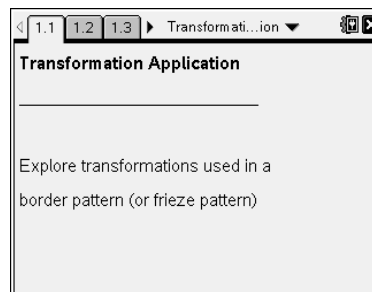




Open the TI-Nspire document *Transformation_Application*.

In this activity, you will be creating border patterns (or frieze patterns) with tiles using transformations.



Move to page 1.2.

Press **ctrl** ◀ and **ctrl** ▶ to
navigate through the lesson.

Suppose you create custom-designed tile work and have been asked to create a tile border for a kitchen. The tile chosen for the project is shown on page 1.2, and you need to design the pattern. You decide to create three different border patterns (also called frieze patterns) using the chosen tile. A border pattern extends to the left and right in such a way that the pattern can be mapped onto itself by using a transformation or a combination of transformations.

Move to page 1.6.

Follow the instructions below to create the first border pattern on page 1.6.

- 1) Grab the bottom segment of the tile and move it so that the left side lines up with the right side of the first tile. Be sure to line up the holes.
 - 2) Repeat the process by grabbing the bottom of the first tile and moving it to line up with the right side of the second tile.
 - 3) When the border pattern is complete, the tile numbers should be in the order 1, 2, 3.
1. What type of transformation does the first border pattern represent? Explain.
 2. Is the first border pattern an example of isometry (also called a congruence transformation)? Explain.
 3. If the height of one tile is 3 inches and the width is 4 inches, how long is the first border pattern? How many tiles would be needed to create a border along a 14-foot wall?
Show your work below.



Move to page 1.13.

Follow the instructions below to create the second border pattern on page 1.13.

- 1) Grab the lower-left circle of the tile and drag it to the right until it is lined up next to the first tile.
 - 2) Grab the bottom of the first tile (rectangle 3) and drag it so it lines up with the right side of the second tile, lining up the holes.
 - 3) Grab the bottom of the first tile (rectangle 4) and drag it to an empty space at the bottom of the page.
 - 4) Grab the left-bottom point of rectangle 4 and drag it to the right until the tile has flipped.
 - 5) Grab the bottom of rectangle 4 and move it next to rectangle 3, lining up the holes.
 - 6) The tiles should be in the order 1, 2, 3, 4.
4. The second border pattern uses a combination of two transformations. Can you name them?
5. Is the second border pattern an example of isometry (also called a congruence transformation)? Explain.

Move to page 1.19.

Follow the instructions below to create the third border pattern on page 1.19.

- 1) Grab the bottom-left corner of the tile (rectangle 2) and flip the tile up.
- 2) Grab the top of rectangle 2 and move the tile so it lines up with the first tile, lining up the holes.
- 3) Grab the bottom of the first tile (rectangle 3) and move it next to the second tile, lining up the holes.
- 4) Grab the bottom-left corner of the first tile (rectangle 4) and flip the tile up.
- 5) Grab the top of rectangle 4 and move the tile so it lines up with the third tile, lining up the holes.
- 6) The tiles should be in the order 1, 2, 3, 4.



Transformation Application Student Activity

- The third border pattern uses a combination of two transformations. Can you name them?
- Is the third border pattern an example of isometry (also called a congruence transformation)? Explain.
- Determine which of the properties listed in the table below were preserved with the transformations of tiles used in this activity. Write Yes or No in each box.

Properties	First Border Pattern	Second Border Pattern	Third Border Pattern
Side Length			
Angle Measure			
Perimeter			
Area			
Orientation			