# Unit 05 Congruent Triangles

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

## Brief Summary of Unit

Students will prove theorems about triangles and use the definition of congruence in terms of rigid motions to show that two triangles are congruent. Students will explain how the criteria for triangle congruence follows from the definition of congruence; they will use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

**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.

| | |
|---|---|
| 3 | Valuing Evidence in Argumentation: Constructing viable claims and evaluating, defending, challenging, and qualifying the arguments of others. |
| 4 | Building Knowledge: Building strong content knowledge and connecting ideas across disciplines using a variety of text resources and media. |
| 3.a | Identify complex, interdisciplinary, real-world problems that can be solved computationally. |
| 3.b | Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures. |
| 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.SRT.B.5 | Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. |
| 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 do you identify corresponding parts of congruent triangles?
- How do you show that two triangles are congruent?
- What are the criteria for triangle congruence, and how can understanding these criteria help in solving geometric proofs and constructions?

## Enduring Understandings

- Comparing the corresponding parts of two figures can show that the figures are congruent, but two triangles can be proven congruent without showing ALL corresponding parts are congruent.
- If two triangles are congruent, then every pair of their corresponding parts is also congruent.
- The criteria for triangle congruence provides a foundation to prove the equality of triangles, which is fundamental in solving geometric problems, constructing accurate designs, and applying these principles in various real-world contexts

## Students Will Know

- How to prove and use the ASA and AAS congruence theorems.
- How to prove and use the special case of SSA, Hypotenuse Leg, congruence theorem.
- How to prove and use the SSS congruence theorem.
- How to prove and use theorems about angles of triangles.
- How to prove and use theorems about isosceles and equilateral triangles.
- How to understand congruence in terms of rigid motions and how to prove and use the SAS congruence theorem.
- How to use congruent triangles in proofs and to measure distances.

## Students Will Be Skilled At

- Classifying triangles by their sides and their angles.
- Deciding which congruence theorem to use in a given situation.
- Finding interior and exterior angle measures of triangles.
- Identifying corresponding parts of congruent polygons.
- 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 rigid motion to prove the SSS congruence theorem.
- Using rigid motions to prove 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 HL congruence theorem.
- Using the SAS congruence theorem.
- Using the SSS congruence theorem.

## 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 5: Chapter 5, Congruent Triangles (1-2 days per topic, 2 days practice, 3 days review, 3 days assessment for 16 days)

- Angles of Triangles 5.1 (1 day)
    - Classify triangles by sides and by angles
    - Identify interior and exterior angles
    - Triangle Sum Theorem, Exterior Angle Theorem
- Congruent Polygons 5.2 (½ day)
    - Identify and Use Congruent Parts
    - CPCTC
- Proving Congruent Triangles by SAS 5.3 (1 day)
    - Present SAS; proofs with SAS
    - Construct congruent triangles using SAS**
- Equilateral and Isosceles Triangles 5.4 (1 day)
    - Base Angle Theorem and its converse
    - Construct Equilateral Triangle**
    - Using Equilateral and Isosceles Triangles to find values

- Proving Congruent Triangles by SSS, ASA, and AAS 5.5, 5.6 (3-4 days)
    - Present SSS, proofs using SSS
    - Copy Triangle using SSS
    - Special case of SSA:  HL
    - Present ASA, proofs using ASA
    - Present AAS, proofs using AAS
    - Copy a Triangle using ASA**
- Using Congruent Triangles 5.7 (1 day)
    - Decide which Congruence Theorem to use in a given situation

## 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, Delta Math, Edia, Geogebra
- Teacher created activiites
- Teacher created notes

## Suggested Strategies for Modifications

Possible accommodations/modification for Geometry CP.