Dilations Lesson 1: Sides & Angles

Student Activity

Name _____

Class _____

In this lesson, you will investigate the relationship between measures of corresponding angles and lengths of corresponding sides of dilated triangles.
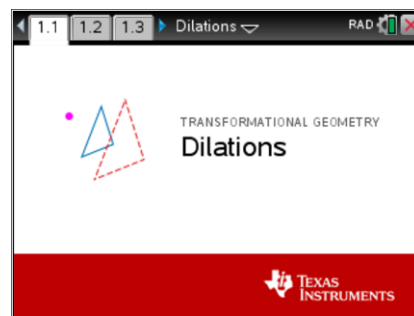
Open the document: *Dilations.tns.*

It is important that the Dilations Tour be done before any Dilations lessons.

PLAY   INVESTIGATE   EXPLORE   DISCOVER

Move to page 1.3.

On the handheld, press ⌈ctrl⌉ ▶ and ⌈ctrl⌉ ◀ to navigate through the pages of the lesson.

On the iPad®, select the page thumbnail in the page sorter panel.
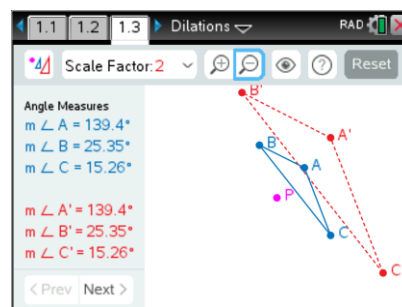
1. a. Press ⌈menu⌉ to open the menu.

    (On the iPad, tap on the wrench icon 🔧 to open the menu.)
    Press ⌈1⌉ (1: Templates) then ⌈1⌉ (1: Angles & Sides).

    b. Dilate $\triangle ABC$ about point P with a Scale Factor of 2

    (📐 or ⌈D⌉). Zoom ⊕ ⊖ in (⌈+⌉) or out (⌈−⌉) as needed.
    Observe.

    Record the *Original* angle measures (*first measures displayed*) in the first row of the table below.

2. a. Investigate **Angle Measures** by grabbing and moving each of the three vertices of $\triangle ABC$ to create different shaped triangles. Record the data in the table below.

    b. Move point P and record the angle measures in the table.

Scale Factor = 2	$m\angle A$	$m\angle B$	$m\angle C$	$m\angle A'$	$m\angle B'$	$m\angle C'$
Original						
Figure 1						
Figure 2						

3. Make a **conjecture** about the angles of a triangle and its image under a dilation about a point. (A **conjecture** is an opinion or conclusion based upon what is observed.)

4. Reset the page (Reset or ⌈ctrl⌉ followed by ⌈del⌉).
    Repeat the earlier investigation using a different scale factor. If working with a group, each person should choose a different scale factor. If working on your own, use a scale factor of ½.

To change the scale factor, press Scale Factor: 2 ▾ (times key ([×])) and use the directional

arrows (▲ ▼ ◀ ▶) on the touchpad to select the scale factor, then press [⚙] or [enter].

Dilate $\triangle ABC$ with the scale factor chosen ([▲] or [D]).

Zoom [⊕] [⊖] in ([+]) or out ([−]) as needed.

Create different triangles as before by grabbing and moving vertices and point P.

Record angle measures for three different figures.

Record the scale factor here: **Scale Factor =** _____ and the **Angle Measures** in the table below.

	$m\angle A$	$m\angle B$	$m\angle C$	$m\angle A'$	$m\angle B'$	$m\angle C'$
Figure 1						
Figure 2						
Figure 3						

Does your conjecture from question 3 still apply?

Compare your results to those of your classmates who used different scale factors.

5. Reset the page (Reset or [ctrl] followed by [del]).

Dilate $\triangle ABC$ about point P with a Scale Factor of 2 ([▲] or [D]).

Zoom [⊕] [⊖] in ([+]) or out ([−]) as needed.

Advance to the **Side Lengths** data by pressing Next ([)] right parenthesis key).

Record the *Original* side lengths (*first lengths displayed*) in the first row of the table below.

6. a. Investigate **Side Lengths** by grabbing and moving each of the three vertices of $\triangle ABC$ to

create different shaped triangles. Record the data for the length of each side in the table below.

Try to make at least one or two lengths in each pre-image a whole number, if possible.

b. Move point P and record the **Side Lengths** in the table.

Scale Factor = 2	$\overline{AB}$	$\overline{BC}$	$\overline{AC}$	$\overline{A'B'}$	$\overline{B'C'}$	$\overline{A'C'}$
Original						
Figure 1						
Figure 2						

7. Make a conjecture about the side lengths of a triangle and its image under a dilation about a point.

8. Advance to the **Ratio of Lengths** data by pressing Next ([)] right parenthesis key). Discuss in

your groups what this page is displaying. Create different triangles as before by grabbing and

moving vertices and point P. Notice what values are changing and what values are not changing.

Does your conjecture from #7 above still apply? Discuss.

9. Reset the page (Reset or ⌈ctrl⌉ followed by ⌈del⌉).

   Repeat the earlier investigation using a different scale factor. If working with a group, each person should choose a different scale factor. If working on your own, use a scale factor of ½.

   To change the scale factor, press Scale Factor: 2 ⌄ (⌈×⌉) and use the directional arrows
   (▲ ▼ ◀▶) on the touchpad to select the scale factor, then press ⌈🔾⌉ or ⌈enter⌉.

   Dilate $\triangle ABC$ with the scale factor chosen (🔺 or ⌈D⌉).

   Zoom 🔍➕ 🔍➖ in (⌈+⌉) or out (⌈−⌉) as needed.

   Advance to the **Side Lengths** data by pressing Next (⌈)⌉ right parenthesis key).

   Create different triangles as before by grabbing and moving vertices and point P.

   Try to make at least one or two lengths in each pre-image a whole number, if possible.

   Record the scale factor here: **Scale Factor =** _____ and the **Side Lengths** in the table below.

	$\overline{AB}$	$\overline{BC}$	$\overline{AC}$	$\overline{A'B'}$	$\overline{B'C'}$	$\overline{A'C'}$
Figure 1						
Figure 2						
Figure 3						

   Make a conjecture about the side lengths of a triangle and its image under a dilation about a point.

10. Advance to the **Ratio of Lengths** data by pressing Next (⌈)⌉ right parenthesis key). Discuss in your groups what this page is displaying.

    Create different triangles as before by grabbing and moving vertices and point P. Notice what values are changing and what values are not changing. Does your conjecture from #9 above still apply? Discuss.

11. Suppose that $\triangle DEF$ were dilated about point P with a scale factor of 5.

    a. If the measure of $\angle D = 20^o$, then the measure of $\angle D' =$ _____ .

    b. If $DE = 40\,cm$, then $D'E' =$ _____ .

    c. If the measure of $\angle E' = 30^0$, then the measure of $\angle E =$ _____ .

    d. If $E'F' = 10\,in$, then $EF =$ _____ .