

Name: _____ Date: _____

Student Exploration: Similar Figures

Vocabulary: image, preimage, scale factor, similar

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

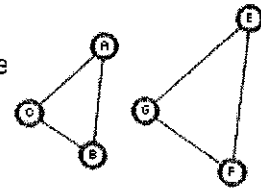
Amy has a picture that is 6 inches wide by 4 inches tall. She takes the picture to a photo store and asks them to enlarge the picture so that it is 8 inches tall.

1. What are the dimensions of the enlarged picture? _____

2. Will the enlarged picture fit in an 8-inch by 10-inch frame? _____ Explain. _____

Gizmo Warm-up

In the *Similar Figures* Gizmo™, you will experiment with **similar** figures. Similar figures have the same shape, but are not necessarily the same size



1. Click the triangle button (). Set **Scale factor** to 1.0 and **Rotation, in degrees** to 0. (To set the value of a slider, drag the slider or select the number in the text field, type in a new value, and hit **Enter**.)

A. Do the pink and green triangles appear to be the same size and shape? _____

B. These triangles are congruent. What is true about corresponding side lengths and angle measures of congruent triangles? _____

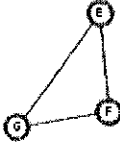
Select **Show lengths** and then **Show angle measures** to check.

C. Drag the **Rotation, in degrees** slider. Are the triangles still congruent? _____

2. Set **Rotation, in degrees** to 0. Drag the **Scale factor** slider. Notice that the size of $\triangle EFG$ (the **image**) changes, but $\triangle ABC$ (the **preimage**) stays the same.

A. How do the image and preimage compare when the scale factor is greater than one? _____

B. How do the image and preimage compare when the scale factor is less than one? _____

Activity A: Similar polygons	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Set the Scale factor to 3.0 and Rotation, in degrees to 0. 	
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1. Make sure the triangle button (\triangle) is selected.

A. Similar figures have pairs of corresponding angles and pairs of corresponding sides, just like congruent figures. Name the part of $\triangle EFG$ that corresponds to each of the following parts of $\triangle ABC$.

$\angle ABC$ and _____ $\angle BCA$ and _____ $\angle CAB$ and _____

\overline{AB} and _____ \overline{BC} and _____ \overline{CA} and _____

B. Turn on **Show angle measures**. What is true about the measures of the

corresponding angles of these similar triangles? _____

C. Select **Show lengths**. Find the ratio of the measures of each pair of corresponding sides in simplest form.

$$\frac{EF}{AB} = \frac{\boxed{}}{\boxed{}} = \underline{} \quad \frac{FG}{BC} = \frac{\boxed{}}{\boxed{}} = \underline{} \quad \frac{GE}{CA} = \frac{\boxed{}}{\boxed{}} = \underline{}$$

D. Compare the simplest forms of the ratios to each other and to the **scale factor**. What do you notice? _____

E. Drag the **Rotation, in degrees** slider. Do the triangles remain similar? _____

Explain. _____

2. Experiment more with similar triangles by dragging the vertices of either triangle to reshape.


A. Select **Show angle measures**. What is true about the measures of the

corresponding angles? _____

B. Select **Show lengths**. What is true about the lengths of the corresponding sides?

(Activity A continued on next page)

Activity A (continued from previous page)

3. Select the  button to change the figures to quadrilaterals. Experiment with a variety of similar quadrilaterals by changing the scale factor and rotation, and dragging their vertices.


A. Select **Show angle measures**. What do you notice? _____

B. Select **Show lengths**. What do you notice? _____

4. Use the buttons at the top left of the Gizmo to explore other types of figures. For each type, create a variety of figures, and vary the scale factor and rotation.

A. What do you notice about the angle measures? _____

B. What do you notice about the side lengths? _____

5. Select the  button to view two similar trapezoids. With **Show lengths** selected, drag the vertices of trapezoid $ABCD$ so that $AB = 12$, $BC = 10$, $CD = 18$, and $DA = 10$.

A. If $EF = 6$, what is the scale factor? _____ Explain. _____

B. Use the scale factor from above to find the lengths of the other three sides of trapezoid $EFGH$. Show your work in the space below. Then check your answers in the Gizmo by setting the **Scale factor** to the value you calculated above.

$FG =$ _____

$GH =$ _____

$HE =$ _____

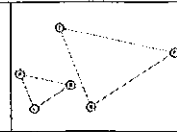
C. If you know the measures of the angles of trapezoid $ABCD$, how do you find the measures of the angles of trapezoid $EFGH$? _____

Select **Show angle measures** and check your answer in the Gizmo.

Activity B:
Using similar polygons

Get the Gizmo ready:

- Be sure the triangle button is selected.



1. State whether each statement is always, sometimes, or never true. Then explain your answer, and check it in the Gizmo.

A. Congruent triangles are similar. _____

B. Equilateral triangles are similar. _____

C. Isosceles triangles are similar. _____

D. Triangles with three pairs of congruent corresponding angles are similar. _____

2. Ken wants to find the height of a building, but realizes that the building is too tall to measure directly. He decides to have a friend measure his shadow and the shadow of the building.

A. Ken is 6 feet tall and his shadow is 4 feet long. The shadow of the building is 10 feet long. Make a sketch of this situation in the space at right.

B. How can Ken use similar triangles to find the height of the building? _____

C. Find the height of the building. Show your work in the space to the right. Then check your answer in the Gizmo.

Building height = _____