    5. Point

    6. Plane

    7. Line

    8. Segment

    9. Ray

    10. Bisector

    11. Acute angles

    12. Right angles

    13. Obtuse angles

    14. Parallel lines

    15. Perpendicular lines

- **Unit 2** Properties of Two Parallel Lines & Proofs

  - **Power Strands**

    1. **G.CO.9:** 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.

  - **Vocabulary/Key Concepts**

    1. Be able to construct a two column proof

    2. Know properties of two parallel lines and transversal

    3. Proofs

    4. Postulates, Theorems, Properties

    5. Parallel Lines

    6. Perpendicular Lines

    7. Supplementary

    8. Complementary

- **Unit 3** Transformations

  - **Power Strands**

    1. **G.CO.4:** Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

    2. **G.CO.5:** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another

    3. **G.CO.6:** 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.

o **Vocabulary/Key Concepts**

1. Rotation

2. Reflections

3. Line of symmetry

4. Translations

5. Image

6. Pre-image

7. Isometry

- **Unit 4** Properties of Triangles

    o **Power Strands**

    1. **G.SRT.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

    2. **G.GPE.7:** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

    3. **G.CO.10:** 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.

    o **Vocabulary/Key Concepts**

    1. Isosceles triangle

    2. Right triangle

    3. Scalene triangle

    4. Triangle angle sum

    5. Pythagorean Theorem

    6. Area of a triangle

    7. Acute, obtuse, right angles

- **Unit 5** Triangle Congruency

  o **Power Strands**

    1. **G-CO.8:** Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

  o **Vocabulary/Key Concepts**

    1. SSS, ASA, SAS, HL Theorems

    2. Congruency statement

    3. Know properties of sides and angles in congruent triangles

- **Unit 6** Triangle Similarity

  o **Power Strands**

    1. **G.SRT.2:** 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.

    2. **G.SRT.5:** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

  o **Vocabulary/Key Concepts**

    1. SSS, ASA, SAS, AA Theorems

    2. Similarity statements

    3. Properties of angles and sides of similar triangles

- **Unit 7** Right Triangle Trigonometry

  o **Power Strands**

    1. **G.SRT.8** Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

2. **G.SRT.6** Understand 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.

- Vocabulary/Key Concepts

  1. Ratios; sine, cosine, tangent

  2. Finding side lengths and angles using trig

  3. Right triangles

  4. Side opposite

  5. Side adjacent

  6. Hypotenuse

- **Unit 8** Quadrilaterals

  - **Power Strands**

    1. **G.CO.11:** 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.

    2. **G.GPE.7:** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

  - **Vocabulary/Key Concepts**

    1. Be able to define; squares, rectangles, trapezoids, parallelogram, trapezoid, kite, rhombus

    2. Know properties of angles, sides, and diagonals of each quadrilateral

    3. Be able to name and find the perimeter of quadrilaterals given coordinates

    4. Know the hierarchy of quadrilaterals

- **Unit 9** Polygons

  - **Power Strands**

1. **G.GPE.7:** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

o **Vocabulary/Key Concepts**

1. Central angles, interior angles, exterior angles

2. Properties of polygons; sides, angles, area

3. Names of polygons by the number of sides; 3-8

- **Unit 10** _____ Circles _____

o **Power Strands**

1. **G.C.2:** Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

2. **G.C.5:** Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

o **Vocabulary/Key Concepts**

1. Radius

2. Circumference

3. Diameter

4. Center

- **Unit 11** _____ 3- D Figures _____

o **Power Strands**

1. **G.GMD.3:** Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

2. **G.GMD.1:** Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid,
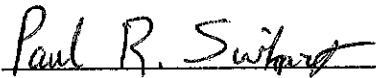
and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.

- o **Vocabulary/Key Concepts**
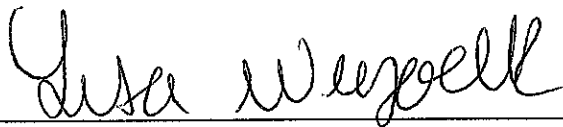
  1. Pyramid

  2. Prism

  3. Cone

  4. Cylinder

  5. radius

  6. Slant Height

  7. Base

  8. Sphere

  9. Diameter

  10. Lateral Area

  11. Surface Area

  12. Volume

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Signature of Current Grade Level/Course Representative

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Signature of Prior Grade Level/Course Representative

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Signature of Next Grade Level/Course Representative