



Marietta City Schools
2023–2024 District Unit Planner

Accelerated Grade 7/8 Mathematics

Unit title	Unit 7: Making Relevant Connections with Geometry	MYP year	2	Unit duration (hrs)	<i>Enter Hours</i> 18 hrs
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Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

Standards

7.GSR.5 Solve practical problems involving angle measurement, circles, area of circles, surface area of prisms and cylinders, and volume of cylinders and prisms composed of cubes and right prisms.

7.MP: Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.

- 7.MP.1: Make sense of problems and persevere in solving them.
- 7.MP.2: Reason abstractly and quantitatively.
- 7.MP.3: Construct viable arguments and critique the reasoning of others.
- 7.MP.4: Model with mathematics.
- 7.MP.5: Use appropriate tools strategically.
- 7.MP.6: Attend to precision.
- 7.MP.7: Look for and make use of structure.
- 7.MP.8: Look for and express regularity in repeated reasoning.

Gifted Standards

Strand 2: Creative Thinking Skills

Students will develop and utilize creative thinking through a variety of products and problem solving.

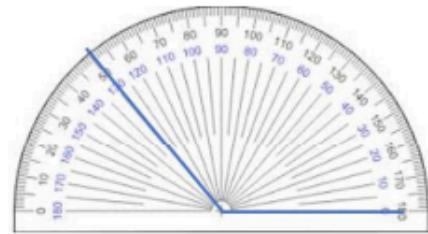
Strand 3: Higher Order Thinking and Problem Solving Skills



Students will develop and utilize critical thinking, higher order thinking, logical thinking and problem solving skills in various situations.


Strand 4: Advanced Communication and Collaboration Skills

Students will develop advanced communication and collaboration skills in working toward a common goal with shared accountability for the final outcome.

7.GSR.5.1	Measure angles in whole non-standard units.	<p>Fundamentals</p> <ul style="list-style-type: none"> Students should be able to recognize angles as geometric shapes formed when two rays share a common endpoint. In previous grades, students learned to draw and measure right, acute, and obtuse angles. To understand measurement, students should measure in non-standard units, such as unit angles or wedges, before being introduced to tools with abstract units such as degrees. Students should also be able to explore this learning objective by investigating angles within circles. 			<p>Example</p> <ul style="list-style-type: none"> Fold a circle of patty paper or waxed paper in half four times to create an angle measuring tool with 16 wedges. This protractor can be used to determine the number of units (wedges) in an angle.
7.GSR.5.2	Measure angles in whole number degrees using a protractor.	<p>Age/Developmentally Appropriate</p> <ul style="list-style-type: none"> Students should be able to use a 180° protractor to draw or measure an angle to the nearest whole degree. 	<p>Fundamentals</p> <ul style="list-style-type: none"> In previous grades, students measured angles in reference to a circle with the center at the common endpoint of two rays. They should be able to use this knowledge to determine an angle's measure in relation to the 360 	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should be able to use hand-held and virtual protractors. Student should be able to use angle measurement tools that help them connect non-standard units (wedges, unit angles, etc.) to standard units of angle measurement (degrees). 	<p>Examples</p> <ul style="list-style-type: none"> Students may be given angles to find precise measurements of angles. Here is an example of how students may use a protractor and measurement reasoning to determine precise angle measurements.

			degrees in a circle through division or as a missing factor problem.		 <p><i>Sample student response: The angle measures 130 degrees.</i></p>
7.GSR.5.3	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.	<p>Age and Developmentally Appropriate</p> <ul style="list-style-type: none"> Students should be able to use a 180° protractor to draw or measure an angle to the nearest whole degree to write and solve equations. Reflex angles are not an expectation at this grade level. 	<p>Fundamentals</p> <ul style="list-style-type: none"> In previous grades, students have studied angles by type according to size: acute, obtuse, and right, and their role as an attribute in polygons. Now angles are considered based upon the special relationships that exist among them: supplementary, complementary, vertical, and adjacent angles. Students should be able to use relationships to write and solve equations for multi-step problems. 	<p>Terminology</p> <ul style="list-style-type: none"> Supplementary angles – two angles add up to 180 degrees Complementary angles – two angles add up to 90 degrees Vertical angles – angles opposite each other when two lines intersect. Adjacent angles – Two angles that have a common side and a common vertex (corner point), and do not overlap. 	
7.GSR.5.4	Explore and describe the relationship between pi, radius, diameter, circumference, and area of a circle to derive the formulas for the circumference and area of a circle.	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should use proportional reasoning to explain the relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is π in order to derive the formulas for the circumference and area of a circle. 	<p>Age/Developmentally Appropriate</p> <ul style="list-style-type: none"> Square roots are an 8th grade expectation. 	<p>Terminology</p> <ul style="list-style-type: none"> Special Note: The terms pi, radius, diameter, and circumference are new academic vocabulary for students. Pi - The ratio of a circle's circumference to its diameter. Radius - The distance from the center to the circumference of a circle. Diameter - The distance from one point on a circle through the center to another point on the circle. Circumference - The distance around the edge of a circle. 	
7.GSR.5.5	Given the formula for the area and circumference of a circle, solve problems that exist in everyday life.	<p>Age/Developmentally Appropriate</p> <ul style="list-style-type: none"> Students should be given the formula for area and circumference of a circle when solving problems. 	<p>Example</p> <ul style="list-style-type: none"> The seventh-grade class is building a mini golf game for the school carnival. The end of the putting green will be a circle. If the circle is 10 feet in diameter, how many square feet of grass carpet will they need to buy to cover the circle? How might you communicate this information to the salesperson to make sure you receive a piece of carpet that is the correct size: $A = \pi r^2$ OR $C = 2\pi r$? 		

7.GSR.5.6	Solve realistic problems involving surface area of right prisms and cylinders.	<p>Age/Developmentally Appropriate</p> <ul style="list-style-type: none"> Students should solve problems involving surface areas of prisms with triangles, rectangles, and other polygons as bases. Students are not expected to memorize formulas to solve problems involving surface area. 	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should have an opportunity to solve single to multi-step authentic, mathematical problems. Students should have opportunities to apply knowledge of the area of triangles, rectangles, and other polygons to solve problems involving surface area of prisms. Students should have opportunities to discover the surface area of a cylinder by decomposing the figure into circles and rectangles. Students should use geometric and spatial reasoning to solve problems involving surface area. 	<p>Terminology</p> <ul style="list-style-type: none"> Cylinder – any three-dimensional figure with two congruent, opposite faces called bases connected by adjacent curved or flat faces (bases can include circles, triangles, rectangles, or other shapes). The bases can be connected by two lines that are parallel to each other. Right prism – any three-dimensional figure with two polygons for bases that are opposite, congruent, and perpendicular to the adjacent faces The inclusive definition of a cylinder classifies prisms as special types of cylinders used to derive formulas that apply to all types of cylinders and prisms alike (Van de Walle, Karp, & Bay-Williams, 2010). All prisms are cylinders, but not all cylinders are prisms (Van de Walle, Karp, Lovett & Bay-Williams, 2010). 	<p>Example</p> <ul style="list-style-type: none"> Cole is planning to cover a cylindrical drum in leather. The diameter of the drum is 10 inches, and its height is 16 inches. What is the minimum amount of leather Cole will need? 
7.GSR.5.7	Describe the two-dimensional figures (cross sections) that result from slicing three-dimensional figures, as in the plane sections of right rectangular prisms, right rectangular pyramids, cones, cylinders, and spheres.	<p>Age/Developmentally Appropriate</p> <ul style="list-style-type: none"> Cross-sections should be limited to horizontal and vertical slices. 	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should have opportunities to explore models of right rectangular prisms, right rectangular pyramids, cones, cylinders, and spheres that can be sliced. Students should determine the different planes that can be created with the slices. 	<p>Fundamentals</p> <ul style="list-style-type: none"> Students should conclude the resulting two-dimensional shape created after the slice is not the entire three-dimensional shape that remains. In seventh grade, cross sections should be limited to horizontal and vertical slices. 	<p>Terminology</p> <ul style="list-style-type: none"> Prism – a solid figure that has the same cross section all along its length
7.GSR.5.8	Explore volume as a measurable attribute of cylinders and right prisms. Find the volume of these geometric figures using concrete problems.	<p>Strategies and Methods</p> <ul style="list-style-type: none"> Students should apply knowledge of cross sections as a strategy for revealing a base of cylinders including right prisms. 	<p>Terminology</p> <ul style="list-style-type: none"> Cylinder – any three-dimensional figure with two congruent, opposite faces called bases connected by adjacent curved or flat 	<p>Age/Developmentally Appropriate</p> <ul style="list-style-type: none"> Cylinders explored in Grade 7 should be limited to right circular 	<p>Examples</p> <ul style="list-style-type: none"> Identical toy building cubes were used to make the stacks shown below. 

		<ul style="list-style-type: none"> • Students should apply reasoning about the volume of rectangular prisms to explore the volume of cylinders and other three-dimensional objects composed of cubes and right prisms. • Students should apply their knowledge of area of a circle when finding the volume of a cylinder. • Students should use the formula Volume = area of the base times height or $V = B \times h$ to find the volume of a cylinder. 	<p>faces (bases can include circles, triangles, rectangles, or other shapes). The bases can be connected by two lines that are parallel to each other.</p> <ul style="list-style-type: none"> • Right prism – any three-dimensional figure with two polygons for bases that are opposite, congruent, and perpendicular to the adjacent faces. • The inclusive definition of a cylinder classifies prisms as special types of cylinders used to derive formulas that apply to all types of cylinders and prisms alike. (Van de Walle, et.al., 2010) • All prisms are cylinders, but not all cylinders are prisms. (Van de Walle, Karp, Lovett & Bay-Williams, 2010) • The formula for volume used in Grade 7 is $V = B \times h$ (area of the base) \times h (height), where B=area of the base, h = height. 	<p>cylinders. Right circular cylinders are three-dimensional solid figures with two congruent, parallel, circular bases that are connected by a curved face that is perpendicular to each base.</p> <ul style="list-style-type: none"> • Students should explore experimentally and conceptually the hierarchy of cylinders and prisms. 	<p>Which stack takes up the least space? Which stack takes up the most space? Order the stacks from the one that takes up the least space to the one that takes up the most space.</p> <ul style="list-style-type: none"> • A farmer is storing ground corn in a silo during the winter months. What is the maximum capacity of the cylindrical part of each silo that has a 20-foot diameter and a 55-foot height for which the farmer can store the ground corn? 
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Concepts/Skills to support mastery of standards

- Measure angles with and without a protractor. (GSR 5.1-5.2)
- Solve multi-step with supplementary, complementary, and vertical angles.(GSR 5.3)
- Derive the formulas for circumference and area of a circle.(GSR 5.4)

- Describe the relationship between pi and radius and diameter.(GSR 5.4)
- Solve real-world problems given the formulas for the area and circumference.(GSR 5.5)
- Solve real-world problems involving surface area of right prisms and cylinders.(GSR 5.6)
- Describe cross-sections from slicing three-dimensional figures. (GSR 5.7)
- Find the volume of geometric figures and explore volume as a measurable attribute of cylinders and right prisms(GSR 5.8)

Vocabulary

Area	Circumference	Supplementary angles	Complementary Angles	Vertical Angles	Pi
Radius	Diameter	Adjacent Angles	Two-dimensional	Three-Dimensional	Volume

Notation

Key concept	Related concept(s)	Global context
Form	Measurement, Space	Orientation in space and time

Statement of inquiry

We can use formulas to model structures and relationships in the real world.

Inquiry questions

Factual— What is pi? What is the relationship between supplementary angles? What is the relationship between complementary angles? What is a cross-section?

Conceptual— How are all circles related? How are area and circumference of a circle related? How do relationships between sides and angles help you identify and describe shapes?

Debatable— Is there a best method for finding surface area?

MYP Objectives	Assessment Tasks	
What specific MYP objectives will be addressed during this unit?	Relationship between summative assessment task(s) and statement of inquiry:	List of common formative and summative assessments.

<p>Criterion A: Knowing and Understanding</p> <p>Criterion C: Communication in Mathematics</p>	<p>Students will be expected to learn about drawing geometric figures using rulers and protractor with an emphasis on triangles, students will also write and solve equations involving angle relationships, area, volume, and surface area of fundamental solid figures</p>	<p><u>Formative Assessment(s):</u> Unit 4 CFA</p> <p><u>Summative Assessment(s):</u> Unit 4 Summative <i>GA DOE Deviving Circles - Pizza Task</i></p>
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Approaches to learning (ATL)

<p>Category: Social Cluster: Collaboration Skills Skill Indicator: Give and receive meaningful feedback.</p> <p>Category: Self-management Cluster: Organization, Affective, & Reflection Skills Skill Indicator: Keep an organized and logical system of information files/notebooks</p>

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
7.GSR.5 Solve practical problems involving angle measurement, circles, area of circles, surface area of prisms and cylinders, and volume of cylinders and prisms composed of cubes and right prisms.	CLE - Vocabulary	In this learning plan, we will use the GA DOE vocabulary words and definitions. Students will help create a graphic organizer with the vocabulary words of the unit.
7.MP: Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals. 7.GSR.5 Solve practical problems involving angle measurement, circles, area of circles, surface area of prisms and cylinders, and volume of cylinders and prisms composed of cubes and right prisms. • 7.GSR.5.1 Measure angles in whole non-standard units. • 7.GSR.5.1 Measure angles in whole nonstandard units. • 7.GSR.5.2 Measure angles in whole number degrees using a protractor.	CLE: Light It Up	Learning Plan Description: In this learning plan, students will recreate the Northern Lights using their understanding of measuring angles using a 180 degree protractor.
7.MP: Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals. 7.GSR.5 Solve practical problems involving	CLE - Deriving Circle Relationships Part 2	In this learning plan, students will extend their understanding of area and derive the formula for the area of a circle by rearranging the area of a square and by adapting the formula for the area of a parallelogram.

<p>angle measurement, circles, area of circles, surface area of prisms and cylinders, and volume of cylinders and prisms composed of cubes and right prisms.</p> <ul style="list-style-type: none"> ● 7.GSR.5.4 Explore and describe the relationship between pi, radius, diameter, circumference, and area of a circle to derive the formulas for the circumference and area of a circle. ● 7.GSR.5.5 Given the formula for the area and circumference of a circle, solve problems that exist in everyday life 		
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Content Resources

Intervention Tasks

- [Making Benchmarks](#) Partition and/or combine like measures and communicate them, using numbers and units. 7.GSR.5.8
- [Odd Solids](#) Sort objects by their spatial features, with justification. 7.GSR.5.7
- [Post It!](#) Sort objects by their spatial features, with justification. 7.GSR.5.7
- [Perspective on Picasso](#) Identify classes of two- and three-dimensional shapes by their geometric properties. 7.GSR.5.7
- [Building Specs](#) Relate three-dimensional models to two-dimensional representations, and vice versa. 7.GSR.5.7
- [Growth Industry](#) Use linear scales and whole numbers of metric units for length, area, volume and capacity, weight (mass), angle, temperature, and time. 7.GSR.5.6

NCTM Illuminations

GaDoe Framework

Savvas: [6-11 Savvas Correlation to 2021 standards](#)