High School Geometry FCPS 2025-2026 Math Unit Framework Topic 10

Geometry Topic 10: Circles	Estimate Time Frame: 8 Block Days
Essential Standards: G.16, G.19 Assessment Resource: End of Unit Common Assessment Folder and Formative Assessment Lesson: **FAL** Equations of Circles 1	

FCPS Supporting Links	Additional Supporting Links
Pacing Guide enVision Geometry Standards Crosswalk Resource FCPS P-12 Mathematics Guidance Document FCPS Achievement & Trauma-Informed Strategies in the Classroom	Kentucky Academic Standards KSA Blueprint Target of the Standards - conceptual, procedural & application Three-Reads Routine Notice and Wonder Routine **MILC Resources Topic 10-Circles** ***enVision Geometry Teacher Guide: page 420A to 420D for specific Topic 10 Focus-Coherence-Rigor***

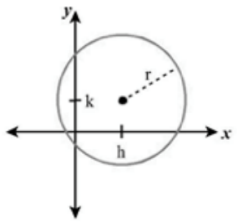
Big Idea
The properties of circles can be used to solve problems involving polygons, lines, and angles.

Essential Questions	Common Preconceptions/Misconceptions
•How is the equation of a circle determined in the coordinate plane? •How is a tangent line related to the radius of a circle at the point of tangency? •How are chords related to their central angles and intercepted arcs? •How is the measure of an inscribed angle related to its intercepted arc?	• Desmos to use before starting Topic 10 OR before **FAL** - Intro: Equations of Circles • Activity Builder by Desmos • Students may give an incorrect answer if they do not use the given information correctly. Have students draw a diagram and mark the given information. Then have them set up an equation and solve.

•How are the measures of angles, arcs, and segments formed by intersecting secant lines related? **Theorems/Postulates:** •Tangent-Radius Theorem (tangent is perpendicular to radius at point of contact) •Two-Tangent Theorem (two tangents meeting an external point are congruent) •Congruent chords --> congruent arcs --> congruent central angles •Chords equidistant from center are congruent •If a diameter is perpendicular to a chord, then it bisects the chord •Inscribed Angles Theorem and Corollaries •Angle-arc relationships for all angles with vertices on the center, on the circle, inside the circle but not on the center, and outside the circle •"Power Theorems" (relating segment lengths of chords, secants, and tangent segments of a circle)	

Standards for Mathematical Practices	Kentucky Interdisciplinary Literacy Practices (KILP)
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. **MP.3. Construct viable arguments and critique the reasoning of others.** MP.4. Model with mathematics. **MP.5. Use appropriate tools strategically.** **MP.6. Attend to precision.** **MP.7. Look for and make use of structure.** **MP.8. Look for and express regularity in repeated reasoning.** ***enVision Teacher Guide: page 420D for specific Math Practice suggestions***	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schemas to understand and create text. 3. View literacy experiences as transactional, interdisciplinary, and transformational. 4. Utilize receptive and expressive language arts to better understand self, others, and the world. **5. Apply strategic practices, with scaffolding and then independently, to approach new literacy tasks.** **6. Collaborate with others to create new meaning.** **7. Utilize digital resources to learn and share with others.** **8. Engage in specialized, discipline-specific literacy practices.** **9. Apply high-level cognitive processes to think deeply and critically about text.** 10. Develop a literacy identity that promotes lifelong learning. *Incorporating texts into math instruction fosters interdisciplinary learning for a more engaging educational experience.*

Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Translate between the geometric description and the equation for a conic section.		
KY.HS.G.19 Understand the relationship between the algebraic form and the geometric representation of a circle. a. Write the equation of a circle of a given center and radius using the Pythagorean Theorem. b. **(+)** Derive and write the equation of a circle of a given center and radius using the Pythagorean Theorem. c. **(+)** Complete the square to find the center and radius of a circle given by an equation.	We are learning about the relationship between the algebraic form and the geometric representation of a circle. • I can define a circle. • I can use the Pythagorean Theorem to find the radius of a circle. • I can use the radius and center to find the equation of a circle. • I can write an equation of a circle from the center and radius.	• Topic 9-1 • Topic 9-3 Give FAL Pre-Assessment as homework

☐ Conceptual ☐ Procedural ❑ Application **MP.6, MP.8, KILP.1, KILP.2, KILP.7** *Supporting Standards: KY.HS.G.1, KY.HS.G.15, KY.HS.G.21*	• I can graph a circle. • I can identify the radius and center from the equation of a circle.	
Cluster: Understand and apply theorems about circles		
KY.HS.G.16 Identify and describe relationships among angles and segments within the context of circles involving: a. Recognize differences between and properties of inscribed, central, and circumscribed angles. b. Understand relationships between inscribed angles and the diameter of a circle. c. Understand the relationship between the radius of a circle and the line drawn through the point of tangency on that radius. **MP.3, MP.5, and MP.7, KILP.2, KILP.5, KILP.8** *Supporting Standards: KY.HS.G.1, KY.HS.G.17 (+) & KY.HS.G.18 (+)* ☐ Conceptual ☐ Procedural ❑ Application	We are learning to identify and describe relationships among angles and segments within the context of circles. • I can identify inscribed angles, radii, chords, central angles, circumscribed angles, diameter, and tangent. We are learning to understand relationships between inscribed angles. • I can recognize that inscribed angles on a diameter are right angles. • I can recognize that the radius of a circle is perpendicular to the radius at the point of tangency. • I can examine the relationship between central, inscribed, and circumscribed angles by applying theorems about their measures.	• Topic 10-1 No arc length or sector area Give **FAL** Pre-Assessment as homework. • Topic 10-2 Use the Pythagorean Theorem
Attending to the Standards for Mathematical Practice		
• Students compare properties of various circles to verify that all circles are similar (MP.8). • Students use technology and drawings of circles to analyze properties of angles, radii, and diameters that hold across all circles (MP.5) and can explain these properties (MP.3).		

- Students explain the connection between the Pythagorean Theorem and the equation of a circle (MP.8) and use the center and radius accurately within the formula (MP.6).

Supporting Standards

KY.HS.G.15 Verify using dilations that all circles are similar. **MP.5, MP.8**

KY.HS.G.17 (+) Apply basic construction procedures within the context of a circle.
a. Construct the inscribed and circumscribed circles of a triangle.
b. Construct a tangent line from a point outside a given circle to the circle.
MP.5, MP.6

KY.HS.G.18 (+) Understand the relationship between an intercepted arc length within a circle and the circle's radius.
a. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius.
Derive the formula for the area of a sector.
b. Define the radian measure of the angle as the measure of a central angle that intercepts an arc equal in length to the circle's radius. **MP.2, MP.3**

KY.HS.G.26 (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. **MP.2, MP.5**

KY.HS.G.29 Use geometric shapes, their measures, and their properties to describe objects in real-world settings. **MP.1, MP.4**

Vocabulary

Circle Vocabulary: central angle, chord, inscribed angle, intercepted arc, major arc, minor arc, semicircle, secant, tangent to a circle; circumscribed figure, inscribed figure, central angle, arc, point of tangency, tangent line, secant line, equation of circle, sector
Vocabulary Self-Guided Notes (MILC)

Essential Theorems/Postulates by Topic
- Tangent-Radius Theorem (tangent is perpendicular to the radius at the point of contact)
- Two-Tangent Theorem (two tangents meeting an external point are congruent)
- Congruent chords --> congruent arcs --> congruent central angles
- Chords equidistant from the center are congruent

- If a diameter is perpendicular to a chord, then it bisects the chord
- Inscribed Angles Theorem and corollaries
- Angle-arc relationships for all angles with vertices on the center, on the circle, inside the circle but not on the center, and outside the circle
- "Power Theorems" (relating segment lengths of chords, secants, and tangent segments of a circle)

*****Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. This example is not comprehensive.
** Mathematical Practices (A.MP. 1- 8) should be evidenced at some point throughout each unit, depending on the explored tasks. It is important to note that MP. 2 should support learning in every lesson.
******* Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to *all* standards in that group.