Geometry Level 1 - Unit F - Circles

Unit Focus

During this unit students use many concepts learned throughout the course to solve problems involving circles. Segments and angles associated with circles are examined. Problems on the coordinate plane again bridge Algebra and Geometry skills and concepts.

Stage 1: Desired Results - Key Understandings

Standard(s)

Common Core
Mathematics: 9-12

- 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. (CCSS.MATH.CONTENT.HSG.CO.A.1)
- Prove that all circles are similar. (CCSS.MATH.CONTENT.HSG.C.A.1)
- Identify and describe relationships among inscribed angles, radii, and chords. (CCSS.MATH.CONTENT.HSG.C.A.2)
- Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. (CCSS.MATH.CONTENT.HSG.C.B. 5)
- Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. (CCSS.MATH.CONTENT.HSG.GPE.A.1)

- Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1)
- Reason abstractly and quantitatively. (CCSS.MATH.MP.2)
- Look for and make use of structure. (CCSS.MATH.MP.7)

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- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)

Transfer

Students will be able to independently use their learning to...
T1 draw conclusions about graphs, shapes, equations, or objects.
T2 demonstrate fluency with math facts, computation and concepts.
T3 make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution.

Meaning

Understanding(s)	Essential Question(s)
Students will understand that... **U1** Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems. **U2** Mathematicians examine relationships to discern a pattern, generalizations, or structure. **U3** Mathematicians analyze characteristics and properties of geometric shapes to develop mathematical arguments about geometric relationships.	*Students will keep considering...* **Q1** What math tools/models/ strategies can I use to solve the problem? **Q2** Does this solution make sense? **Q3** How does classifying bring clarity?

Acquisition of Knowledge and Skill

Knowledge	Skill(s)
Students will know... **K1** how to identify a major or minor arc **K2** the formula for the area and circumference of a circle **K3** if a radius is perp to a chord, then it bisects the chord (and the converse)	*Students will be skilled at...* **S1** identifying if a point is located in the interior, exterior or on the circle **S2** identifying chords, radii, diameters, tangents of circles

Stage 1: Desired Results - Key Understandings		
• Product Creation: Effectively use a medium to communicate important information. (POG.3.2)	**K4** the perp. bisector of a chord passes through the center of the circle **K5** Vocabulary: sector, circle, center, radius, concentric, interior, exterior, diameter, chord, arc, central angle, minor arc, major arc, semicircle	**S3** applying circle area and circumference formulas to find the area of a sector or length of an arc **S4** solving a wide variety of problems, including proofs, involving circles