

# GEOMETRY PLAYGROUND

Activities | Grades 3–5

[www.exploratorium.edu/geometryplayground/activities](http://www.exploratorium.edu/geometryplayground/activities)

## MAKING A TRANSLATION TESSELLATION

### Background: What is a tessellation?

Suppose you wanted to cover a floor with tiles. You could cover it with square tiles, since squares fit together without leaving any gaps. A floor covered with square tiles is an example of a *tessellation*, a design made of shapes that completely covers a surface.

If you wanted to make a more interesting design, you could modify a square or rectangle by adding another shape. In this activity, you're going to transform a rectangle into a more interesting shape, then make a tessellation by repeating that shape over and over again.

### Make a translation tessellation.

[45 minutes]

Hint for success: When tested in groups of students grade 3 and younger, this activity worked best as a “centers” activity.

#### Materials:

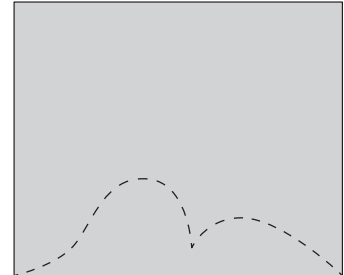
- Index card 3" x 5"
- Ruler
- Scissors
- Blank paper
- Pencil
- Transparent tape
- Colored markers or pens
- 2.5" x 3" Grid paper (included)
- Optional: Printed example of a tessellation to show students before starting activity (possibly from the online M. C. Escher gallery at: <http://www.mcescher.com/Gallery/gallery-recogn.htm>).

## Try This:

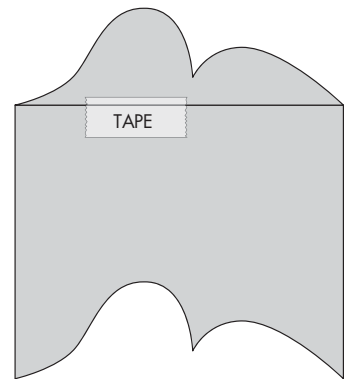
Step 1 Find the area of the index card (length times width). Cut the card in half so that you get two 2.5" x 3" rectangles.

Step 2 Find area of the rectangle (length times width).

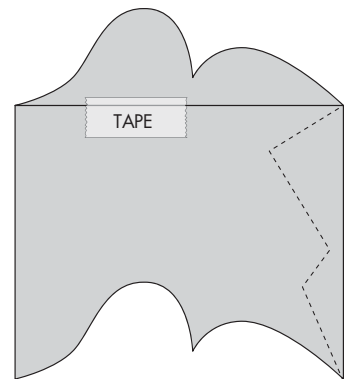
Step 3 Draw a line between two adjacent corners on one of the long sides of the rectangle. Your line can be squiggly or made up of straight segments. Whatever its shape, your line must connect two corners that share one side of the rectangle.



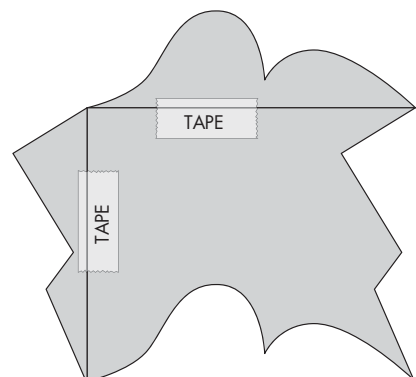
Step 4 Cut along the line you drew. Take the piece you cut off and slide it straight across to the opposite long side of the rectangle. Line up the long, straight edges of the two pieces and tape them together.



Step 5 Can you tessellate with this shape? Try tracing this shape several times, creating a row going across a piece of paper. Line up the cut edges of the shape as you trace it.



Step 6 Now draw another line that connects two adjacent corners on one of the short sides of the shape.



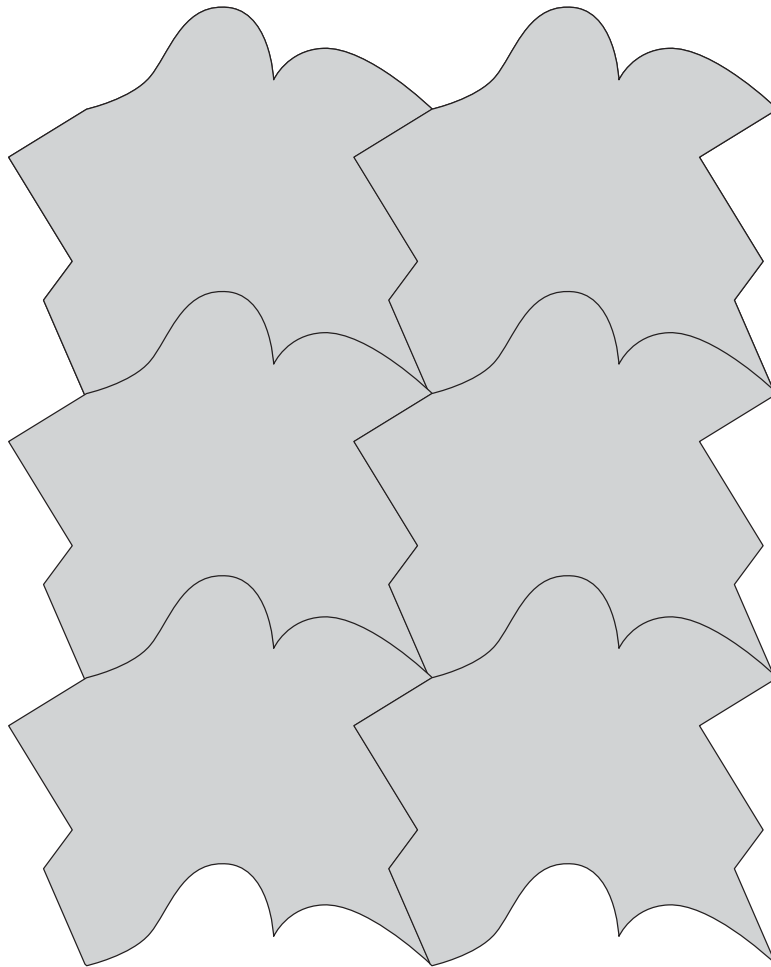
Step 7 Cut along this new line. Take the piece you cut off and slide it straight across to the opposite side of the shape. Line up the straight edges and tape them together.

Step 8 You have now created a shape that you can use as a pattern to make a tessellation. What's the area of this shape? Write the letter A on one side of the shape and turn it over and write the letter B on the other side.

Step 9 On your grid paper, carefully trace around your pattern.

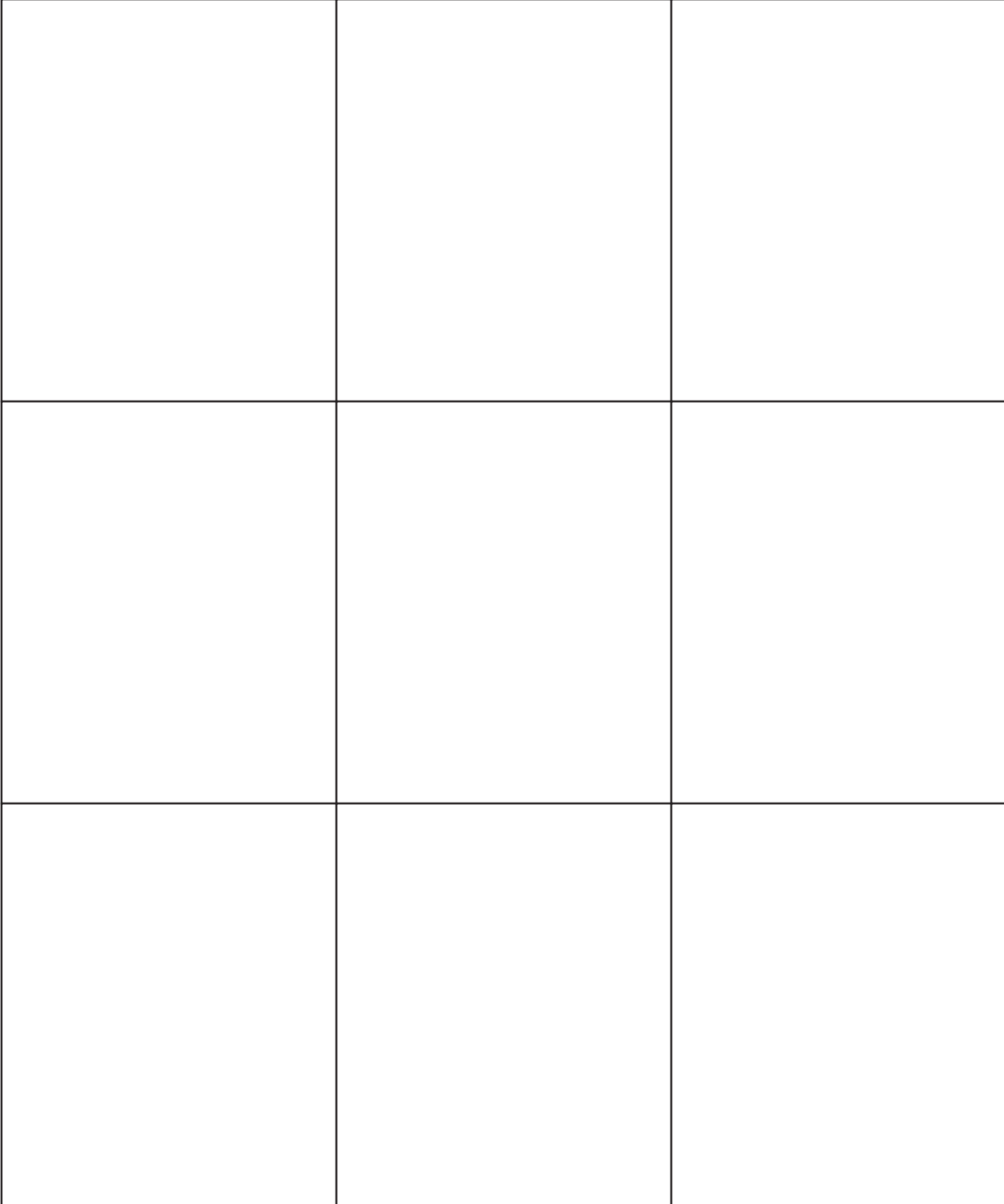
Can you figure out where to place the pattern so that your paper will be covered with repetitions of this shape with no overlaps and no gaps? Try to cover your whole sheet of paper by tracing the pattern, moving it, then tracing it again. If you start with side A facing up, do you ever have to turn it over to side B to make your tessellation? If you only have to slide the piece without flipping it over or rotating it, then you are making a *translation tessellation*.

In math, translation means shifting the position of a shape without moving it in any other way.



Step 10 Look for a clever way to color in the resulting design on your sheet of paper. Does your shape look like a fish? A bird? An elephant? Color in your repeated pattern to complete your design.

2.5"x 3" Grid



## MAKING A TRANSLATION TESSELLATION

Apply transformations and use symmetry to analyze mathematical situations:

- Predict and describe the results of sliding, flipping, and turning two-dimensional shapes.

Understand measurable attributes of objects and the units, systems, and processes of measurement:

- Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;
- Explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way.