



Geometry Course Syllabus

Course Description:

In Geometry, students will begin with an understanding of the basic tools of geometry, including points, lines, and planes, and will go on to master angles and angle pair relationships, as well as polygons. Students will learn to construct proofs, and learn the relationships of perpendicular and parallel lines, as well as what constitutes congruent triangles. Students will become proficient in understanding the anatomy of triangles, as well as what makes triangles similar, and will master right triangles and basic trigonometry. Students will learn what defines a quadrilateral, and will learn the various types, as well as circles, including arc measures, and the areas and lengths of sectors. Students will go on to learn to find the area and perimeter of various shapes, and will learn to solve for the surface area and volume of three dimensional shapes. Finally, students will learn the basic types of transformations and will learn to conduct compositions of transformations.

Part 1: 5 credit hours

Part 2: 5 credit hours

Course Outline

Common Core Standards (CA)

Geometry, Part 1

Unit 1: Introduction to Geometry

- 1.1 Points, Lines, & Planes
- 1.2 Measuring Segments
- 1.3 Measuring & Classifying Angles
- 1.4 Angle Pair Relationships
- 1.5 Classifying Polygons

In Unit 1 students will learn:

To engage the basic concepts in Geometry, including the ideas of points, lines and planes.
To measure segments, as well as angles, and the classifications of the different types of angles.
The angle pair relationships, including vertical angles, linear pairs, supplementary angles, and complementary angles, to name a few.
To classify polygons, from concave and convex, to naming them by the number of sides they have.
[G-CO, G-GPE, G-MG]

Unit 2: Reasoning & Proof

- 2.1 Inductive Reasoning
- 2.2 Deductive Reasoning
- 2.3 Conditional Statements
- 2.4 Proving Angles Congruent

In Unit 2 students will learn:

The basic principles in reasoning, including deductive and inductive reasoning.
What conditional statements are, as well as converse, inverse, and contrapositive statements.
To use logic and to perform proofs to prove angles congruent.
[G-CO, G-GPE, S-CP, S-MD]

Unit 3: Perpendicular & Parallel Lines

- 3.1 Parallel Lines with Transversals
- 3.2 Proving Lines Parallel
- 3.3 Parallel vs. Perpendicular Using Slope
- 3.4 Write Equations of Lines

Unit 4: Congruent Triangles

- 4.1 Congruent Figures
- 4.2 Congruent Triangles by SSS and SAS
- 4.3 Congruent Triangles by AAS, ASA, and HL
- 4.4 Isosceles and Equilateral Triangles
- 4.5 Corresponding Parts of Congruent Triangles

Unit 5: Anatomy of Triangles

- 5.1 Mid-segments of Triangles
- 5.2 Perpendicular Bisectors of Triangles
- 5.3 Angle Bisectors of Triangles
- 5.4 Medians and Altitudes
- 5.5 Inequalities in One Triangle
- 5.6 Inequalities in Two Triangles

Unit 6: Similarity

- 6.1 Ratios and Proportions
- 6.2 The Geometric Mean
- 6.3 Similar Polygons
- 6.4 Prove Triangles Similar by AA
- 6.5 Prove Triangles Similar by SSS and SAS
- 6.6 Similarity in Right Triangles

In Unit 3 students will learn:

The nature of the angles formed when parallel lines are divided by a transversal.

To prove lines parallel or perpendicular using slope, and other methods.

To use information, like slope and a given point, to write an equation of a line.

[G-CO, G-GPE]

In Unit 4 students will learn:

The minimum requirements to determine whether or not two figures are congruent, and will prove polygons congruent.

Triangle congruency proofs, including SSS, SAS, AAS, ASA, and HL.

To recognize and learn the key parts of isosceles and equilateral triangles.

To use CPCTC to prove other parts of triangles congruent.

[G-CO]

In Unit 5 students will learn:

The anatomy of triangles including mid-segments, perpendicular bisectors, angle bisectors, medians, and altitudes of triangles.

The concept of inequalities in one triangle as well as inequalities in two triangles.

[G-CO, G-SRT]

In Unit 6 students will learn:

What ratios are and how to use proportions to solve problems involving ratios.

What the geometric mean is and how to use it to solve for sides of triangles.

To prove triangles similar using AA, SSS, and SAS and what similarity is.

To understand the implications of similarity in right triangles.

[G-CO, G-SRT, G-GPE, G-GMD]

Geometry, Part 2

Unit 1: Right Triangles and Trigonometry

- 1.1 Pythagorean Theorem
- 1.2 Special Right Triangles
- 1.3 Six Trigonometric Functions: Sin, Cos, Tan, Sec, CSC, and Cot
- 1.4 Angles of Elevation and Depression

Unit 2: Quadrilaterals & Other Polygons

- 2.1 Polygon Angle Sum Theorem
- 2.2 Interior and Exterior Angles of Regular Polygons
- 2.3 Parallelograms
- 2.4 Rhombuses, Rectangles, and Squares
- 2.5 Trapezoids and Kites
- 2.6 Convex vs. Concave Polygons

Unit 3: Circles

- 3.1 Tangent Lines
- 3.2 Chords
- 3.3 Secant Lines
- 3.4 Finding Arc Measures
- 3.5 Inscribed Angles
- 3.6 Angle Measures and Segment Lengths
- 3.7 Graphing Circles on the Coordinate Plane
- 3.8 Areas and Circumferences of Circles

Unit 4: Areas & Perimeters of Polygons

- 4.1 Perimeters of Polygons
- 4.2 Areas of Triangles
- 4.3 Areas of Parallelograms
- 4.4 Areas of Rhombuses
- 4.5 Areas of Kites
- 4.6 Areas of Regular Polygons
- 4.7 Trapezoids
- 4.8 Areas of Sectors of Circles
- 4.9 Arc Lengths in Circles

In Unit 1 students will learn:

To use the Pythagorean theorem to solve for missing sides in right triangles.

To identify and solve special right triangles.

When and how to use the six trigonometric functions: Sin, Cos, Tan, Sec, CSC, and Cot.

To solve problems involving angles of elevation and depression.

[G-SRT, G-MG]

In Unit 2 students will learn:

The polygon angle sum theorem to be able to find the sum of interior or exterior angles of any polygon.

To find individual angles of regular polygons, and to recognize and identify parallelograms, rhombuses, rectangles, squares, trapezoids, and kites.

The fundamental difference between convex and concave polygons.

[G-CO, G-MG]

In Unit 3 students will learn:

The anatomy of circles, including tangent lines, chords, secant lines, radii, and diameters.

To find arc measures, inscribed angles, and well as angle measures and segment lengths.

To graph circles on a coordinate plane and to solve for areas and circumferences of circles.

[G-CO, G-C, G-MG]

In Unit 4 students will learn:

To find the perimeters of polygons given side lengths as well as the areas of triangles, regardless of their dimensions.

To calculate the areas of parallelograms, rhombuses, kites, regular polygons, and trapezoids.

To find the areas of sectors, as well as the arc lengths of circles, given a central angle and a radius.

[G-CO, G-C, G-GPE]

Unit 5: Surface Area & Volume

- 5.1 Surface Area of Prisms
- 5.2 Surface Area of Cylinders
- 5.3 Surface Area of Pyramids
- 5.4 Surface Area of Cones
- 5.5 Volumes of Prisms
- 5.6 Volumes of Cylinders
- 5.7 Volumes of Pyramids
- 5.8 Volumes of Cones
- 5.9 Surface Area and Volume of Spheres

Unit 6: Transformations

- 6.1 Translations, Reflections, and Rotations
- 6.2 Dilations
- 6.3 Symmetry
- 6.4 Composition of Transformations

In Unit 5 students will learn:

To find the surface area of prisms, cylinders, pyramids, and cones.

To find the volumes of prisms, cylinders, pyramids, cones, and the volume and surface areas of spheres.

[G-GPE, G-GMD, G-MG, S-CP]

In Unit 6 students will learn:

The basics of translations, including reflections and rotations.

Dilations and lines of symmetry.

To perform compositions of transformations.

[G-CO, G-SRT]