Geometry
Essential Learnings Quarter View

Mt.Vernon Community School Corporation is committed to providing a guaranteed and viable curriculum for all students. A guaranteed curriculum ensures all students have the opportunity to learn the same essential learnings (EL's) or the curriculum that is determined to be essential for students to learn during the course. A viable curriculum ensures it is possible for all students to learn in the allotted time. The curriculum blueprint below lists the essential learnings students will be taught and assessed during each nine (9) week quarter as well as the resource themes that support the learning targets. The goal is for every student to become proficient in every essential learning by the end of the school year.

Geometry

1st Quarter
● EL #1 Logic and Proofs   ○ G.LP.2 - Know precise definitions for angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, and plane. Use standard geometric notation.   ○ G.LP.4 - Develop geometric proofs, including direct proofs, indirect proofs, proofs by contradiction and proofs involving coordinate geometry, using two-column, paragraphs, and flow charts formats.   ○ G.LP.3 - State, use, and examine the validity of the converse, inverse, and contrapositive of conditional ("if – then") and bi-conditional ("if and only if") statements.
● EL #2 Points, Lines and Angles   ○ G.PL.1 Prove and apply theorems about lines and angles, including the following: ○ a. Vertical angles are congruent.   ○ b. When a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent.   ○ c. When a transversal crosses parallel lines, same side interior angles are supplementary.   ○ d. Points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment.
● EL #3 Triangles   ○ G.T.1 Prove and apply theorems about triangles, including the following: ○ a. Measures of interior angles of a triangle sum to 180°.   ○ b. The Isosceles Triangle Theorem and its converse.   ○ c. The Pythagorean Theorem.   ○ d. The segment joining midpoints of two sides of a triangle is parallel to the third side and half the length.   ○ e. A line parallel to one side of a triangle divides the other two proportionally, and its converse.

- ○ f. The Angle Bisector Theorem.
- ○ G.T.2: Explore and explain how the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) follow from the definition of congruence in terms of rigid motions.
- ○ G.T.5 - Use of congruent and similar triangles to solve real-world and mathematical problems involving sides, perimeters, and areas of triangles.
- ○ G.T.7 - State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle. Understand and use the geometric mean to solve for missing parts of triangles.
- ○ G.T.9: Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles.
- ○ G.T.10: Explore the relationship between the sides of special right triangles (30° - 60° and 45° - 45°) and use them to solve real-world and other mathematical problems.

2nd Quarter

- ● EL #3 Triangles
  - ○ G.T.7 - State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle. Understand and use the geometric mean to solve for missing parts of triangles.
  - ○ G.T.9: Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles.
  - ○ G.T.10: Explore the relationship between the sides of special right triangles (30° - 60° and 45° - 45°) and use them to solve real-world and other mathematical problems.

- ● EL #4 Quadrilaterals and Other Polygons
  - ○ G.QP.1: Prove and apply theorems about parallelograms, including those involving angles, diagonals, and sides.
  - ○ G.QP.2: Prove that given quadrilaterals are parallelograms, rhombuses, rectangles, squares, kites, or trapezoids. Include coordinate proofs of quadrilaterals in the coordinate plane.
  - ○ G.QP.3: Develop and use formulas to find measures of interior and exterior angles of polygons.

- ● EL #5 Circles
  - ○ G.CI.1 Define, identify and use relationships among the following: radius, diameter, arc, measure of an arc, chord, secant, tangent, and congruent concentric circles.
  - ○ G.CI.3 Explore and use relationships among inscribed angles, radii, and chords, including the following:
  - ○ a. The relationship that exists between central, inscribed, and circumscribed angles.
  - ○ b. Inscribed angles on a diameter are right angles.
  - ○ c. The radius of a circle is perpendicular to a tangent where the radius intersects the circle.
  - ○ G.CI.4 Solve real-world and other mathematical problems that involve finding measures of circumference, areas of circles and sectors, and arc lengths and related angles (central, inscribed, and intersections of secants and tangents).

- ● EL #6 Three-Dimensional Solids

- ○ G.TS.3 Explore properties of congruent and similar solids, including prisms, regular pyramids, cylinders, cones, and spheres and use them to solve problems.
  - ○ G.TS.4 Solve real-world and other mathematical problems involving volume and surface area of prisms, cylinders, cones,
  - ○ spheres, and pyramids, including problems that involve composite solids and algebraic expressions.

- ● EL #7 Proportions and Similarity
  - ○ G.T.4: Use the definition of similarity in terms of similarity transformations, to determine if two given triangles are similar. Explore and develop the meaning of similarity for triangles.
  - ○ G.T.8: 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.
  - ○ G.TR.2: Verify experimentally the properties of dilations given by a center and a scale factor. Understand the dilation of a line segment is longer or shorter in the ratio given by the scale factor.