

Congruent Triangles Lesson Plan

GRADE/SUBJECT: GEOMETRY

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TIME: 1–2 PERIODS

Lesson Description:

In this lesson, students will explore triangle congruence by SSS and SAS. Students will discuss the definition of congruence and will have the opportunity to both physically and digitally visualize congruence by SSS and SAS.

Key Essential Questions:

- How do you show two triangles are congruent by SSS and SAS?
- How can we use technology to better understand proofs?

Desired Results + Learning Outcomes: (Students will know that... / Students will be able to...)

- Justify triangle congruence through geometric proofs.
- Prove triangle congruence by SSS and SAS (to be followed by ASA, AAS and HL)

Prior Student Knowledge:

- Definition of congruence (All corresponding sides and angles are congruent)
- Knowledge of definition and properties of Isosceles Triangle
- Definition of a midpoint
- Definition of segment bisector and vertical angles (for challenge problem)
- Basic understanding of CanFigureIt Geometry platform

Lesson Materials:

- Exploragons or physical objects for students to create triangles with
- Formal Notes to hand out
- Individual Access to CanFigureIt Geometry (laptops, chromebooks, macbooks, or desktops)

Standards Alignment:

- G.CO.1: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
- G.CO.8: Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.
- MP1: Make sense of problems and persevere in solving them.
- MP3: Construct viable arguments and critique the reasoning of others.
- MP5: Use appropriate tools strategically.
- MP6: Attend to precision.
- MP7: Look for and make use of structure.
- MP8: Look for and express regularity in repeated reasoning.

Assessment Evidence:

- Warm-Up (Listening to discussions)
- CanFigureIt Geometry Proof Activities:
 - SSS 1 & SAS 1 (basic entry)
 - SSS 2 (definition of a midpoint and isosceles triangle)
 - SAS 6 (reflexive property)
 - Congruence and Parallel Lines 1 (alternate interior angles and reflexive property)
 - *SAS 20 (segment bisector and vertical angles)

Lesson Plan Structure:

1. Warm-Up
 2. Exploragons Activity
 3. Formalized Class Notes
 4. CanFigureIt Geometry Activities
 5. Individual Homework
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Warm-Up

1. Begin classroom discussions by asking “What does it mean to be congruent?”
 - a. The discussion should stem around all corresponding sides and corresponding angles are congruent.
 - i. Discuss the fact that this contains 6 pieces of information for a pair of triangles:
 1. Corresponding sides are congruent (3) and corresponding angles are congruent (3)
 - b. Lead discussion: Do we need all 6 pieces, or do we know sooner?

Exploragons Activity

1. Utilize [Exploragons](#) or other physical objects with 3 different lengths (ie. spaghetti, straws, etc.) to demonstrate triangle congruence
2. Have students take one of each color. Tell students to make a triangle out of a blue, green and yellow piece (or objects of three different lengths; make sure students have access to same objects of various lengths)
 - a. Ask students to compare their creations with each other and ask, “How many different triangles did we create?”
 - b. There is only one possible triangle created, and students will see this as they flip or compare their triangles.
 - c. This should lead the discussion to the SSS congruence.

3. Have students take 2 pieces and have them play with creating different triangles
 - a. Discussion leading to SS is not enough to claim congruence
 - b. Now have them “fix” the angle between the two pieces
 - i. How many different ways can you connect the two sides?
 - ii. This should lead to the discussion of SAS congruence

Formalized Class Notes

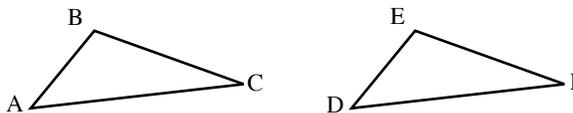
1. Handout the following notes for each student and define triangle congruence through SSS and SAS postulates. Work through examples.

Class Notes

_____ - _____ - _____ Postulate or (_____):

If _____ sides of one Δ are _____ to the _____ sides of another Δ , then the Δ s are _____.

Mark the \cong parts on the Δ 's.
Write a conditional statement



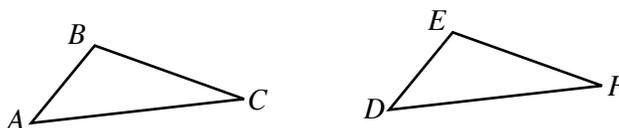
If _____, _____, and _____, then Δ _____ \cong Δ _____.

Here is another way to prove triangles congruent...

_____ - _____ - _____ Postulate or (_____):

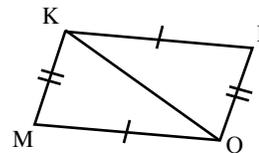
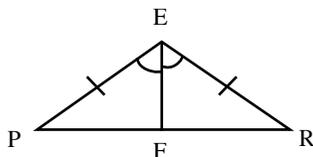
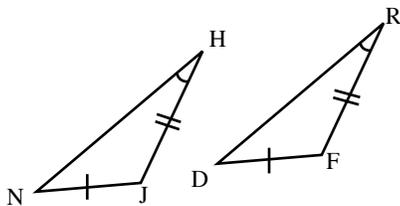
If _____ sides and the _____ \angle of one Δ are _____ to the _____ sides and the _____ \angle of another Δ , then the Δ s are _____.

Mark the \cong parts on the Δ 's.
Write a conditional statement



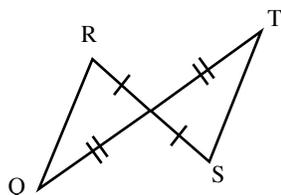
If _____, _____, and _____, then Δ _____ \cong Δ _____.

Would you use SSS or SAS to prove these triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write not enough information. Explain your answer.



Given: $\overline{RX} \cong \overline{SX}$ and $\overline{QX} \cong \overline{TX}$

Prove: $\Delta QRX \cong \Delta TSX$



Statements	Reasons
1.	1.
2.	2.
3.	3.
4.	4.

CanFigureIt Geometry

1. Direct students to log into [CanFigureIt Geometry](#) using their individual username and password
 - a. Basic Entry:
 - i. If CanFigureIt Geometry is relatively new to students, have students work through SSS 1 and SAS 1 first to see what they have to do for each proof.
 - b. Have students work through SSS 2, SAS 6, and Congruence and Parallel Lines 1:
 - i. These activities include: the definition of a midpoint and isosceles triangle, reflexive property, and alternate interior angles.
 - c. Once finished, they can move onto the challenge problem, SAS 20
 - i. Covers segment bisector and vertical angles
2. Check off completion and correctness of proofs via the teacher dashboard or checking with students individually.

Individual Homework

1. Have students begin homework for the remainder of class
 - a. CanFigureIt Geometry Homework Activities
 - i. SSS 3-SSS 7
 - ii. SAS 2-SAS 5, SAS 7-SAS 24
2. Teachers can review work via the CanFigureIt Geometry teacher dashboard or have students print completed activities as PDFs or upload/email PDFs to the classroom management system.