Marietta City Schools

2024–2025 District Unit Planner

Geometry: Concepts & Connections

Unit title	Unit 4: Investigating Similarity	**MYP year**	*5*	**Unit duration (hrs)**	17 hours

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) --> (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

- Identifying Dilations: Recognize the center and scale factor of a dilation and understand its effect on figures.
- Proving Triangle Similarity: Use criteria (AA, SSS, SAS) to establish similarity between triangles.
- Performing Dilations on a Coordinate Plane: Apply dilations to figures, calculate new coordinates, and verify similarity.
- Solving Proportional Problems: Use proportional relationships in similar figures to solve geometric problems.
- Writing Geometric Proofs: Construct formal proofs involving dilations and similarity, using precise definitions and logical reasoning.
- Applying to Real-World Problems: Model and solve real-life scenarios involving dilations and similarity, such as scale drawings or enlargements.

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		

Notation

$(x, y) \rightarrow (k * x,\ k * y)$

Key concept	Related concept(s)	Global context
Relationship	Change, Patterns	Identities and relationships

Statement of inquiry

Students will understand patterns in forms and space to enhance creativity.

Inquiry questions

Factual—

- 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?

Conceptual—

- How do I know which method to use to prove two triangles similar?
- How do I prove geometric theorems involving triangles?

Debatable-

- Are identical twins considered congruent or similar?

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 B **Investigating patterns**	On the summative assessment, questions will be posted to prove triangles and their similarities.	**Formative Assessment(s):** MYP B patterns CFA - Dilations **Summative Assessment(s):** Unit 4 Test
Approaches to learning (ATL)		
Category: Thinking Skills **Cluster:** Transfer **Skill Indicator:** Combine knowledge, understanding and skills to create products or solutions		

Learning Experiences Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
G.GSR.5.2 Given two figures, use and apply the definition of similarity in terms of similarity transformations. **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.	**3-Act Task: Similarity Scanner** **Description:** In this learning plan, students can apply concepts of dilations, similarity, and proportion in relationship to triangles. Students will utilize technology resources like Geogebra and will answer and engage in discourse-based questions. **Learning Goals:** ● I can determine when triangles are similar and non-similar given side lengths or angles.	**On - Level Only** 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 responses.
G.GSR.5.3 Use the properties of similarity transformations to establish criterion for two triangles to be similar. Use	**Measure the Flagpole Task** **Description:** In this learning plan, students will apply their knowledge of similar figures, corresponding parts, and proportionality to measure the height of the flagpole. Students will engage in collaborative, discourse-based problems.	**Honors Only** Support the Learning: Provide scaffolded steps for students to apply their knowledge of proportional figures.

similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**Learning Goals:** ● I can create a mathematical model of a geometric situation and use it to solve problems. ● I can determine the missing side lengths of similar triangles in real world situations.	

Content Resources

Textbook Correlation: enVision A|G|A - Geometry

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