



Marietta City Schools
2023–2024 District Unit Planner

Honors Geometry: Concepts & Connections

Unit title	Unit 4: Similarity	MYP year	5	Unit duration (hrs)	17 hours
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Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

Standards

G.GSR.5: Describe dilations in terms of center and scale factor and use these terms to describe properties of dilations; use the precise definition of a dilation to describe similarity and establish the criterion for triangles to be similar; use these terms, definitions, and criterion to prove similarity, model, and explain real-life phenomena.

G.GSR.5.1 Verify experimentally the properties of dilations.

Fundamentals

- Students should be able to identify dilation as reduction or enlargement depending on scale factor.
- Students should be given multiple opportunities to draw a dilated image given the center at the origin and scale factor.
- Students should be able to describe a dilation by identifying its center through the intersection of lines going through corresponding preimage and image points by finding the ratio of sides of the image to the preimage as its scale factor.
- Students should be able to understand and use function notation to represent dilations in the coordinate plane.
- Students should be able to describe properties of dilations, such as center, scale factor, angle measure, parallelism, and collinearity.

Strategies and Methods

- Dilations should be limited to those centered at the origin.

Example

- The function notation $(x, y) \rightarrow (4x, 4y)$ enlarges the point (x, y) with a scale factor of four

G.GSR.5.2 Given two figures, use and apply the definition of similarity in terms of similarity transformations.

Fundamentals

- Students should be able to explain using similarity transformations the meaning of similarity for figures as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
- Students should apply properties of similarity to solve problems with missing values involving corresponding parts.

G.GSR.5.3 Use the properties of similarity transformations to establish criterion for two triangles to be similar. Use similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Fundamentals

- Students should be able to apply properties of similarity to solve problems with missing values involving corresponding parts.

Strategies and Methods

- Students should be given opportunities to explore the AA, SAS, and SSS similarity postulates/theorems and use these to prove triangles are similar.

- Students should be able to prove that two triangles are similar using appropriate methods (logic statements, paragraph proofs, two-column proofs, or flowchart proofs).

G.GSR.5.4 Construct formal proofs to justify and apply theorems about triangles.

Fundamentals

- Students should be able to prove a line parallel to one side of a triangle divides the other two proportionally, and its converse.
- Students should be able to prove the Pythagorean Theorem using triangle similarity.

Relevance and Application

- Students should be able to apply these theorems, as well as the Midsegment and Angle Bisector Theorems to solve problems in similar geometric figures.

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

Angle Bisector	Center of Dilation	Congruence	Dilation	Function Notation	Midsegment
Proof	Proportionality	Pythagorean Theorem	Rigid Motion	Scale Factor	Similar
Similarity	Similarity Transformation	Theorem	Transformation	Enlargement	Reduction

Notations

~ Similarity $A \rightarrow A'$ $(x, y) \rightarrow (4x, 4y)$ k (scale factor)

Key concept	Related concept(s)	Global context
Relationships	Change, Patterns	Orientation in Space & Time - Scale, duration, frequency, and variability
Statement of inquiry		
Relationships can be discovered from different patterns to compare scale and variability among similar objects.		
Inquiry questions		
<p>Factual—</p> <ul style="list-style-type: none"> What is dilation and how does this transformation affect a figure in the coordinate plane? What strategies can I use to determine missing side lengths and areas of similar figures? Under what conditions are similar figures congruent? <p>Conceptual—</p> <ul style="list-style-type: none"> How do I know which method to use to prove two triangles similar? How do I prove geometric theorems involving triangles? <p>Debatable-</p> <ul style="list-style-type: none"> Are identical twins considered congruent or similar? 		
MYP Objectives	Assessment Tasks	
What specific MYP <u>objectives</u> will be addressed during this unit?	Relationship between summative assessment task(s) and statement of inquiry:	List of common formative and summative assessments.
MYP B Patterns	Students will be able to describe and effectively use the relationship between similar figures to justify theorems about similar triangles and similarity transformations through proofs.	<p><u>Formative Assessment(s):</u></p> <p>MYP B - Dilations</p> <p>CFA - Similarity</p> <p><u>Summative Assessment(s):</u></p> <p>Unit 4 Assessment</p>

Approaches to learning (ATL)
<p>MYP B - Dilations Category: Self-Management Skills Cluster: Affective Skill Indicator: Practice “bouncing back” after adversity, mistakes, and failures</p> <p>CFA - Similarity Category: Thinking Skills Cluster: Transfer Skill Indicator: Combine knowledge, understanding & skills to create products or solutions</p>

<u>Learning Experiences</u> Add additional rows below as needed.		
Objective or Content	Learning Experiences	Personalized Learning and Differentiation
G.GSR.5.3 G.GSR.5.4 Students will use proportions of triangle similarity to prove pythagorean theorem	<p>Proving Pythagorean Theorem Using Triangle Similarity - Engage, Explore, and Apply (DOE) Description: In this learning plan, students prove the Pythagorean Theorem using triangle similarity. Learning Goals: • I can prove the Pythagorean Theorem using triangle similarity</p>	- Provide triangle cut outs and grid paper for visual representation - “Thinking stems” may be needed to help some groups with #6 on explore - Extension: Have students go through the reflect to discover the Geometric Mean proportion
Content Resources		
<p>Textbook Correlation: enVision A G A - Geometry</p> <p>G.GSR.5.1 - Lesson 7-1, Topic 7 - Mathematical Modeling in 3 Acts G.GSR.5.2 - Lesson 7-2 G.GSR.5.3 - Lesson 7-3, 7-4 G.GSR.5.4 - Lesson 4-2, 5-2, 5-3, 5-4, 5-5, 7-5, 8-1, Topic 5 - Mathematical Modeling in 3 Acts</p> <p>Executing Dilations DOE Task - Good introduction to dilations and scale factor. Visualizations on Desmos</p> <p>Shadow Math DOE Task - Simple task on similarity criteria.</p> <p>Floodlight Shadows DOE Task is similar and more rigorous - links were not matching up as of 7/19/23</p>		