

**Geometry: Curriculum Map**

*Note: Though our lessons are Common Core Aligned we also have many extra material that are aligned to State Standards that do not use Common Core. We have many PBL (Project Based Learning) materials as well.*

**I. Unit 1:**

**A. Points, lines, planes, segments and rays**

1. **Objective 1**: Be able to write the vocabulary word that corresponds to a given definition.

Point, Line, Plane, Space, Collinear points, Coplanar points, Non-collinear points, Non-coplanar points, Intersection, Segments, Rays, Postulates, Theorems, Endpoint, Line segment, Ray, Opposite rays, Coordinate, Length, Congruent, Midpoint of segment, Bisector, Theorems, Existence, Uniqueness

2. **Objective 2**: Identify points, lines, planes, segments, and rays, and properly name them.

3. **Objective 3**: Identify the intersections of geometric figures.

Intersections of two lines

Intersections of two planes

Intersections of a line, segment, or ray and a plane

4. **Objective 4**: Apply the segment addition postulate.

Using numeric values

Using algebraic expressions for segment lengths

5. **Objective 5:** (Bonus for States Requiring Constructions) Create Geometric Constructions

Using a compass and a straight edge

Bisect and angle, Bisect a line segment, construct a perpendicular bisector, copy a line, copy and angle, copy a shape.

**B. Angles**

1. **Objective 5**: Correctly use angle vocabulary.

Angle, Sides of an angle, Vertex of an angle, Acute, Right, Obtuse, Straight angle, Adjacent angles, Bisector of an angle

2. **Objective 6**: Correctly name angles. 3 ways to name an angle (3 points, named after vertex, number)

3. **Objective 7**: Measure angles using a protractor. Measures of single angles, sums of angles on a protractor.

4. **Objective 8**: Apply the angle addition postulate. By measure, by naming angles, using simple algebraic expressions.

**II. Unit 2:**

**Inductive and Deductive reasoning**

1. **Objective 1**: Be able to write the vocabulary word that corresponds to a given definition, including terminology from prior unit(s).

Conditional statements, Converse, Hypothesis, Conclusion, Counterexample, Biconditional, Deductive reasoning, Complementary angles, Supplementary angles, Vertical angles, Perpendicular lines

2. **Objective 2**: Be able to recognize and apply properties of conditional statements.

Recognize parts of conditional statements (hypothesis and conclusion)

Write converse of conditionals

Give counterexamples for a conditional

3. **Objective 3**: Be able to justify statements (algebraic and congruence) and place statements within geometric proof.

4. **Objective 4**: Perform calculations using midpoints and angle bisectors

5. **Objective 5**: Determine the complement and supplement of a given angle.

Numeric calculations, algebraic expressions.

6. **Objective 6**: Use vertical angles to perform calculations.

Numeric calculations, algebraic expressions.

7. **Objective 7**: Apply the properties of perpendicular lines.

Including the theorems from section 2-5

8. **Objective 8**: Use cumulative concepts to solve problems. (using problems from this unit and previous units to solve multistep problems).

**III. Unit 3:**

**A. Parallel lines and planes**

1. **Objective 1**: Be able to write the vocabulary word that corresponds to a given definition, including terminology from prior unit(s).

Parallel lines, Skew lines, Parallel planes, Transversal, Interior angles, Exterior angles, Alternate interior angles, Same side interior angles, Corresponding angles, Same side exterior angles, Alternate exterior angles, corollaries

2. **Objective 2**: Perform calculations on alternate interior angles formed by two parallel lines cut by a transversal.

Identify the alternate interior angles

Show that alternate interior angles are congruent.

Solving equations based on alternate interior angles

3. **Objective 3**: Perform calculations on same side interior angles formed by two parallel lines cut by a transversal.

Identify same side interior angles.

Show that same-side interior angles are supplementary.

Solving equations based on same-side interior angles.

4. **Objective 4**: Perform calculations on corresponding angles formed by two parallel lines cut by a transversal.

Identify corresponding angles.

Show that alternate interior angles are congruent.

Solving equations based on corresponding angles.

5. **Objective 5**: Determine if two lines are parallel based on their special angles.

Showing that alternate interior angles are congruent proves lines parallel.

Showing that same-side interior angles are supplementary proves lines parallel.

Showing that corresponding angles are congruent proves lines parallel.

6. **Objective 6**: Perform calculations using multiple special angle pairs when parallel lines are cut by a transversal.

Combining skills from previous sections such as supplementary angles and vertical angles with parallel lines.

Multiple sets of parallel lines.

7. **Objective 7**: Use cumulative concepts to solve problems. (using problems from this unit and previous units to solve multistep problems).

**B. Angles of polygons**

1. **Objective 1**: Be able to write the vocabulary word that corresponds to a given definition, including terminology from prior unit(s). (10)

Triangle, Vertex, Sides, Scalene, Isosceles, Equilateral, Acute triangle, Obtuse triangle, Right triangle, Equiangular triangle, Exterior angle, Remote interior angles, Convex polygons, Non-convex polygons, Concave polygons, Diagonal, Regular polygon

2. **Objective 2**: Naming and classify triangles by sides and angles. (5)

Acute, Obtuse, Right

Isosceles, Scalene, Equilateral

3. **Objective 3**: Using the sum of the interior angles of a triangle to perform computations.

Sum of the interior angles of a triangle = 180 degrees.

4. **Objective 4**: Use the relationship between exterior angles and remote interior angles of a triangle to solve problems.

Exterior angle of a triangle equals sum of remote interior angles.

5. **Objective 5**: Name and classify polygons by the number of sides.

Triangle, quadrilateral, pentagon, hexagon, septagon/heptagon, octagon, nonagon, decagon, dodecagon, n-gon

6. **Objective 6**: Using the formula 180(n-2) find the sum of the interior angles of a polygon.

7. **Objective 7**: Find the measure of one interior angle of a regular polygon

Sum of interior angles divided by number of angles gives one interior.

8. **Objective 8**: Use the sum of the exterior angles of a triangle to solve problems and find the measure of an exterior angle of a regular polygon.

Sum of exterior angles is always 360.

9. **Objective 9**: Be able to apply the exterior angle relationship

10. **Objective 10**: Be able to understand and use inequaility theorems and corollaries for one triangle.

11. **Objective 11**: Use cumulative concepts to solve problems. (using problems from this unit and previous units to solve multistep problems). (inductive reasoning to enrichment)

**IV. Unit 4:**

**Congruent Figures**

1. **Objective 1**: Know the proper vocabulary for the unit.

Congruent figures, Corresponding parts, CPCTC, Opposite sides, Opposite angles, Included sides, Included angles, a line perpendicular to a plane, Legs of isosceles triangle, Base, Base angles, Vertex angle, Hypotenuse, Legs of a right triangle, median, altitude, perpendicular bisectors

2. **Objective 2**: Writing and using congruence statements.

Properly naming congruent polygons (order of letters).

Matching congruence statement to a set congruent polygons

3. **Objective 3**: Apply congruence postulates and theorems to congruent triangles

SSS congruency

SAS congruency

ASA congruency

AAS congruency

HL congruency

4. **Objective 4**: Use the congruence postulates and theorems as part of cumulative skeleton proofs

5. **Objective 5**: Use the properties of isosceles triangles to perform calculations.

Base angles congruent

Congruent legs

Equilateral Triangle is also equiangular

Bisector of vertex angle is perpendicular to the base at its midpoint.

6. **Objective 6**: Use properties of medians, altitudes, perpendicular bisectors and angle bisectors to perform calculations.

Point on perpendicular bisector is equidistant to the endpoints.

Point equidistant from endpoints of segment lies on perpendicular bisector

Point on bisector of angle is equidistant to the sides of the angle (converse also true)

**7.** **Objective 7**: Use cumulative concepts to solve problems.

**V. Unit 5:**

**Parallelograms**

1. **Objective 1**: Know the proper vocabulary for the unit.

Parallelogram, Consecutive angle, Midsegment of a triangle, Rectangle, Rhombus, Square, Trapezoid, Bases of trapezoid, Legs of trap., Base angles of trapezoid, Isosceles trapezoid, Midsegment of trapezoid (median)

2. **Objective 2**: Use properties of parallelograms to compute angle measures.

Consecutive angles supplementary

Opposite angles congruent

Finding missing angles about diagonals

3. **Objective 3**: Use properties of parallelograms to make conclusions about segments.

Opposite sides congruent

Diagonals bisect each other

Opposite sides parallel

4. **Objective 4**: Properties of parallel lines

Parallel lines are equally spaced.

3 lines cut by a transversal

Midsegment of a triangle

5. **Objective 5**: Use properties of rectangles to compute angle measures.

Sides meet at 90 degree angles

Diagonals create isosceles triangles

All properties of parallelograms remain

6. **Objective 6**: Use properties of rectangles to compute segment lengths.

Diagonals are congruent

All properties of parallelograms remain

Diagonals form 2 sets of isosceles triangles

7. **Objective 7**: Use properties of rhombuses to compute angle measures.

All properties of parallelograms remain

Diagonals are perpendicular

Diagonals bisect opposite angles

8. **Objective 8**: Use properties of rhombuses to compute segment lengths.

All sides congruent

All properties of parallelogram remain

9. **Objective 9**: Show that quadrilaterals are parallelograms.

Opposite sides parallel

Opposite sides congruent

Diagonals bisect each other

One pair of opposite sides congruent and parallel

Opposite angles congruent

10. **Objective 10**: Use properties of trapezoids to compute angle measures.

Use same side interior angles on a trapezoid

Isosceles trapezoids have congruent base angles

11. **Objective 11**: Use properties of trapezoids to compute segment lengths.

Midsegment (Median) of trapezoid is average of bases

Diagonals of isosceles trapezoid congruent

Bases of trapezoid cannot be congruent

12. **Objective 12**: Use cumulative concepts to solve problems.

**VI. Unit 6:**

1. **Objective 1**: Know the proper vocabulary for the unit and previous units.

Ratio, Proportion, Means, Extremes, Scale, Similar polygons, Scale factor

2. **Objective 2**: Express ratios into simplest form

Reduced fractions and same labels

3. **Objective 3**: Manipulate ratios and proportions to solve problems

Cross multiplication (means extremes)

Properties of proportions

4. **Objective 4**: Use properties of similar polygons to make conclusions and solve problems

Scale Factor

Correctly make similarity statements

Corresponding angles congruent

Corresponding sides proportional

5. **Objective 5**: Show that two triangles must be similar

AA similarity

SAS similarity

SSS similarity

6. **Objective 6**: Use proportional lengths to solve problems involving lengths of segments

Triangle proportionality theorem

Parallel lines cut by a transversal

Triangle angle bisector theorem.

**VIII Unit 8:**

**Coordinate Geometry**

1. **Objective 1**: Know the proper vocabulary for the unit.

Origin, Axes, Quadrants, Coordinate plane, Slope, Linear equation, Standard form, Slope-intercept form

2. **Objective 2**: Apply the distance formula to find the distance between two points.

3. **Objective 3**: Apply the midpoint formula to find the midpoint of a segment.

4. **Objective 4**: Finding and applying slope.

Find slope given a graph

Find slope when given two points on the line

5. **Objective 5**: Be able to determine whether lines are perpendicular, parallel or neither based on their slope values.

6. **Objective 6**: Use coordinate geometry to make conclusions about quadrilaterals

Parallelograms

Rectangles

Rhombuses

Squares

7. **Objective 7**: Be able to find the slope and y-intercept of a line when given the equation.

8. **Objective 8**: Be able to graph a line using standard or slope intercept form.

(graphing inequalities and compound inequalities)

**IX Unit 9:**

**A. Circles**

1. **Objective 1**: Know the proper vocabulary for the unit.

Circle, Center, Radius, Chord, Common chord, Diameter, Secant, Tangent, Point of tangency, Sphere, Concentric circles, Inscribed polygon, Circumscribed polygon, Common tangent, Internal tangents, External tangents, Tangent circles, Internally tangent circles, Externally tangent circles, Central angle, Arc, Minor arc, Major arc, Semicircle, Adjacent arcs, Inscribed angle, Intercepted arc

2. **Objective 2**: Be able to apply theorems relating to tangents and radii of circles.

Applying Pythagorean Theorem to triangles produced using a radius and a tangent

3. **Objective 3**: Students will analyze common tangents between 2 circles

Two separate circles

Externally tangent circles

Internally tangent circles

Concentric circles

4. **Objective 4**: Be able to recognize and use relationships between arcs and central angles

5. **Objective 5**: Recognize and apply the relationship between congruent chords and their arcs.

6.  **Objective 6**: Recognize and utilize the relationship between radius that is perpendicular to a chord and that chord. Recognize and apply the relationships between chords that are equidistant from the center of a circle.

7. **Objective 7**: Recognize and apply properties of inscribed angles and their intercepted arcs,

Relationship between inscribed angle and the intercepted arc

Relationships between inscribed angles that intercept the same arc.

Relationship between angles formed by a tangent and a chord and the intercepted arc

8. **Objective 8**: Recognize and apply corollaries involving inscribed angles

An angle inscribed in a semicircle is a right angle

Opposite angles in an inscribed quadrilateral are supplementary.

9. **Objective 9**: Recognize and apply theorems involving other angles formed in circles

Angles formed by intersecting chords

Angles formed by intersecting secants

Angles formed by intersecting tangents

Angles formed by an intersecting secant and tangent

10. **Objective 10**: Recognize and apply theorems involving circles and lengths of segments.

Intersecting chords

Intersecting secants

Intersecting secant and tangent

**X Unit 10:**

**Pythagorean Theorem**

1. **Objective 1**: Know the proper vocabulary for the unit.

Sine, cosine, tangent, angle of elevation, angle of depression, regular polygon, Center of a regular polygon, Radius of a regular polygon, Central angle of a regular polygon, Apothem

2. **Objective 2**: Use and apply Pythagorean Theorem.

3. **Objective 3**: Apply the converse of the Pythagorean Theorem.

4. **Objective 4**: Use Pythagorean Theorem to set up and solve word problems.

5. **Objective 5**: Use trigonometric ratios to find sides of right triangles.

6. **Objective 6**: Use trigonometric ratios to find angles of right triangles.

7. **Objective 7**: Use angle of depression and angle of elevation to solve problems using right triangle trigonometry.

8. **Objective 8**: Use 45-45-90 triangles to solve right triangle problems.

9. **Objective 9**: Use 30-60-90 triangle to solve right triangle problems.

**XI Unit 11:**

**Area**

1. **Objective 1:** Know the proper vocabulary for the unit.

Area, Altitude, Height, Base, Sector of a circle, Arc length, Circumference

2. **Objective 2:** Students will be able to use A = s2 for the area of a square. Students will apply area of rhombuses (A = ½ d1d2)

3. **Objective 3:** Students will be able to use area of a rectangle and use the area addition postulate to find the area of irregular figures. Students will apply area of parallelograms (A = bh).

4. **Objective 4:** Students will apply area of triangles (A = ½ bh). Students will apply the area of trapezoids (A = ½ h (b1+b2))

5. **Objective 5:** Students will be able to use circumference formula to perform calculations involving circles (C = πd). Students will be able to use the formula for the area of a circle to perform calculations. (A = πr2)

6. **Objective 6:** Students will calculate the length of an arc of a circle. Students will calculate the area of a sector of a circle.

7. **Objective 7:** Students will use relationship between the dimensions of figures and units of area.

8. **Objective 8:** Students will be able to use geometry to determine the probability of certain outcomes.

8. **Objective 9:** Apply right triangle traits to find the apothem of a regular polygon.

9. **Objective 10:** Calculate the area of a regular polygon using A = ½ pa

**XII Unit 12:**

**Surface Area and Volume**

1. **Objective 1**: Know the proper vocabulary for the unit.

Prism, Bases of prisms, Altitude of a prism, Lateral faces, Lateral edges, Right prism, Oblique prism, Lateral area, Total area, Cube, Base edges, Pyramid, Vertex of a pyramid, Base of a pyramid, Altitude of a pyramid, Lateral faces, Lateral edges, Regular pyramids, Slant height Cylinder, Right cylinder, Altitude of the cylinder, Radius of the cylinder, Cone, Oblique cylinder, Similar solids

2. **Objective 2**: Students will be able to calculate the surface area of prisms.

3. **Objective 3**: Students will be able to calculate the volume of prisms.

4. **Objective 4**: Students will be able to calculate the surface area of pyramids.

5. **Objective 5**: Students will be able to calculate the volume of pyramids.

6. **Objective 6**: Students will be able to calculate the surface area of cylinders.

7. **Objective 7**: Students will be able to calculate the volume of cylinders.

8. **Objective 8**: Students will be able to calculate the surface area of cones.

9. **Objective 9**: Students will be able to calculate the volume of cones.

10. **Objective 10**: Students will be able to calculate the surface area of spheres.

11. **Objective 11**: Students will be able to calculate the volume of spheres.

12**. Objective 12**: Students will use properties of similar solids to perform calculations.

[](http://geometrycoach.com/geometry-lesson-plans)

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