

Geometry A Year-at-a-Glance 2018-2019

Year-at-a-Glance				
FIRST SEMESTER		SECOND SEMESTER		
Unit 1 Foundations of Geometry	Unit 2 Circles	Unit 3 Equations of Lines and Angle-Pairs	Unit 4 Congruence	Unit 5 Triangles
1st 9-weeks	2nd 9-weeks	3rd 9-weeks	4th 9-weeks (First4weeks)	4th 9-weeks (Last5weeks)
<p><u>Lines and Angles</u></p> <ul style="list-style-type: none"> ● Seg Add Post ● Angle Add Post ● Classify Angles ● Midpoint formula ● Distance formula ● Perimeter, Area, Circumf. ● Perpendicular lines ● Parallel lines ● Midpoint 	<p><u>Circles</u></p> <ul style="list-style-type: none"> ● Equation of a Circle ● Arcs, Sectors, Angles ● Tangents, Secants, Chords ● Inscribed/Circumscribed Figures ● Radians 	<p><u>Eq. of Lines & Angle Pair Rel.</u></p> <ul style="list-style-type: none"> ● Equations of lines ● Informal Proofs(critical thinking) ● // & \perp equations of lines ● Vertical Angles ● \angle pairs with // lines ● Basic Triangle Theorems <ul style="list-style-type: none"> ○ Triangle Sum ○ Polygon Sum ○ Ext. Angle Th. 	<p><u>Congruence</u></p> <ul style="list-style-type: none"> ● Congruence ● Triangle Congruence Theorems 	<p><u>Triangles</u></p> <ul style="list-style-type: none"> ● Isosceles Triangle Th. ● Midsegments of a triangle ● Triangle Inequalities ● Identify medians, altitudes, perp.bisectors and angle bisectors

COLOR KEY:

BLUE - Power Standard

BLACK - Additional Skills

RED - Closing the Achievement Gap

Green - Familiarity Only

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Unit 1	Foundations of Geometry	Grade Level	Geometry A 10-11	Approx length	9 weeks
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CPSD Power Standards with Student Learning Objectives

HSG.CO.C.9.3 Apply and prove theorems about lines and angles Note: Theorems include but are not limited to: 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. Note: Proofs are not an isolated topic and therefore should be integrated throughout the course.

Student-Friendly Objectives:

- I can recognize angle pairs.
- I can identify the relationships among various angle pairs.
- I can use the relationships among angle pairs to solve problems.
- I can recognize angle or segment bisectors, and use this to solve problems..
- I can use the distance and midpoint formulas to solve problems.

Learning Indicators of Power Standards

Students will know...

- The angle addition postulate
- The segment addition postulate
- The definition of a bisector
- The distance and midpoint formulas
- Area, perimeter, and circumference

And be able to...

- Use algebra to solve for missing angles, segments, or variables.
- Recognize and use bisectors to solve problems.
- Apply the distance and midpoint formula to solve problems.
- Find the area, perimeter, and circumference of basic geometric shapes.

Additional Arkansas State Standards

- **HSG.CO.A.1.1** Based on the undefined notions of *point*, *line*, *plane*, distance along a line, and distance around a circular arc, define:
 - Angle
 - Line Segment
 - Circle
 - Perpendicular Lines
 - Parallel Lines

Unit 2	Circles	Grade Level	Geometry A 10-11	Approx Length	9 weeks
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CPSD Power Standards with Student Learning Objectives

HSG.C.A.2 10 Identify, describe, and use relationships among angles, radii, segments, lines, arcs, and chords as related to circles Note: Examples include but are not limited to the following: the relationship between central, inscribed, and circumscribed angles and their intercepted arcs; angles inscribed in a semicircle are right angles; the radius of a circle is perpendicular to a tangent line of the circle at the point of tangency.

Student-Friendly Objectives:

- I can employ correct vocabulary for parts of circles in my work and explanations.
- I can name and classify arcs (minor, semicircle, major).
- I can calculate the measure of an arc given a central or an inscribed angle.
- I can calculate the length of an arc and express it in either terms of pi or as an approximated answer.
- I can use angle relationships of circles to find unknown angle measures.
- I can explain that inscribed angles have a measure that is half of its intercepted arc measure.
- I can explain that circumscribed angles have a measure that is half the difference of the two intercepted arcs.
- I can evaluate segment relationships of circles to find unknown segment lengths.
- I can determine if a segment is tangent to a circle by using the Pythagorean Theorem.

Learning Indicators of Power Standards

Students will know...

- The parts of a circle: radius, diameter, chord, secant, and tangent
- The difference between central, inscribed, and circumscribed angles
- Naming conventions for classification of arcs
- All circles are similar
- Congruent circles have congruent radii
- That central angle measures are equivalent to their intercepted arc measure
- That inscribed angles are $\frac{1}{2}$ the measure of their intercepted arc
- The difference in arc length and arc measure
- That arc length is a section/portion of the circumference of the circle
- That answers left in terms of π are exact
- That a tangent is always perpendicular to a radius at the point of tangency
- The standard form for the equation of a circle

And be able to...

- Identify segments related to circles: radius, diameter, chord, secant tangent.
- Identify angles related to circles: central, inscribed, circumscribed.
- Classify arcs as minor, semi-circle, or major.
- Name arcs using the correct naming conventions.
- Find the measure of an arc given the central angle measure.
- Find the length of an arc given the central angle measure and the measure of the radius, diameter, or circumference.
- Find angle measures given arc measures.
- Find arc measures given angle measures.
- Apply properties of circles in real life situations to solve for a given problem.

Additional Arkansas State Standards

- **HSG.CO.A.1.1** Distance around a circular arc
- **HSG.C.A.3.10** Prove properties of angles for a quadrilateral inscribed in a circle
- **HSG.C.B.5.11** Derive using similarity that the length of the *arc* intercepted by an angle is proportional to the *radius*
 - Derive and use the formula for the area of a *sector*
 - Understand the radian measure of the angle as a unit of measure
- **HSG.GPEA.1.12** Derive the equation of a circle of given center and radius using the Pythagorean Theorem. Note: Students should also be able to identify the center and radius when given the equation of a circle and write the equation given a center and radius.
- **HSG.GPE.B.6.13** Find the midpoint between two given points; ~~and find the endpoint of a line segment given the midpoint and one endpoint~~ Note: An extension of this standard would be to find the point on a directed line segment between two given points that partitions the segment in a given ratio.
- **HSG.GPE.B.7.13** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles Note: Examples should include, but are not limited using the distance formula and area of composite figures.
- **HSG.GMD.A.1** Give an informal argument for the formulas for the circumference of a circle, area of a circle, ~~volume and surface area of a cylinder, pyramid, and cone~~ For example: Use dissection arguments, Cavalieri's principle, and informal limit arguments.

Unit 3	Equations of Lines and Angle Pairs	Grade Level	Geometry A 10-11	Approx Length	9-weeks
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CPSD Power Standards with Student Learning Objectives

HSG.GPE.B.5.13 Prove the slope criteria for parallel and perpendicular lines; Use the slope criteria for parallel and perpendicular lines to solve geometric problems. Note: Examples should include but are not limited to finding the equation of a line parallel or perpendicular to a given line that passes through a given point.

Student-Friendly Objectives:

- I can find the slope of a line given two points.
- I can find the slope of a line given any linear equation.
- I can find the slope parallel and/or perpendicular to a given line.
- I can find the equation of a line that is parallel and/or perpendicular to a given line through a given point.

HSG.CO.C.10.3 Apply and prove *theorems* about triangles. Note: Theorems include but are not limited to: measures of *interior angles* of a triangle sum to 180°

Student-Friendly Objectives:

- I can find the measure of a missing angle in a triangle when I know the other two angle measures.
- I can recognize vertical angle pairs.
- I can calculate the sum of the measures of the interior angles of a polygon.
- I can use what I know about interior and exterior angle measures in polygons to solve problems.

Learning Indicators of Power Standards

Students will know...

- The slope formula
- The parallel symbol, \parallel
- The perpendicular symbol, \perp
- The characteristics of slopes of lines/segments that are parallel
- The characteristics of slopes of lines/segments that are perpendicular
- What vertical angles are
- The Triangle Sum Theorem
- Exterior Angle Theorem
- The polygon sum formula ($S = 180(n - 2)$), where n is the number of sides

And be able to...

- Calculate the slope of a line given two points.
- Determine whether two lines/segments are parallel, perpendicular, or neither.
- Write the equation of a line that is parallel or perpendicular to a given line and/or through a given point.
- Find the measure of a missing angle in a triangle when given the other two angle measures.
- Use the Polygon Angle Sum Formula to find missing angle measures and solve problems.
- Calculate the sum of the measures of the interior angles of a polygon.
- Calculate a single interior angle of a regular polygon.

- Calculate a single exterior angle of a regular polygon.
- Utilize exterior angles of a polygon to calculate a missing interior angle of a triangle.
- Determine the measure of an exterior angle of a triangle given 2 interior angles.

Additional Arkansas State Standards

None

Unit 4	Congruence	Grade Level	Geometry A 10-11	Approx Length	4 Weeks
CPSD Power Standards with Student Learning Objectives					
<p>HSG.SRT.B.5.7 Use congruence (SSS, SAS, ASA, AAS, and HL) • Use congruence criteria to prove relationships in geometric figures</p> <p>Student Friendly Objectives</p> <ul style="list-style-type: none"> • I can prove two triangles are congruent using one of five methods: SSS, SAS, ASA, AAS, or HL. • I can explain why the five methods for triangle congruence are shortcuts. • I can explain how CPCTC allows us to solve for other parts of congruent triangles. • I can use congruence theorems for triangles to solve real-world problems 					
Learning Indicators of Power Standards					
<p>Students will know...</p> <ul style="list-style-type: none"> • There are 5 methods used to prove triangles are congruent (SSS, SAS, ASA, AAS, HL) • Congruence is associated with rigid transformations (rotations, reflections, translations) • Rigid transformations are isometries • Corresponding parts of congruent triangles are congruent (CPCTC) 			<p>And be able to...</p> <ul style="list-style-type: none"> • Prove congruence of triangles. • Employ CPCTC to solve problems. 		
Additional Arkansas State Standards					
None					

Unit 5	Triangles	Grade Level	Geometry A 10-11	Approx Length	5 Weeks
CPSD Power Standards with Student Learning Objectives					
<p>HSG.CO.C.10.3 Apply and prove <i>theorems</i> about triangles. Note: Theorems include but are not limited to: base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. Note: Proofs are not an isolated topic and therefore should be integrated throughout the course.</p>					
<p>Student-Friendly Objectives</p> <ul style="list-style-type: none"> ● I can use the base angles theorem to find the measure of a missing angle in an isosceles triangle. ● I can identify a midsegment and use it to solve problems. ● I can describe, identify, and sketch a median, an altitude, a perpendicular bisector, and an angle bisector. ● I can order the sides of a triangle from shortest to longest given the angles measures. ● I can order the angles of a triangle from least to greatest given the lengths of the sides. ● I can determine if three side lengths can create a triangle. ● I can calculate all possible values for the missing side of a triangle when given two sides. 					
Learning Indicators of Power Standards					
<p>Students will know...</p> <ul style="list-style-type: none"> ● Isosceles Triangle Theorem ● Midsegment Theorem ● Definitions of median, altitude, perpendicular bisector and angle bisector ● Triangle Inequality Theorem ● The definitions of median, altitude, perpendicular bisector, and angle bisector 			<p>And be able to...</p> <ul style="list-style-type: none"> ● Apply the base angles theorem to find missing angle/s in an isosceles triangle. ● Identify a midsegment and utilize its properties to solve problems. ● Order the sides of a triangle from shortest to longest. ● Order the angles of a triangle from least to greatest. ● Determine if 3 side lengths can create a triangle. ● Calculate all possible values for side lengths of the 3rd side of a triangle when given 2 sides. 		
Additional Arkansas State Standards					
None					