Gizmos

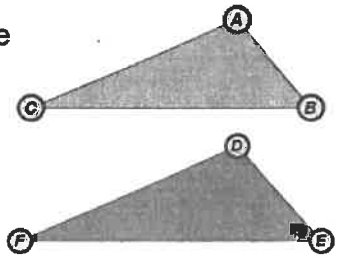
Name: _____ Date: _____

Student Exploration: Proving Triangles Congruent

Vocabulary: congruent, corresponding angles (of a polygon), corresponding sides, similar

Gizmo Warm-up

Buzz wants to make a triangle that is **congruent** to, or identical to, the triangle described by his uncle. But how much information is needed to guarantee that one triangle is congruent to another? You can use the *Proving Triangles Congruent* Gizmo to find out.

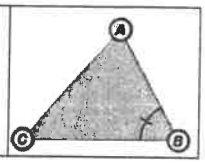


1. Under **Conditions**, check that **None** is selected. Drag each of the six vertices to form a variety of triangles.

   A. Is it possible to create two triangles that are *not* congruent? _____

2. Under **Conditions**, select **S**. Notice that one pair of sides is now congruent. Drag the vertices to form a variety of triangles.

   A. Can you make two triangles that are *not* congruent? _____

Activity A: **Congruent sides and angles**	Get the Gizmo ready: • Under **Conditions**, select **A**.	

1. Check that **A** is selected under **Conditions**. Notice that $\angle B$ and $\angle E$ are congruent. Do you think this condition guarantees that the two triangles are always congruent? _____

2. For each condition listed below, write "yes" or "no" in the second column to tell whether you think the condition guarantees congruency.

Condition	Do you think this condition guarantees congruency?	Does this condition actually guarantee congruency?
AA		
AAA		
S		
SS		
SSS		
SA		
SSA		
SAS		
ASA		
AAS		

3. In the Gizmo, choose each condition listed above, and try to create triangles that are not congruent. In the third column, write "yes" if you made all congruent triangles, or "no" if you were able to make non-congruent triangles.

4. Under **Conditions**, select **AAA**. Two congruent shapes are the same shape and size. Two **similar** shapes are the same shape, but not necessarily the same size. Drag vertices *C* and *F* to create a variety of triangles. What is true about the triangles when the condition is AAA?

_____

_____

5. Under **Conditions**, select **SSA**. For some triangles, SSA guarantees congruence, while for others it does not. Create a variety of triangles. When the message, "For these triangles, SSA does not imply congruence," appears, click **Show counterexample**. Paste an image of the triangles in your document. If necessary, modify your table on the previous page.

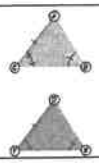
6. Under **Conditions**, select **AAS**. Why is this condition equivalent to **ASA**? (Hint: If two pairs of **corresponding angles** are congruent, what can you say about the third pair?)

_____

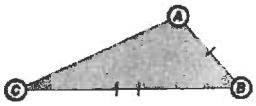
_____

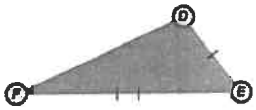
7. Of all the conditions you have investigated, which ones guarantee congruency? _____

_____

Activity B: **Proving congruence**	Get the Gizmo ready: • Under **Conditions**, select **None**.	

1. In the triangles to the right, you know that $\overline{AB} \cong \overline{DE}$ and $\overline{BC} \cong \overline{EF}$.





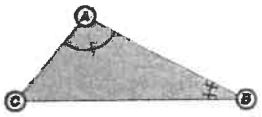
   A. What other information do you need to prove that the two triangles are congruent by SSS? _____

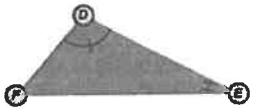
      Check your answer in the Gizmo.

   B. What other information do you need to prove that the two triangles are congruent by SAS? _____

   C. Is $\Delta ABC \cong \Delta DEF$ if $\angle C \cong \angle F$? _____

2. In the triangles to the right, you know that $\angle A \cong \angle D$ and $\angle B \cong \angle E$.





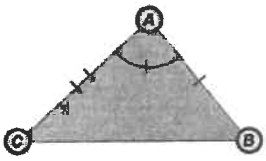
   A. What other information do you need to prove that the two triangles are congruent by ASA? _____

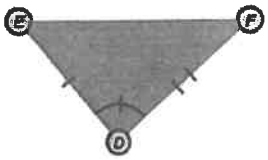
   B. What other information do you need to prove that the two triangles are congruent by AAS? _____

   C. Can you prove that the two triangles are congruent if you also know that $\angle C \cong \angle F$?

      _____

3. The two triangles shown to the right have the congruent parts as marked.





   A. Are the triangles congruent? _____

      Why or why not? _____

   B. What other pairs of **corresponding sides** and angles are congruent? _____

      _____