

POLYGON PARADE

GEOMETRY

- Spatial visualization
- Comparing
- Classifying

Getting Ready

What You'll Need

Tangrams, 1 set per child

Newsprint or construction paper, 11 x 17-in. piece per group

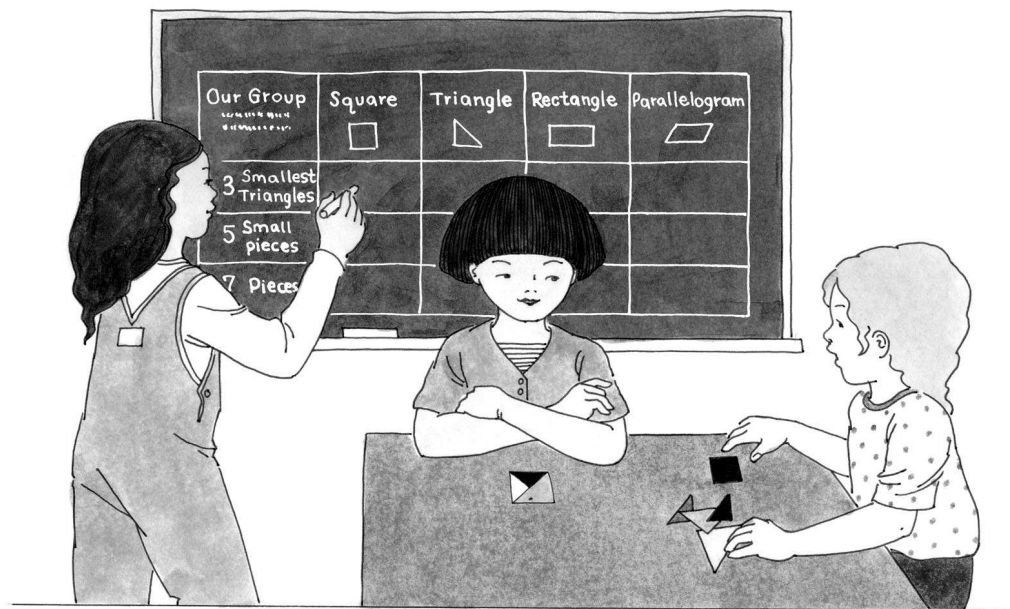
Crayons or markers, red, yellow, blue, and green

Overhead Tangram pieces (optional)

Overview

Children build polygon shapes using different numbers of Tangram pieces. They record their results on a shape chart. In this activity, children have the opportunity to:

- ◆ explore the characteristics of polygons
- ◆ apply spatial visualization
- ◆ develop an understanding of relationships among polygons



The Activity

Some children may say that they made the square another way. If they do, draw another square on the board. Ask a volunteer to draw a dotted line on it to show the other way—a diagonal line connecting the other two corners.

Introducing





- ◆ Have children remove the two small triangles from their Tangram sets. Tell them to use the two pieces to make a square. Record a square on the chalkboard.
- ◆ Invite a volunteer to model how to form the square from the two small triangles. Be sure all children understand how to do this.
- ◆ Draw a dotted line diagonally on the square to show how the two small triangles can make up the square.
- ◆ Now challenge children to use the two small triangles to make two other shapes—a triangle and a parallelogram. Draw the outlines of these polygons on the chalkboard as you name them.
- ◆ Call on volunteers to come to the board to draw dotted lines on these shapes to show how they formed each of them from the two small triangles.



On Their Own

How can you use Tangram pieces to make different polygon shapes?

- Working in a group, make a chart like this one on a large sheet of paper.
- Take the 3 smallest triangles from a Tangram set. Use them all to make a square.
- Draw a square on your chart in the space where the first row and the first column meet. Then draw dotted lines on your square to show how you placed the 3 triangles.
- Use the same triangles to make 3 more shapes—a triangle, a rectangle, and a parallelogram. Draw each shape, then draw dotted lines on each to record.
- Now, make each shape again using the 5 smaller pieces from your Tangram set, (all but the 2 large triangles). Record your work on the chart.
- Keep going. This time, use all 7 Tangram pieces to make each shape! Record your work on the chart.
- Be ready to talk about how you decided to make the polygon shapes from different numbers of Tangram pieces.

	square	triangle	rectangle	parallelogram
3 smallest triangles				
5 small pieces				
all 7 pieces				

The Bigger Picture

Thinking and Sharing

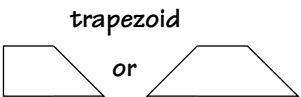
Have children post their charts on the board.

Use prompts such as these to promote class discussion:

- What did you discover about the way the Tangram pieces fit together?
- Which polygons were the easiest to make? Which were the hardest? Why?
- Why is it sometimes possible to find more than one way to make a polygon?
- How did knowing how to make one polygon help you make another?

Extending the Activity

- Explain that a trapezoid is a four-sided polygon with two parallel sides. Challenge children to build trapezoids using three small pieces, the five small pieces, then all 7 Tangram pieces. You may want to have children start by adding this column head as an extension of their charts:



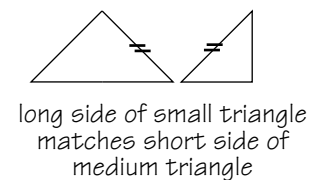
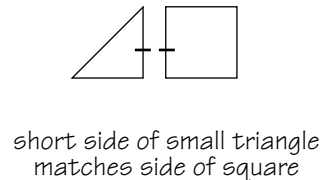
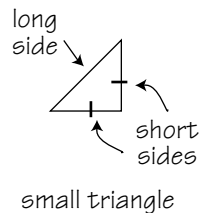
- Have children explore building six-sided shapes (hexagons) using three small pieces, the five small pieces, and all seven pieces in their Tangram sets.

Teacher Talk

To make this an on-going learning activity, you may want to provide a classroom polygon chart. Children may add new solutions to the chart as they discover them.

Where's the Mathematics?

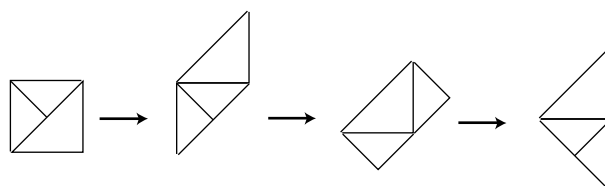
While building polygons using three, five, and seven Tangram pieces, children use problem-solving skills to demonstrate their understanding of the characteristics of polygons. As children work, some may notice that the lengths of the sides of all polygons are multiples of the short and long sides of the small triangle. They may use this fact to match similar edges.



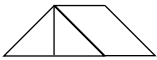
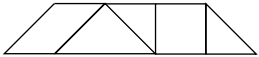
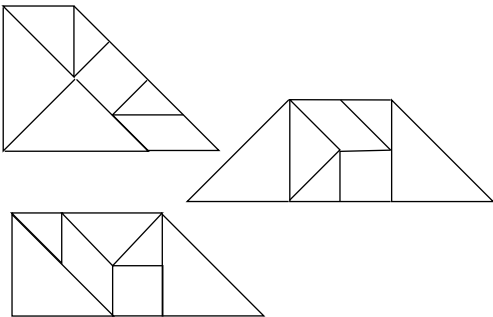
Children may discover that there is more than one way to make each of the polygons. This becomes clear as they flip and rotate pieces and when they substitute some pieces for others having the same area. A few samples are shown here.

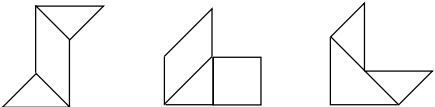
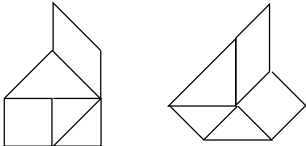
	square	triangle	rectangle	parallelogram
3 smallest triangles				
5 small pieces				
all 7 pieces				

While manipulating Tangram pieces, some children may transform one solution into another by moving a piece or two. For example, here a child has changed the square made from the 3 smallest triangles into a parallelogram, a rectangle, and a triangle by moving only one piece at a time.



Here are some of the possible ways to build trapezoids and hexagons from various numbers of Tangram pieces.

	trapezoids
3 small pieces	
5 small pieces	
all 7 pieces	

	hexagons
3 small pieces	
5 small pieces	
all 7 pieces	