

Topics: Patterns,
Tessellations, Art

Materials List

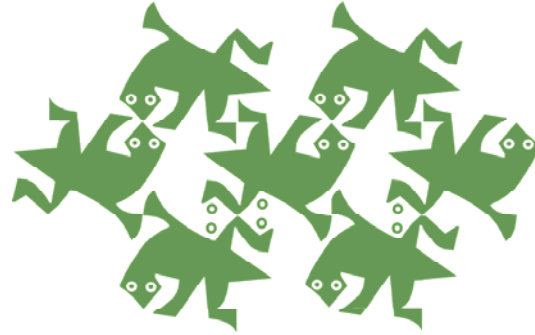
- ✓ Paper, square
- ✓ Scissors
- ✓ Large piece of paper or equal
- ✓ Pencil
- ✓ Tape

This activity can be used to teach:

- Shapes and Polygons (CA Math Standards: Grades 3 & 4; Measurement & Geometry, 3.2.1, 4.3.4, 4.3.8)
- Creating and Participating in the Visual Arts (Grades 3-HS, Creative Expression, 2.0)
- Principles of design, color & shape (All Grades, Artistic Perception, 1.0)

Tessellating Lizard

Create a Lizard from a Square and Repeat



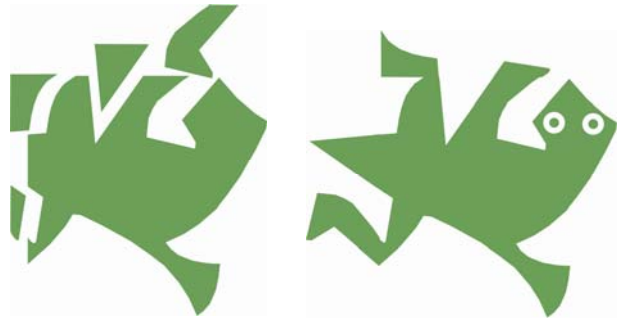
Create a template for a repeating pattern from a square in a tessellation activity that combines art and mathematics.

Assembly

1. To create a tessellating template: start with a square. Create a line design the length of one side of the shape. (See pattern on page 2 if desired)
2. Trace the design along one side. Rotate the design around point A and trace along the adjacent side.
3. Cut the square along the lines as marked
4. Move the cut pieces from their original positions to their new positions as indicated by the trace line.
5. Repeat steps 2 - 4 using a new line design. Trace the new design, then rotate the design at point B (See pattern on page 2 if desired)



6. Tape all pieces together at to their new locations.



7. On a large piece of paper use pencil to draw a grid of squares, the same size as the original square.
8. Trace the template onto the top row of squares, skipping every other square. Rotate the template 180° and trace the design onto the second row of squares, alternating squares, starting below the first empty square. Repeat.
9. Shade or color the design. Does a white version of the design appear in the “empty” squares?

The Content Behind the Activity

Tessellations are repeating patterns involving one or more shapes that cover a surface without any gaps. People have been creating tessellations as part of their art and architecture for thousands of years. Over 6,000 years ago, the ancient Sumerians used tessellations as part of intricate mosaics which decorated the walls of temples and homes. Tessellations are found in the art of many cultures including Roman, Greek, Chinese, Japanese, and Persian. The Dutch artist M.C. Escher was inspired by the work of Islamic artists seen in the Alhambra, a fourteenth century Moorish castle in Spain. Escher’s work includes several examples of tessellation, including “Reptiles” which inspired the lizard pattern example used above.

In addition to art, tessellations and symmetry are important in mathematics and in many areas of science including x-ray crystallography, geology, and biology.

Taking it Further

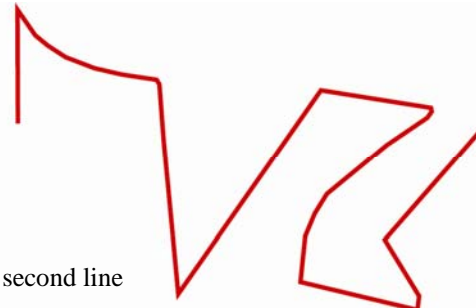
- Create another tessellation based on a square.
- Create shapes based on a different polygon (e.g., hexagon, equilateral triangle, parallelogram), see RAFT Idea Sheets *Patterning with Polygons* and *Tile Patterns Aplenty* for an explorations of simple tessellations.
- Create a tessellation based on two different polygons that tessellate together.
- Add two or more colors to a tessellating pattern.

Web Resources (Visit www.raft.net/more for how-to videos and more ideas!)

- Examples to illustrate the basic rules of tessellating patterns - <http://www.coolmath.com/tesspag1.htm>
- A wide variety of artistic patterns and a great Do It Yourself section - <http://www.tessellations.org>
- Mathematical based tessellation tutorials - <http://mathforum.org/sum95/suzanne/tess.intro.html>
- Totally Tessellated website - more tessellation information - <http://library.thinkquest.org/16661/index2.html>



Pattern for first line



Pattern for second line