Marietta City Schools

2023–2024 District Unit Planner

Honors 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

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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 problems6 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 (θ)   cos (θ)   tan (θ)   sin(θ) = cos (90-θ)   cos(θ) = sin(90-θ)

Key concept	Related concept(s)	Global context
Relationships	Patterns, Models, Equivalence	Scientific and Technical Innovation - Mathematical puzzles, principles, and discoveries

Statement of inquiry
Students will explore relationships and patterns to discover models of equivalence within right triangles.

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.*
MYP D Applications	Students will be able to use trigonometric patterns in right triangles along with the equivalence of complementary angles to solve real application problems.	**Formative Assessment(s):** MYP D - Trigonometry Application TOTD - Complementary Angles **Summative Assessment(s):** Unit 5 Assessment

Approaches to learning (ATL)
MYP D - Trigonometry Application   **Category:** Thinking Skills   **Cluster:** Transfer   **Skill Indicator:** Change the context of inquiry to gain a different perspective   **Miracle on the Hudson Reflection (DOE)**   **Category:** Thinking Skills   **Cluster:** Critical Thinking   **Skill Indicator:** Propose and evaluate a variety of solutions

Learning Experiences		
Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
G.GSR.6.1 G.GSR.6.2 G.GSR.6.3 Students will use trigonometric ratios, pythagorean theorem, and complementary angles to solve the real world application problem.	**Miracle on the Hudson** - Engage, Explore, and Reflect (DOE) **Description**: In this learning plan, students will analyze the flight path of an airplane that hit a flock of birds and landed in the Hudson River. They will calculate the height of the plan above the water and the lengths it traveled. Students will also use inverse ratios to calculate the various angles of elevation and depression along the path. **Learning Goal**: • I can use trig ratios and the Pythagorean Theorem to solve right triangles in applied problems. • I can interpret statements about heights, distances, and angles of elevation and depression.	- Diagnostic Assessment can be used as a warm up review - Provide review on vocab: angle of depression, angle of elevation, altitude - Support some students with unit conversion with various units - For ELL students, possible translation of situation could be needed - For an extension, have students complete the "Apply" section with a different scenario
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

Discovering Special Triangles DOE Task - HIGHLY recommend using this resource to discover special right triangles.

Sine, Cosine Relationships DOE Task - Great resource on complementary angles

Access Ramp DOE Task - Real world application using slope and pythagorean theorem