Grade 8 Mathematics

Unit title	Unit 6: Exploring Geometric Relationships	MYP year	3	Unit duration (hrs)	*Enter Hours* *20 Hours –4 Weeks* *MMS- (4.5 hours per week)*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

Standards

8.GSR.8 Solve geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real-life phenomena.
8.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.
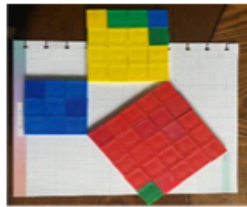
Concepts/Skills to support mastery of standards

8.GSR.8.1 - Explain a proof of the Pythagorean Theorem and its Converse

8.GSR.8.2 - Apply the Pythagorean Theorem to determine the unknown side lengths in right triangles.

8.GSR.8.3 - Apply the Pythagorean Theorem to find the distance between two points.

8.GSR.8.4 - Apply the formulas for the volume of Cylinders, Cones, and Spheres.

8.GSR.8.1	Explain a proof of the Pythagorean Theorem and its converse using visual models.	*Age/Developmentally Appropriate* • Students are not limited to a particular proof for the Pythagorean Theorem or its converse.	*Strategies and Methods* • Geometric and spatial reasoning should be used when explaining the Pythagorean Theorem.	*Example*
8.GSR.8.2	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles within authentic, mathematical problems in two and three dimensions.	*Age/Developmentally Appropriate* • Triangle dimensions may be rational or irrational numbers.	*Strategies and Methods* • Geometric and spatial reasoning should be used to solve problems involving the Pythagorean theorem. • Models and drawings may be useful as students solve contextual problems in two- and three-dimensions.	*Example* How tall is the Great Pyramid of Giza?
8.GSR.8.3	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system in practical, mathematical problems.	*Age/Developmentally Appropriate* • Students should apply their understanding of the Pythagorean Theorem to find the distance. Use of the distance formula is not an expectation for this grade level.	*Strategies and Methods* • Students should be provided opportunities to solve problems using a variety of strategies.	*Example* • There are two paths that Sarah can take when walking to school. One path is to take is to take A Street from home to the traffic light and then walk on B street from the traffic light to the school, and the other way is for her to take C street directly to the school. How much shorter is the direct path along C Street?

To answer this question, students may use what they learned in 6th grade to find the distance between (-12, 9) and (-12, -2) representing A street and the distance between (-12, -2) and (16, -2) representing B street. Then, students could use those two distances to find the sum of the distances for the first path. Then, students can apply the Pythagorean theorem to determine the distance between the final two points, (-12, 9) and (16, -2) to determine the answer to the question.

8.GSR.8.4	Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve in relevant problems.	**Age/Developmentally Appropriate** • This learning objective is limited to right circular cones, right cylinders, and spheres. _	**Strategies and Methods** • Given the volume, solve for an unknown dimension of the figure. Students will need to be able to express the answer in terms of pi and as a decimal approximation. • Students should be able to use their knowledge of cube roots to solve for unknown dimensions of geometric figures.	**Relevance and Application** • Students should be given opportunities to find missing dimensions of a right circular cone (e.g., slant height, radius, etc.). • Students should be able to make connections between the Pythagorean Theorem and solving relevant problems related to volume of cones.

Vocabulary

Altitude of a Triangle	Base (of a Polygon)	Coordinate Plane	Coordinate Point of a Plane	Converse of Pythagorean Theorem	Cube Root
Hypotenuse	Leg of a Triangle	Perfect Squares	Perfect Cubes	Pythagorean Theorem	Pythagorean Triples
Square Root					

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

Statement of inquiry
People can explore relationships through measurement.

Inquiry questions

- **Factual—** What is the Pythagorean Theorem?
- **Conceptual—** How has the discovery of the Pythagorean Theorem shaped the world in which we live? What does it mean to cube or square a number? Why is the square root of 2 irrational?
- **Debatable—** Can the Pythagorean Theorem be applied to any polygon? Explain

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.*
Criterion A: Knowledge and Understanding	Students will explore relationships through measurement.	**Formative Assessment(s):** Unit 6 CFA **Summative Assessment(s):** Uni 6: Geometric Applications of Exponents MYP: Pythagorean Theorem Project - Fencing the Yard

Approaches to learning (ATL)
Need: Give and receive meaningful feedback **Category:** Research Skills **Cluster:** Information literacy **Skill Indicator:** Finding, interpreting, judging and creating information

Learning Experiences		
Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
8.GSR.8.1 Explain a proof of the Pythagorean Theorem and its converse using visual models.	**Discovering the Pythagorean Theorem FAL** **Brief Description:** In this learning plan, students will discover and explore the Pythagorean Theorem and its converse through the Discovering the Pythagorean Theorem Formative Assessment Learning plan. Students will use the area of right triangles to deduce the areas of other shapes, use dissection methods for finding areas, organize an investigation systematically and collect data, and deduce a generalizable method for finding lengths and areas (The Pythagorean Theorem). **Learning Goal:** ● Discovering the Pythagorean Theorem ● Understanding the converse of the Pythagorean Theorem	In this learning plan, students will discover and explore the Pythagorean Theorem and its converse.
8.GSR.8: Solve geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real-life phenomena.	**Calculate the Volume of Glasses** **Brief Description:** In this learning plan, students will solve real-world problems involving the volume of compound objects including right cylinders, right circular cones, and spheres. Students will explore the formulas for the shapes, use the Pythagorean Theorem, and use the volume formulas to determine the	In this learning plan, students will apply volume formulas of cones, cylinders, and spheres to real-world problems.

8.GSR.8.2 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles within authentic mathematical problems in two and three dimensions. **8.GSR.8.4** Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve relevant, real-life problems.	volume of three glasses. **Learning Goal:** ● I can use geometric and spatial reasoning to solve problems involving the Pythagorean Theorem. ● I can use models and drawings to help solve contextual problems in two- and three dimensions. ● I can compose and decompose shapes to find the volume of a compound object.

Content Resources

[Grade-8-Mathematics-Unit-6-Exploring-Geometric-Relationships](#)

[Savvas Correlation Link](#)