Geometry: Concepts & Connections

Unit title	Unit 5: Right Triangle Trigonometry	MYP year	5	Unit duration (hrs)	11 hours

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?* Establishing relationships helps us to understand and model change

GA DoE Standards

Standards

G.GSR.6: Examine side ratios of similar triangles; use the relationship between right triangles to develop an understanding of sine, cosine, and tangent to solve geometric problems and to model and explain real-life phenomena.

  G.GSR.6.1 Explain that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
    Fundamentals
    • Students should be able to use similarity to establish sine, cosine, and tangent ratios.

  G.GSR.6.2 Explain and use the relationship between the sine and cosine of complementary angles.
    Fundamentals
    • Students should be able to verify and apply the relationship between cofunctions, $\sin(\Theta) = \cos(90° - \Theta)$ and $\cos(\Theta) = \sin(90° - \Theta)$.
    • In seventh grade, students write and solve equations using supplementary, complementary, vertical, and adjacent angles.

  G.GSR.6.3 Use trigonometric ratios and the Pythagorean Theorem to solve for sides and angles of right triangles in applied problems.
    Strategies and Methods
    • Students should be able to use sine, cosine, and tangent to solve real-life problems that require them to find missing side and angle measurements.

G.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics.

  G.MM.1.1 Explain mathematically applicable problems using a mathematical model.
    Fundamentals
    • Students should be provided with opportunities to learn mathematics through the exploration of real-life problems.
    • Mathematically applicable problems are those presented in context where the context makes sense, realistically and mathematically, and allows for students to make decisions about how to solve the problem (model with mathematics).

  G.MM.1.2 Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
    Fundamentals
    • Students should be able to use the content learned in this course to create a mathematical model to explain real-life phenomena.

  G.MM.1.3 Using abstract and quantitative reasoning, make decisions about information and data from a mathematically applicable situation.
    Fundamentals
    • Students should be able to connect learning of geometric shapes and their properties to describe objects.

- Students should be able to apply geometric methods and data to make decisions about structures and solve real-world problems.

G.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems.

Fundamentals

- Students should be able to construct a model by selecting and creating algebraic and geometric representations that describe relationships between variables in context.

Concepts/Skills to support mastery of standards

Vocabulary

Adjacent Side	Angle of Depression	Angle of Elevation	Complementary Angles	Cosine	Hypotenuse
Opposite Side	Right Angle (90° Angle)	Similar Triangle	Sine	Tangent	Trigonometric Ratio
Trigonometry					

Notation

$\sin(\theta)$ $\cos(\theta)$ $\tan(\theta)$ $\sin(\theta) = \cos(90-\theta)$ $\cos(\theta) = \sin(90-\theta)$

Key concept	Related concept(s)	Global context
Relationship	Pattern and Model	Scientific and Technical Innovation Exploration: Mathematical puzzles, principles and discoveries

Statement of inquiry
Establishing relationships helps us to understand and model change.

Inquiry questions

Factual—

- What is the process to find a missing side using right triangle trigonometry?
- What is the process to find a missing angle using right triangle trigonometry?
- What are Pythagorean triples?
- What is the difference between angle of elevation and angle of depression?

Conceptual—

- How would you describe the relationship between the sine and cosine of complementary angles?
- How is right triangle trigonometry used to solve real world problems?
- How do I know which trigonometric ratio to use to solve for a missing side/angle?
- How are Pythagorean triples used to solve problems involving right triangles?

Debatable-

How would measurements taken with a clinometer on a different planet, with a different distance from the sun, differ from clinometer measurements taken on earth?

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.*
Objective D i. select appropriate mathematical strategies when solving authentic real-life situations ii. apply the selected mathematical strategies successfully to reach a solution	Students will use sinusoidal relationships to solve problems involving angles and sides of right triangles in real-world contexts.	**Formative Assessment(s):** MYP D - Applications **Summative Assessment(s):** Unit 5 Test
Approaches to learning (ATL)		
Category: Communication Skills **Cluster:** Communication **Skill Indicator:** Give and receive meaningful feedback, Understand and use mathematical notation		

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
G.GSR.6.1 Explain that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	**Discovering Special Right Triangles** **Description**: Special right triangles provide a good foundation for understanding the Unit Circle. This learning task provides an opportunity for students to discover the relationships in special right triangles. **Learning goals:** ● I can identify 45-45-90 and 30-60-90 triangles. ● I understand the relationship between the angles and sides of 45-45-90 triangles. ● I understand the relationship between the angles and sides of 30-60-90 triangles.	Establish mathematics goals to focus learning. Supporting the Learning: Make explicit connections between current and prior lessons or units by focusing on the mathematical precise vocabulary when discussing the responses to the Diagnostic and Engage section of the task. Supporting the Learning: Use diagnostic to establish common learning and opportunities for acceleration.

Content Resources

Textbook Correlation: enVision A|G|A - Geometry

G.GSR.6.1 - Lesson 8-2
G.GSR.6.2 - Lesson 8-2
G.GSR.6.3 - Lesson 8-1, 8-2, Topic 8 - Mathematical Modeling in 3 Acts