Translations: Lesson 2 Perimeters & Areas Name _____

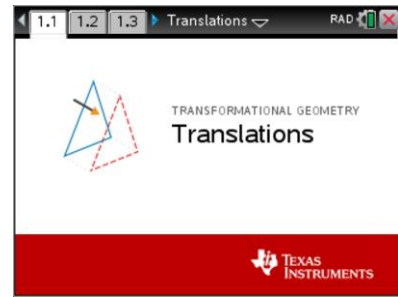## Student Activity

Class _____

In this lesson, you will investigate the perimeters and areas of triangles that have been translated in different directions.
Open the document: *Translations.tns.*

It is important that one of the Translations Tour be done before any Translations lessons.

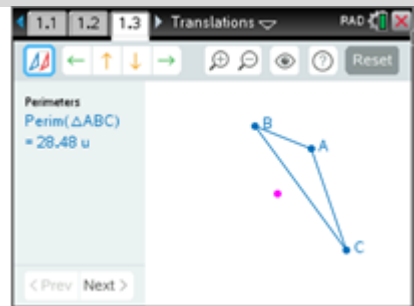PLAY   INVESTIGATE   EXPLORE   DISCOVER

Move to page 1.3. (ctrl ▶ two times)

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. Press menu to open the menu.

   (On the iPad®, tap on the wrench icon   to open the menu.)
   Press 1 (1: Templates), 2 (2: Perimeter & Area).

2. Translate △ABC down 4 and to the left 5.

   Press the down arrow (▼) four times and the left arrow (◀) five times then click on   or press T. Zoom   in (+) or out (−) as needed.

   a. Record the Original perimeters (first measures displayed) in the appropriate places of the **Down 4 Left 5** section in the table below.

   b. Investigate and mentally make note of the perimeters by grabbing and moving each of the three vertices of △ABC (A, B, C) to create different shaped triangles. Record a set of data observed in row "Figure 1" in the following table.

Down 4 Left 5	Perimeter $\triangle ABC$	Perimeter $\triangle A'B'C'$		Up 3 Right 6	Perimeter $\triangle ABC$	Perimeter $\triangle A'B'C'$
Original				Original		
Figure 1				Figure 1		

c. Reset the page. Press Reset (⌈ctrl⌉ ⌈del⌉).

Translate $\triangle$ ABC up 3 and to the right 6.

Press the up arrow (▲) three times and the right arrow (▶) six times then click on ◿◿ or

press ⌈T⌉. Zoom ⊕ ⊖ in (⌈+⌉) or out (⌈−⌉) as needed.

Record the Original perimeters in the appropriate places of the **Up 3 Right 6** section in the

previous table.

d. Investigate and mentally make note of the perimeters by grabbing and moving each of the

three vertices of $\triangle$ ABC (⌈A⌉, ⌈B⌉, ⌈C⌉) to create different shaped triangles. Record a set of data

observed in row "Figure 1" in the previous table.

e. Reset the page. Press Reset (⌈ctrl⌉ ⌈del⌉).

Repeat what was done in parts a – d, but with each person in the group choosing a different

translation. Each person in the group should choose one from the following:

 i) Translate $\triangle$ ABC down 4 units and to the right 2 units.

ii) Translate $\triangle$ ABC up 5 units.

iii) Translate $\triangle$ ABC down 1 unit and to the left 4 units.

iv) Translate $\triangle$ ABC up 6 units and to the left 3 units.

Record the Original perimeters in the appropriate places in the following table.

Circle: i ii iii iv	Perimeter $\triangle ABC$	Perimeter $\triangle A'B'C'$
Original		
Figure 1		

f. Investigate and mentally make note of the perimeters by grabbing and moving each of the

three vertices of $\triangle$ ABC (⌈A⌉, ⌈B⌉, ⌈C⌉) to create different shaped triangles. Record a set of data

observed in row" Figure 1" in the previous table.

g. Many different triangles were translated in several different directions.

Make a conjecture about the perimeters of translated triangles.

A ***conjecture*** is an opinion or conclusion based upon what is observed.

h. Based on explorations of translated triangles in previous lessons, explain why this conjecture is true.

3. Do a similar exploration about the areas of translated triangles.

a. Reset the page. Press Reset (ctrl del).

Translate $\triangle ABC$ down 4 and to the left 5.

Press the down arrow (▼) four times and the left arrow (◀) five times then click on or press T. Zoom in (+) or out (−) as needed.

Click on Next > or press) to explore the areas of the triangles.

Record the Original areas (first measures displayed) in the appropriate places of the **Down 4 Left 5** section in the table below.

Down 4 Left 5	Area $\triangle ABC$	Area $\triangle A'B'C'$		Up 3 Right 6	Area $\triangle ABC$	Area $\triangle A'B'C'$
Original				Original		
Figure 1				Figure 1		

b. Investigate and mentally make note of the areas by grabbing and moving each of the three vertices of $\triangle ABC$ (A , B , C) to create different shaped triangles. Record a set of data observed in row "Figure 1" in the previous table.

c. Reset the page. Press Reset (ctrl del).

Translate $\triangle ABC$ up 3 and to the right 6. Click on Next > or press) to explore the areas of the triangles

Record the Original areas in the appropriate places of the **Up 3 Right 6** section in the previous table.

d. Investigate and mentally make note of the areas by grabbing and moving each of the three vertices of $\triangle ABC$ (A , B , C) to create different shaped triangles.

Record a set of data observed in row "Figure 1" in the previous table.

e. Reset the page. Press Reset 　ctrl 　del).

Repeat what was done in parts a – d, but each person in the group choosing a different translation. Record the Original areas in the appropriate place in the following table.

Each person in the group should choose one from the following:

i)   Translate $\triangle$ ABC down 4 units and to the right 2 units.

ii) Translate $\triangle$ ABC up 5 units.

iii) Translate $\triangle$ ABC down 1 unit and to the left 4 units.

iv) Translate $\triangle$ ABC up 6 units and to the left 3 units.

Click on Next > or press 　) to explore the areas of the triangles

Record the Original areas in the appropriate place in the following table.

Circle: i ii iii iv	Area $\triangle ABC$	Area $\triangle A'B'C'$
Original		
Figure 1		

f. Investigate and mentally make note of the areas by grabbing and moving each of the three vertices of $\triangle$ ABC (A , B , C) to create different shaped triangles. Record a set of data observed in row "Figure 1" in the previous table.

g. Many different triangles were translated in several different directions.
Make a conjecture about the areas of translated triangles.
A **conjecture** is an opinion or conclusion based upon what is observed.

h. Based on explorations of translated triangles in previous lessons, explain why this conjecture is true.

4. $\triangle JKL$ is translated to the left 4 units. The perimeter of $\triangle JKL$ is 40 cm and its area is 60 sq cm.

a. What is the perimeter of $\triangle J'K'L'$? _____

b. What is the area of $\triangle J'K'L'$? _____