Unit 07 Similarity

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

Brief Summary of Unit

Students will use similarity transformations to explain the meaning of similar triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. They will also use similarity criteria for triangles to solve problems.

Revision Date: July 2024

Standards

Students will analyze geometric designs which connects to various cultures. Embracing the diversity within society incorporates the following:

Amistad Commission

This unit also reflects the goals of the Department of Education and the Amistad Commission including the infusion of the history of Africans and African-Americans into the curriculum in order to provide an accurate, complete, and inclusive history regarding the importance of of African-Americans to the growth and development of American society in a global context.

Asian American and Pacific Islander History Law

This unit includes instructional materials that highlight the history and contributions of Asian Americans and Pacific Islanders in accordance with the New Jersey Student Learning Standards in Social Studies.

New Jersey Diversity and Inclusion Law

In accordance with New Jersey's Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity, including:

economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and

sexual orientation, race and ethnicity, disabilities, and religious tolerance.

ELA.K-12.2	Adapting Communication: Adapting communication in response to the varying demands of audience, task, purpose, and discipline.
ELA.K-12.3	Valuing Evidence in Argumentation: Constructing viable claims and evaluating, defending, challenging, and qualifying the arguments of others.
ELA.K-12.4	Building Knowledge: Building strong content knowledge and connecting ideas across disciplines using a variety of text resources and media.
MATH.9-12.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).
MATH.9-12.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.
MATH.9-12.G.SRT.A.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
MATH.9-12.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.
MATH.9-12.G.SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
TEC.K-12.8.1	All students will use computer applications to gather and organize information and to solve problems.
TEC.K-12.8.2	All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual society, and the environment.
WORK.K-12.9.1	All students will develop career awareness and planning, employability skills and foundational knowledge necessary for success in the workplace.
WORK.K-12.9.2	All students will develop career awareness and planning, employability skills and foundational knowledge necessary for success in the workplace.

Essential Questions

- How can you use proportions to find side lengths in similar polygons?
- How do the properties and classifications of polygons help us understand and solve geometric problems in both theoretical and practical applications?
- What are the relationships between the sides, angles, and diagonals of different polygons, and how can these relationships be used to solve problems and make real-world applications?

Enduring Understandings

- Ratios and proportions are used to determine the lengths of sides in similar polygons.
- Recognizing and understanding the properties and classifications of polygons allows us to solve complex geometric problems, make accurate constructions, and apply these principles to various real-life scenarios.
- Using ratios and proportions between two polygons, you can determine if the polygons are similar.

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 AA similarity theorem.
- 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 AA similarity theorem.
- Using 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: IXL 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, DeltaMath, and IXL

- 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

Unit 7: Chapter 8, Similarity (1-2 days per topic, 1 day practice, 1 day review, 1 day assessment for 11 days)

- Similar Polygons 8.1
    - Definition of Similarity, understand similarity statement
    - Use proportions to solve for corresponding lengths
    - Scale Factor
    - Perimeter of similar polygons
    - Decide if two polygons are similar
- Proving Triangle Similarity by AA 8.2
    - AA Similarity Theorem
- Proving Triangle Similarity by SSS and SAS 8.3
    - SSS Similarity Theorem
    - SAS Similarity Theorem
- Proportionality Theorems 8.4
    - Triangle Proportionality Theorem
    - Finding Lengths
    - Other Proportionality Theorems (if time allows)

Materials

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

Supplemental materials: Khan Academy, Edia, DeltaMath

- District approved textbook and ancillary materials
- Online resources: Khan Academy, IXL, Delta Math, Edia, Geogebra
- Teacher created activiites
- Teacher created notes

Suggested Strategies for Modifications

Possible accommodations/modification for Geometry CP.