Trimester:	Unit Title:	Recommended Instructional Days:
3	**Geometric Shapes and Angles**	**13 - 17 days**

Domains: Geometry

Strand:

7.G.A.2 Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. *Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.*

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Key:

Major Cluster **Supporting Cluster** **Additional Cluster** **Climate Change Opportunity**

Progress Indicators: ◊ Tests ◊ Homework / Classwork ◊ Projects ◊ Formative Assessments ◊ Summative Assessments

Mathematical Practices:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason of others.
4. Model with mathematics.

5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Questions:
Lesson 1: How do you find and use the circumference of a circle? What is the relationship between the circumference and the diameter of a circle?
Lesson 2: How do you find the area of a circle?
Lesson 3: Why do different shapes have different formulas to describe the area? How can a formula help you to determine the area of a figure? How do you find the area of composite figures?
Lesson 4: How can you draw shapes that satisfy given conditions?
Lesson 5: How can you use angle relationships to solve problems? How are vertical and adjacent angles related?

Essential Understandings:
Geometric properties can be used to construct geometric figures.
Geometric relationships provide a means to make sense of a variety of phenomena.
There are a variety of angles and geometric figures that have special names and properties.
Angles are related in such a way that missing angles can be found by setting up and solving equations.
Each geometric figure has certain characteristics.
Formulas allow us to quantify the relationships between various aspects of a shape.
The area of a 2D figure describes the covering of the shape.

Vocabulary:
- circle
- center
- radius
- diameter
- circumference
- pi
- semicircle
- composite figure
- adjacent angles
- complementary angles
- supplementary angles
- vertical angles

**Encourage students to practice using the unit vocabulary as they talk and write about mathematics. Understanding vocabulary will aid their understanding of the concepts. When students encounter a new definition, encourage them to write in their Big Ideas Student Journals. They will revisit these definitions during the Chapter Review.*

Suggested Activity Descriptions:

- Chapter Exploration problems on TB page 360.
- Exploration Activities at the beginning of each section.
- Use GeoGebra to construct geometric figures and calculate measurements.
- Read books by Cindy Neuschwander: Sir Cumference and the Dragon Pi, Sir Cumference and the First Round Table, and Sir Cumference and the Knight of Angleland.
- Have students measure the diameter and circumference of various circular objects using a ruler and string. Ask students to record their findings on a student-created table and then divide the circumference by the diameter for each object. Most results should be near 3.14. Ask students what they notice about all of the results and ask them to come up with a formula to find the circumference of a circle by working backwards. Introduce them to pi, as well as the two formulas for circumference.
- Have students construct a circle on graph paper using a compass. Ask them to trace that circle on another sheet of graph paper and then cut out the two congruent circles. Have them trace the vertical and horizontal diameters and then draw a square around the circle that touches the circle in four locations. Four squares should now exist that have an area of the circle's radius squared. Have students cut out the "radius squares" and glue them on the second constructed circle to show that they need "a little more than three radius squares" to cover the circle (they will need to cut the squares into smaller pieces so that they can cover the circle with no overlaps and no gaps). This proves where the area of a circle formula comes from.
- Ask each student to draw five different triangles using a protractor and a ruler. Have them exchange papers with a partner, then ask them to classify each triangle by its sides and its angle measures.
- It's All About the Details from the Big Ideas Game Library.
- Pick Your Polygon from the Big Ideas Game Library.
- Picture This from the Big Ideas Game Library.

Interdisciplinary Connections:
Science:

1. Big Ideas STEAM Video and corresponding questions on TB page 359.
2. Big Ideas STEAM Performance Task. QR Code on TB page 397.
3. Question #24 on TB page 367: A satellite is in an approximately circular orbit 36,000 kilometers from Earth's surface. The radius of Earth is about 6400 kilometers. What is the circumference of the satellite's orbit?

Physical Education:

1. Question #19 on TB page 380: A running track has six lanes. Explain why the starting points for the six runners are staggered. Draw a diagram as part of your explanation.
2. Question #20 on TB page 380: You run around the perimeter of the baseball field at a rate of 9 feet per second. How long does it take you to run around the baseball field?

Language Arts:

1. Writing Question #9 on TB page 364: Are there circles for which the value of the ratio of circumference to diameter is not equal to π? Explain.
2. Writing Question #7 on TB page 371: Explain the relationship between the circumference and area of a circle.

Spot Light On: Dr. Stephon Alexander

Social and Emotional Learning: *Competencies*	**Social and Emotional Learning: *Sub-Competencies***
SEL Competencies: • Self-Awareness • Social Awareness • Self-Management • Relationship Skills • Responsible Decision-Making	• Recognizing the importance of self-confidence in handling daily tasks and challenges. • Demonstrate an awareness of the expectations for social interactions in a variety of ways. • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Identify and apply ways to persevere through alternative methods to achieve goals. • Utilize positive communication and social skills to interact effectively with others. • Develop, implement, and model effective problem solving and critical thinking skills.
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: • Teacher Observations • Exit Tickets • Quizzes • Self Assessments • Big Ideas Student Journals • Homework/Classwork • Teacher Created Assessments • Progress Monitoring Items • Formative Assessment Tips in Big Ideas Teacher Edition	**Benchmarks & Summative Assessments:** • Chapter/Unit Assessments • Standardized Tests • Project-based Assessments • Benchmark Tests

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Big Ideas Student Journal, Dynamic Assessment System, iReady, Khan	Reteach worksheets, Extra Practice worksheets, Math manipulatives,	Dictionary for native language, Video tutorial in native language, ELL	ST Math Challenge Objectives, G&T tasks, Enrichment and

Academy, Illustrative Mathematics, Learn360, TeacherTube, BrainPOP, Freckle, LearnZillion, MobyMax, 60 minutes of weekly ST Math, Edulastic, Achieve the Core, Desmos	Scaffolding Instructions in each section of textbook, Tutorial Videos, Skills Review Handbook, Skills Trainer	Support in each section of Big Ideas Teacher's Edition	Extension worksheets, Art of Problem Solving, Leveled assessments

Supplemental Resources

Technology:
• Chromebooks • Scientific Calculators • Online math manipulatives
Other:
• Google Classroom, Google Meets, Schoology, Interactive Workbooks • Illustrative Mathematics • insidemathematics.org • National Library of Virtual Manipulatives

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics.	Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related content.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept(s):** Critical Thinking and Problem Solving	
	Core Ideas:	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.
	Performance Expectation/s:	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
X	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	**X**	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*