Course: Geometry **Unit 5 - Circles**	**Year of Implementation:** 2021-2022
Curriculum Team Members: Jaclyn Ford jford@lrhsd.org, Kylie Johnson kjohnson@lrhsd.org, Daniel O'Keefe dokeefe@lrhsd.org, Christina Mull cmull@lrhsd.org	

Stage One - Desired Results

Link(s) to New Jersey Student Learning Standards for this course:
https://www.state.nj.us/education/cccs/2020/

Unit Standards:
G-CO.A.1, G-C

9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas
9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities

Transfer Goal: Students will be able to independently use their learning to apply and transfer basic geometric concepts and problem-solving techniques to unfamiliar, varied and real-world situations.

Enduring Understandings Students will understand that. . .	*Essential Questions*
EU 1 a circle is a unique geometric shape with many key features.	*EU 1, 2, 3* ● How do we use circles to model and solve real world situations?
EU 2 there is a specific relationship between the circumference, area and the diameter of a circle.	*EU 2* ● What is the relationship between the circumference, area and the diameter of a circle?
EU 3	*EU 3*

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<tr>
<td>relationships exist between circles, segments, angles, and arc measurements.</td>
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How does the location of the vertex of an angle affect the formula for finding the angle measure?
How are angles and intercepted arcs of circles related and applied?
How does the location of segments affect the formula for finding their lengths?

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<td><u>Knowledge</u>
Students will know . . .

EU 1
● the key features of a circle. (G-CO.1, G-C.2)

EU 2
● the relationship between circumference, area, and diameter..
● the difference between arc measure and arc length. (G-C.2)
● how to find the area of a circle and use that knowledge to find the area of a sector. (G-C.2)

EU 3
● the lengths of tangent segments, secant segments, and chords are related. (G-C.2)
● angles and intercepted arcs of circles are related. (G-C.2)</td>
<td><u>Skills</u>
Students will be able to. . .

EU 1, 2
● identify the key features of a circle. (G-CO.1, G-C.2)
● determine the circumference and arc length of a circle. (G-C.2)
● determine the area of a circle and a sector. (G-C.2)

EU 3
● find the measure of arcs given angles with vertices at the center, inside the circle, on the circle, or outside the circle. (G-C.2)
● calculate the lengths of tangents, secant segments, and chords depending on the location of the intersection. (G-C.2)
● prove the properties of angles for a quadrilateral inscribed in a circle. (G-C.3)</td>
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<td colspan="2">Stage Two - Assessment</td>
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Other Evidence:

- Assessed elements from the Performance Task
- Other teacher–graded evaluations
- Warm-Ups/Exit Tickets

Stage Three - Instruction

Learning Plan: **Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.**

- 3 Act Task: Ninja Warrior Captain's Wheel - How many degrees does he have to turn the wheel? (M/T, EU 1, 3) https://whenmathhappens.com/2019/01/04/captains-wheel/
- 3 Act Task: Nardo Ring - Which car will win the 1 lap race? (M/T, EU 1, 2) http://dailyoverviewmath.weebly.com/nardo-ring.html
- Penny Circle - How many pennies will fill the circle? (M/T, EU 1, 2)
  - 3 Act Task version http://threeacts.mrmeyer.com/pennycircle/
  - Desmos Version - How many pennies will fill the circle? https://teacher.desmos.com/activitybuilder/custom/586ab17c2f8cd5bc3bcaf259
- Desmos: Area of a Sector Activity (M/T, EU 2) https://teacher.desmos.com/activitybuilder/custom/58d92ba29623f50ba8d7f2af
- Theater: Which is the best viewing angle? (M/T, EU 1, 3) https://www.radford.edu/rumath-smpdc/Performance/src/Arthur%20Madeoy%20-%20Where%20Should%20We%20Sit.pdf

The following is the suggested sequence of learning activities.

Approximate Timeline: 16 days

- Identify and use parts of circles
- Solve problems involving the circumference and area of a circle
- Identify central angles, major arcs, minor arcs, and semicircles, and find their measures
- Find arc lengths and find area of a sector
- Recognize and use relationships between arcs and chords
- Find measures of inscribed angles, find measures of angles of inscribed polygons
- Use properties of tangents, solve problems involving circumscribed polygons
- Find measures of angles formed by lines intersecting on, inside, outside a circle
- Find measures of segments that intersect in the interior and exterior of a circle