

FRACTION SPIN

GEOMETRY • NUMBER

- Spatial visualization
- Fractions
- Counting
- Comparing

Getting Ready

What You'll Need

Tangrams, 1 set per group

Fraction Spinner, 1 per group, page 98

Small paper clip, 1 per group

Overhead Tangram pieces (optional)

Overview

Children identify a Tangram piece as a fractional part of a whole shape. Then they construct the whole. In this activity, children have the opportunity to:

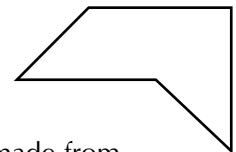
- ◆ count fractional parts to make a whole
- ◆ compare fractional parts according to area
- ◆ learn that the denominator of a fraction is the number of parts that make up a whole
- ◆ understand the relationship between the numerator and the denominator of a fraction



The Activity

Introducing

- ◆ Make the shape shown with three large triangles, but keep it hidden.
- ◆ Tell children you are hiding a shape that was made from only large Tangram triangles and that the shape is smaller than a sheet of notebook paper. Ask children to guess how many large triangles you used.
- ◆ Write down all the guesses.
- ◆ Now, give the class the following clue: The large triangle is one third of the whole shape.
- ◆ Ask children to guess again, this time giving a reason for their guesses. Then, reveal the shape.
- ◆ Fill the shape with large triangles. Establish that “three” is the only possible solution because one third or $\frac{1}{3}$ means “one out of three equal parts.”



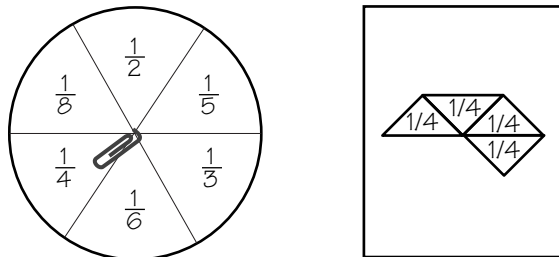
Tell children that the number below the bar, or denominator, in any fraction always tells how many parts of the same size are in the whole.

On Their Own

What can you find out about a whole shape?

- Work with a group. Each of you should choose one Tangram piece.
- Take turns spinning the Fraction Spinner.
- On your turn, spin, and then announce the winning fraction. Everyone should use that fraction as the value of their Tangram piece.
- Figure out how many of your pieces make a whole. Arrange, or trace, that many pieces so they form a shape you like.
- Record your shape. Label each piece with its fractional value.

An example is shown here.



- Compare the shape you made with those of your group.
- Repeat the process several times.
- Be ready to explain what you noticed.

The Bigger Picture

Thinking and Sharing

Begin a class chart by posting the fractions $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{4}$, and $\frac{1}{8}$ across the chalkboard. Invite volunteers, one at a time, to post their shapes under the proper heading. Ask them to name the piece they used to build their whole shape and tell how many of them make up the whole.

Use prompts such as these to promote class discussion:

- What do you notice about the postings?
- How did you know how many pieces to use?
- Look at all the shapes in the column labeled _____. How are they the same? How are they different? How do they compare to the shapes in the other columns?
- Are shapes with the same number of pieces always the same size? Explain.

Writing and Drawing

Ask children to explain, with words and pictures, why each of the fractions $\frac{2}{2}$, $\frac{3}{3}$, and $\frac{4}{4}$ is equal to 1.

Extending the Activity

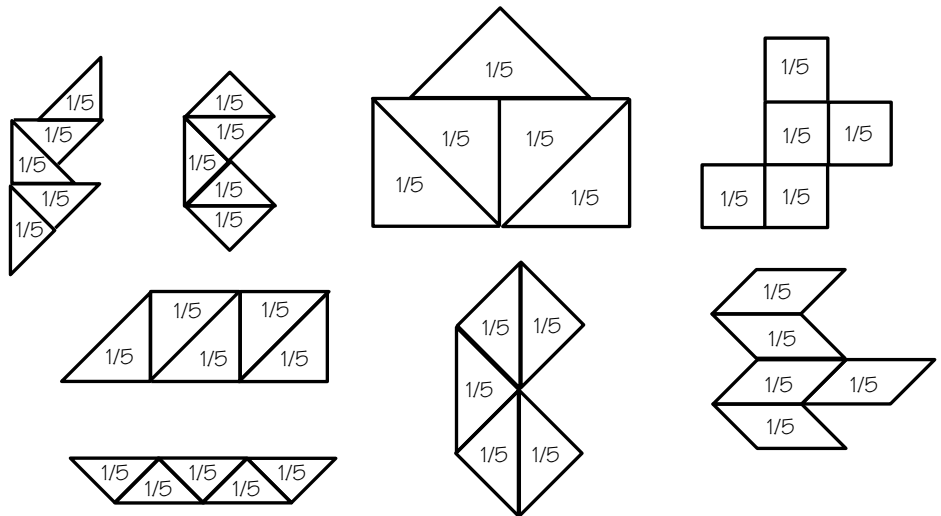
1. Create a set of task cards. Ask children to repeat the activity, but this time have them draw only the outline of their shape. Then ask them to write the following directions above their shapes: If my shape is equal to 1 write a fraction for each Tangram piece. Have them put the answers on the other side of the paper.

Teacher Talk

Where's the Mathematics?

A big idea in fractional work is that the whole, or 1, is not always the same size or made up of the same number of pieces. Comparing and contrasting shapes where the same unit fraction has been assigned to different Tangram pieces helps children to develop this understanding.

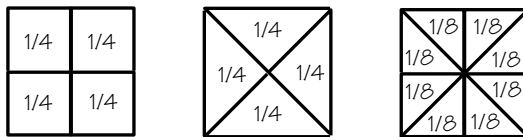
As they first look at the class postings, children usually make two observations. One is that the number of pieces in a shape matches the denominator of the assigned fraction. The other is that shapes made with the same number of equal-sized pieces do not have to look alike. For example, here are some possible solutions children may find for the fraction $\frac{1}{5}$.



2. Invite children to make a puzzle. Have them draw a large picture on sturdy paper, such as a file folder, oak tag, or index card. Then, direct them to fold their pictures into any number of equal parts, cut along the folds, and label the back of each piece with its fractional value. Have children put their pieces in an envelope marked with their name, trade puzzles and try them.

By counting or adding the pieces in every whole shape children discover that each is equal to $\frac{1}{2}$. Most of the shapes do not look alike. However, it is, possible to have similar shapes, that is, shapes that look exactly alike but are of different sizes. The seven-sided figures above are identical in shape but one is made with small triangles and the other with medium triangles.

When comparing the postings in different columns, children may notice that it is possible to have congruent shapes that are made from different pieces, as are the three squares shown below. One square is made up of Tangram squares and shows $\frac{1}{4}$. Another square, also showing $\frac{1}{4}$, is made with medium triangles. Still another square is made with small triangles and shows $\frac{8}{32}$.



Physically arranging multiples of the same piece into a whole helps children understand the meaning of a fraction; that is, for example, that $\frac{1}{8}$ means “one out of eight equal parts” or that $\frac{3}{8}$ means “three out of three equal parts.”

FRACTION SPINNER

