Unit 06 - Congruent Triangles

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 2**
Length: **3-4 weeks**
Status: **Published**

Brief Summary of Unit

In this chapter, students will achieve and exhibit with excellence how to recognize congruent figures and their corresponding parts, prove two triangles congruent using the SSS, SAS, ASA, and AAS theorems, use and apply properties of isosceles and equilateral triangles, prove right triangles congruent using Hypotenuse-Leg Theorem, and use corresponding parts of congruent triangles to prove that parts of two triangles are congruent.

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.CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
G.CO.B.8	Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
G.CO.C.10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
G.GPE.B.4	Use coordinates to prove simple geometric theorems algebraically.
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 you classify a triangle by its angles?
- How can you classify a triangle by its sides?
- How can you name the corresponding parts of congruent figures?
- How can you prove figures to be congruent?
- How can you use CPCTC to prove additional information?
- What does the Exterior Angle Theorem and its corollary state?
- What is the Base Angles Theorem and its converse in isosceles triangles?
- What is the difference between the ASA Congruence Theorem and the AAS Congruence Theorem?
- What is the difference between the SAS Congruence Theorem and the HL Congruence Theorem?
- What is the Third Angles Theorem and how can it be applied when proof writing?
- What is the Triangle Sum Theorem and how can it be applied when proof writing?

Enduring Understandings

- Prove and use the ASA and AAS Congruence Theorems.
- Prove and use the SAS Congruence Theorem.
- Prove and use the SSS Congruence Theorem.
- Prove and use theorems about angles of triangles.
- Prove and use theorems about isosceles and equilateral triangles.
- Understand congruence in terms of rigid motions.
- Use congruent triangles in proofs and to measure distances.
- Use coordinates to write proofs.

Students Will Know

- How to classify triangles by sides and angles.
- How to prove that triangles are congruent using different theorems.
- How to solve problems involving congruent polygons.
- How to write a coordinate proof.

Students Will Be Skilled At

- Classifying triangles by sides and by angles.
- Finding interior and exterior angles measures of triangles.
- Identifying corresponding parts of congruent polygons.
- Placing figures in a coordinate plane.
- Proving and using theorems about equilateral triangles.
- Proving and using theorems about isosceles triangles.
- Proving the AAS Congruence Theorem.

- Proving theorems about angles of triangles.
- Using congruent polygons to solve problems.
- Using congruent triangles to prove statements and constructions.
- Using congruent triangles to solve real-life problems.
- Using rigid motions to prove SSS Congruence Theorem.
- Using rigid motions to prove the ASA Congruence Theorem.
- Using rigid motions to prove the SAS Congruence Theorem.
- Using rigid motions to show that two triangles are congruent.
- Using the ASA and AAS Congruence Theorems.
- Using the Hypotenuse-Leg Congruence Theorem.
- Using the SAS Congruence Theorem.
- Using the SSS Congruence Theorem.
- Writing coordinate proofs.

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. (This unit may need to be broken into two parts due to the timing of midterm exams. Plan appropriately and

talk with other teachers of this course to determine what must be covered before the exams.)

- Begin by defining the classifications of triangles by sides and angles. Include identifying a triangle given by three coordinate points. (You may need to review the distance formula.) Discuss the Triangle Sum Theorem, which students may recall from previous knowledge. Relate this knowledge to the Exterior Angle Theorem and its corollary.
- Students will likely need additional time to practice identifying triangles, especially when working in a coordinate plane.
- Introduce identifying corresponding parts of congruent polygons, and writing congruence statements based on them. Remind students of congruence properties such reflexive, symmetric, and transitive. Discover the Third Angles Theorem. From here, prove two triangles congruent by proving all corresponding sides and all corresponding angles congruent.
- Introduce proving congruent triangles by SSS, SAS, and HL Congruence Theorems. Emphasize in the last theorem that the angle must be a right angle, and one of the pairs of congruent sides must be the sides across form those right angles.
- Extend into proving congruent triangles by ASA and AAS Congruence Theorems. Emphasize that choosing either of these theorems depends on where the congruent sides are located in relation to the pairs of congruent angles.
- Students will likely need additional time to practice proving these five triangle congruence theorems. Feel free to use any information/vocabulary discussed in previous units in given statements.
- Identify the parts of an isosceles triangle, and extend to the Base Angles Theorem and its converse. Also, discuss the corollary to both of those theorems. Define an equilateral triangle again and continue to discuss its importance. Use all this information in proofs and algebraic problems.
- Build off of having congruent triangles into then proving additional information using CPCTC. Lead into also proving special segments, points, or relationships.
- If time allows, spend some time creating proofs specifically for figures in the coordinate plane.

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
- SMART Board
- Teacher created activiites
- Teacher created notes
- Whiteboard tables

Suggested Strategies for Modifications

Possible accommodations/modification for Geometry