

Geometry A

SCOPE OF COURSE

Plane and solid geometry are examined visually, analytically, and logically. Constructions are made with a compass and straight edge and by folding paper. Geometric concepts beginning with basic points, lines, planes, angles, and rays are developed along with properties of parallel and perpendicular lines as a basis for the study of polygons. Triangles and triangle properties are studied. Similarities and differences between polygons are addressed using a hierarchical approach. Area, perimeter, and volume connect plane and solid geometry. Students are taught to use definitions, axioms, and postulates to justify conjectures.

The focus and goals of the geometry sequence are concept based and designed to help students think logically and analytically. Making sense of the world through geometry is a priority.

SEQUENCE OF SKILLS

UNIT 1 – Foundations

- Introduction to Geometry
- Points, Lines, and Planes
- Line Segments, Rays, and Angles
- Plane Geometry
- Polygons
- Solid Geometry
- Sketches and Intersections of Planes with Solids
- Ominoes
- Nets for Cubes
- Nets of other Three-Dimensional Figures
- Visualizing Three-Dimensional Objects
- Perspective
- Sketch Geometric Models
- Proofs

UNIT 2 – Congruent Triangle Theorems & Constructions

- Proofs
- Side-Angle-Side Theorem
- Angle-Side-Angle Theorem
- Isosceles Triangle Theorems
- Converse of the Isosceles Triangle Theorem
- Side-Side-Side Theorem
- Introduction to Constructions
- Triangle Constructions
- Conditions That Are Or Are Not Sufficient To Prove Triangles Congruent
- Perpendicular Bisector Theorem
- More Constructions
- Right Triangle Theorem I
- Right Triangle Theorem II

Geometry A

SEQUENCE OF SKILLS

UNIT 3 – Parallel, Perpendicular, & Angle Theorems

- Exterior Angles
- Lines Perpendicular to the Same Line
- Lines Perpendicular to Parallel Lines and Non-Euclidean Geometries
- Transversals and Parallel Lines
- Interior Angles and Corresponding Angle Theorems
- The Sum of the Angles in a Triangle
- Equal Segments Theorem
- Points on the Bisector of an Angle
- Angle Comparisons
- Mid-Segments
- The Median in a Right Triangle
- Triangles with Unequal Sides
- Triangles with Unequal Angles
- Comparing Triangles

UNIT 4 – Perimeter, Area, and Volume

- Perimeter
- Area
- Connection Between Perimeter and Area
- Area of Parallelograms
- Area of Triangles
- Area of Trapezoids
- Area of Regular Polygons
- Surface Area of Prisms
- Surface Area of Cylinders and Spheres
- Surface Area of Pyramids and Cones
- Volume of Prisms
- Volume of Pyramids
- Volume of Cylinders, Cones, and Spheres
- Effects of Changing Dimensions

UNIT 5 – Properties of Common Geometric Shapes

- Hierarchy of Polygons and How This Relates to Their Properties
- Properties of Special Parallelograms
- Sufficient Conditions for a Parallelogram
- Parallelogram Constructions
- Sufficient Conditions for Rectangles, Rhombi, and Squares
- Isosceles Trapezoids
- Constructing Trapezoids
- Trigonometric Ratios
- Right Triangle Applications and Properties of Special Right Triangles
- Identities
- Law of Cosines
- Law of Sines