

# Unit Plan Example - Geometry

## Course Enduring Understandings

- Good mathematicians explain their thinking and justify their reasoning using precision and accuracy.
- Relationships within and between geometric shapes can be used to solve problems.
- Representing geometric shapes on the coordinate plane can help us understand relationships within and between them.

## Course Essential Questions

- How do you show your mathematical thinking?
- How can geometric relationships be used to solve problems?
- How do we use the Cartesian coordinate system to explore geometric relationships?

## Unit I: Language of Geometry

### Enduring Understandings:

- Geometry has a language of its own, which includes both words and symbols.

### Essential Questions:

- Can you understand and do geometry without pictures? Without words?

KNOW	DO
Geometric objects and relationships can be represented symbolically.	Use vocabulary and symbols to represent information about geometric figures.
There are specific relationships between the angles formed when lines do or do not intersect.	Find angle measures based on angle relationships.
Parallel lines have the same slope; perpendicular lines have opposite reciprocal slopes.	Find slopes of parallel and perpendicular lines.
The Pythagorean Theorem can be used to solve problems involving right triangles.	Use the Pythagorean Theorem to solve problems.
The distance formula can be used to find the distance between the two points; the midpoint formula can be used to find the midpoint of a segment. Both can be applied to solve problems.	Find distances between points and midpoints of segments. Find the point that partitions a segment in a given ratio. Solve problems on the coordinate plane.

Ongoing:	Ongoing: Use units appropriate to the problem. Express answer in specified form. Explain your thought process. Justify solution
Vocabulary: Point, line, plane, segment, ray, congruent, parallel, perpendicular, linear pair, angle, supplementary, complementary, vertical, collinear, coplanar, obtuse, acute, right, alternate interior angles, corresponding angles, bisect, midpoint, transversal	

### Standards Assessed:

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.

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.*

G-GPE-5: 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).

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

G-GPE-4: 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  $(0, 2)$ .*

G-GPE-6: Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

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

### Learning Targets:

Symbolic Notation – Model: Analyze models

- I can use vocabulary and symbols to represent information about geometric figures

Angle Relationships – Model: Analyze models

- I can use a protractor to measure and draw angles
- I can find and name angles made by intersecting lines
- I can find and name angles made by parallel lines and a transversal

Slopes of Parallel and Perpendicular lines – Model: Analyze models

- I can find slopes of a line from two points and from an equation
- I can find the slope of a line if it is parallel or perpendicular to another line.

Applications of Pythagorean Theorem – Model: Analyze models

- I can use the Pythagorean Theorem to find missing sides of right triangles
- I can square and combine numbers in radical form.
- I can use the Pythagorean Theorem to solve problems involving right triangles.

Applications of Coordinate Geometry – Model: Analyze models

- I can use the distance formula to find the distance between two points on the coordinate plane.
- I can use the midpoint formula to find the midpoint of a segment on the coordinate plane.
- I can find the point that partitions a segment in a given ratio.
- I can solve problems on the coordinate plane.

### **Major Assessments:**

Slopes PSA

- Model: Analyze Models
- Constructing Viable Arguments: Justify

Unit test

- Analyze Models
- Problem Solving: Number Sense