Unit 6: Circles

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

UNIT RATIONALE

Students will make connections regarding lines and circles. In particular, angles created inside, outside or on a circle and the theorems associated with them will be examined. They study relationships among segments on chords, secants, and tangents as an application of similarity. On the coordinate plane, students use the distance formula to write the equation of a circle when given the radius and the coordinates of its center. Given an equation of a circle, they draw the graph in the coordinate plane. They apply techniques for solving quadratic equations to determine the equation of a given circle. Students will examine circumference and areas of a circle and make connections to arc lengths and sector areas.

ESSENTIAL QUESTIONS

- How do you find the equation of a circle in the coordinate plane?
- What is the relationship between the radius and a tangent line?
- How can you determine the measures of angles within or on a circle?
- How can you find the area of a portion of a circle?
- How can you use circumference to determine arc length?

STANDARDS

NEW JERSEY STUDENT LEARNING STANDARDS: CONTENT AREA

New Jersey (NJSLS) - High School - Mathematics (2020)

MA.G-CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
MATH.9-12.F.IF.C.8.a	Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
MA.G-C.A	Understand and apply theorems about circles
MA.G-C.A.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of

	angles for a quadrilateral inscribed in a circle.
MA.G-C.B	Find arc lengths and areas of sectors of circles
MA.G-C.B.5	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.

New Jersey (NJSLS) - K-12 - Math Practice Standards (2020)

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
MA.K-12.7	Look for and make use of structure.

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.9-12.8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.

PRE-ASSESSMENTS

Non-curricular tasks to identify student readiness in respect to problem solving.

Students will collaboratively solve real- world tasks.

INSTRUCTIONAL PLAN

MODULE 1

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to find equations of circles. We are learning to determine angle measures in,out and on circles. We are learning to determine segment measures in circles.
Student Learning Strategies	Students will complete the INB pages
Success Criteria	I can find the equation of a circle I can find angle measures in a circle I can use the vocabulary in this unit correctly
Formative Assessment (drives instructional decisions)	Formative assessment will be determined by studen responses to the questions in the activity.
Activities and Resources	INB pages and examples
Suggested Modifications	Help students with examples.

CircleVocabulary_GeometryFoldable_.pdf

Circles(Foldable).pd

MODULE 2

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are designing a logo with circles
Student Learning Strategies	Students will draw and design a logo with circles.
Success Criteria	I can find the area of a circle I can find the circumference of a circle I can determine arc length I can determine sector areas.

Formative Assessment (drives instructional decisions)	Formative assessment will be determined by studen responses to the questions in the activity.
Activities and Resources	Powerpoint
Suggested Modifications	Help students with the formulas needed for the calculations

Circular Car Logo Design Task

MODULE 3

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are using circles and lines to create a piece of art that includes repeating patterns.
Student Learning Strategies	Students will use at least three circles, radii, diameters, tangents and secants to create a drawing.
Success Criteria	I can correctly draw a radii I can correctly draw a secant I can correctly draw a tangent and the point of tangency I can identify repeating patterns
Formative Assessment (drives instructional decisions)	Formative assessment will be determined by the questions asked during the activity.
Activities and Resources	Handout, pencils or markers, straightedges, or computer drawing program
Suggested Modifications	Students can choose if they want to use technology or paper and pencil.

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REFLECTIONS

We may not get to this unit next year if the schedule changes in the high school.

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

LA.K-12.NJSLSA.R4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.9-10.9	Draw evidence from literary or nonfiction informational texts to support analysis, reflection, and research.
SCI.HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.