Unit 07 - Similarity

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 3**
Length: **1-2 weeks**
Status: **Published**

Brief Summary of Unit

In this unit, students will be shifting their attention from congruence to similarity. The first connection will be made from dilations in a previous unit. Then, we will explore other ways to show figures can be similar. Students will extend similarity into other proportional relationships regarding triangles and parallel lines.

Revision Date: July 2024

Standards

9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
L.KL.9–10.2.A	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level.
G.GPE.B.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
G.GPE.B.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
G.SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
G.SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
G.SRT.B.4	Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.
G.SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
SL.PE.11–12.1.A	Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.

Essential Questions

- How can ratios and proportions prove meaningful relationships between various types of triangles?
- How can the AA, SAS, and SSS Similarity Theorem prove meaningful relationships?
- How can you apply the Three Parallel Lines Theorem?
- How can you apply the Triangle Angle Bisector Theorem?
- How can you apply the Triangle Proportionality Theorem and its converse?
- How can you use a scale factor to determine perimeter and area of similar figures?

Enduring Understandings

- Understand and use additional triangles and similarity theorems.
- Understand and use proportionality theorems to prove meaningful relationships?
- Understand and use the AAS Similarity Theorem.
- Understand the relationship between similar polygons.

Students Will Know

- How to find and use scale factors in similar polygons.
- How to identify corresponding parts of similar polygons.
- How to prove triangles are similar.
- How to use proportionality theorems to solve problems.

Students Will Be Skilled At

- Deciding whether polygons are similar.
- Finding corresponding lengths in similar polygons.
- Finding lengths when a ray bisects an angle of a triangle.
- Finding lengths when two transversals intersect three parallel lines.
- Finding perimeters and areas of similar polygons.
- Proving triangle similarity using the AAS Similarity Theorem.
- Solving real-life problems using similar triangles.
- Using angle measures of triangles to determine whether triangles are similar.
- Using proportionality theorems to find lengths in triangles.
- Using similar triangles to prove theorems about slopes of parallel and perpendicular lines.
- Using similarity statements.
- Using similarity transformations to prove the AAS Similarity Theorem.
- Using the SSS and SAS Similarity Theorems to determine whether triangles are similar.

Evidence/Performance Tasks

Assessments

- Formative: Daily assessments using examples from class notes, NJSLA test bank problems, and/or Albert/AP Classroom assessments
- Summative: Teacher-created assessments, NJSLA test bank problems, Big Ideas Math online platform problems, Albert/AP Classroom and/or Big Ideas Math unit assessments
- Benchmark: DeltaMath or teacher created diagnostic assessments in addition to unit assessments from Big Ideas Math
- Alternative Assessments: Student-centered activities such as scavenger hunts, various projects involving real world applications, and differentiated learning tasks in Khan Academy, and DeltaMath

- Answer essential questions
- Class discussion of daily topic
- Classwork and homework that assess the essential questions
- Provide alternative means of assessments for certain students
- Teacher Observation
- Tests and quizzes that assess the essential questions
- Written assignments that assess the essential questions that involves providing explanations

Learning Plan

The following list is meant to create a day-to-day plan. Teachers are encouraged to slow down or condense days as appropriate to the student population in the class. Assessment(s) should be given when appropriate.

- Begin by recalling ratios and proportions, connecting back to dilations from a previous unit. Use ratios to prove corresponding sides of polygons proportional. Given two similar polygons, find the scale factor through proportions and solve for missing segments. Introduce how to use the scale factor to find the ratio of perimeters and area.
- Define the AA Similarity Theorem and use it in proofs. Be sure to include other information such as vertical angles, parallel lines, etc to form the needed angle relationships.
- Introduce SSS and SAS Similarity Theorems and use them in proofs. Remind students that when discussing similarity, corresponding sides must be proportional. Sides should be matched based on their corresponding lengths.
- Students will likely need additional time to practice using these similarity theorems in proofs.
- State the Triangle Proportionality Theorem and its converse. Discuss how this can be helpful in determining side lengths. Also, take time to discuss the Three Parallel Lines Theorem and the Triangle Angle Bisector Theorem, extending the discussion of proportionality.

Materials

Core instructional materials: Core Book List including Big Ideas Math Common Core Geometry

Supplemental materials: Khan Academy, Edia, DeltaMath

- District approved textbook
- Khan Academy
- Teacher created activiites
- Teacher created notes
- Whiteboard tables

Suggested Strategies for Modifications

Possible accommodations/modification for Geometry