

SHOWING ONE HALF

GEOMETRY • NUMBER

- Fractions
- Counting
- Comparing
- Sorting

Getting Ready

What You'll Need

Snap Cubes, 50 per pair in 2 different colors

Die, 1 per pair

Snap Cube grid paper, page 93

Overhead Snap Cubes and/or Snap Cube grid paper transparency (optional)

Overview

Children use two different colors of Snap Cubes to build a design in which each colored section represents one half of the design. In this activity, children have an opportunity to:

- ◆ develop an understanding of the meaning of one half
- ◆ discover that there are many ways to show one half
- ◆ see that the two halves of a whole have equal areas



The Activity

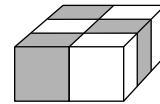
Introducing

- ◆ Roll a die and take as many red Snap Cubes as the number rolled.
- ◆ Ask a volunteer to take that same number of Snap Cubes in a different color.
- ◆ Arrange all the Snap Cubes into a design that is one layer high. Ask if anyone can explain why you can describe your arrangement as “half red.”
- ◆ After listening to children’s responses, count the cubes in the design aloud, pointing out the total number of cubes, the number of red cubes, and the number of the other-colored cubes. Explain that whenever a design has the same number of cubes in one color as in another color, the design is made up of one half of each color.

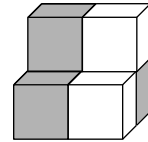
On Their Own

How can you build a Snap Cube design that is half one color and half another color?

- Work with a partner. Each of you choose a different color of Snap Cube.
- Roll the die. Each of you count out that many Snap Cubes of your color.
- Put your Snap Cubes together to make a design. Make sure your design is in 1 layer. When you place the design on a table, the Snap Cubes must all touch the table.
- Think about why your design shows one half of each color. Then set it aside.
- Continue to roll the die and use Snap Cubes to build designs that show one half of your color and one half of your partner's color. Try to make each design different from those you have already built.
- Be ready to talk about how you made your designs.



Okay



Not okay

The Bigger Picture

Thinking and Sharing

Create a display of children's work by asking volunteers to group their smallest designs together on a table. Then have children place each of the next larger designs on the table until all the designs are grouped according to the total number of Snap Cubes used.

Use prompts such as these to promote class discussion:

- ◆ What is the same about each group of designs? What is different?
- ◆ Which groups show halves in the same way? Which show halves in a different way?
- ◆ (Hold up two designs of the same colors but which have different numbers of Snap Cubes.) These two designs use different numbers of (name the color) cubes. How is it that these both show halves?
- ◆ Do you notice any pattern in the numbers of Snap Cubes used in the designs? Explain.
- ◆ Do you think that you could use seven Snap Cubes to make a design that is one half one color and one half another? Why or why not?
- ◆ How could you show halves in a design made with 20 cubes? with 50 cubes? with 100 cubes?

Drawing and Writing

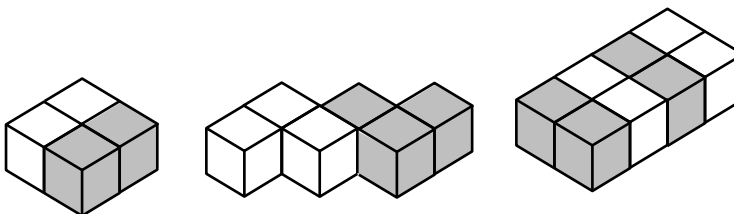
1. Have children draw several designs on Snap Cube grid paper that show halves. Tell them to color the designs so that one half of each is red.
2. Have children draw a blue-and-red design that is not one-half red. Ask them to explain why one half is *not* red.

Teacher Talk

Where's the Mathematics?

The activity helps children understand that one half does not only mean one of two individual items (which is a typical understanding in young children) but, rather, one of two equal parts, whatever the size of the parts. The two parts of a figure must be equal to each other in some way if each is to show “one half.” Some children will be just developing their notions of the meaning of *half*, whereas others may be able to use numerical ideas to express their understanding.

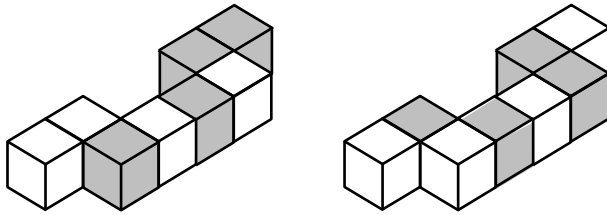
Some children will notice halves by observing patterns in their designs. Children who produce designs with patterns such as the ones below may not have to count cubes to convince themselves that the designs show halves.



In designs in which there is no obvious pattern, children—especially the younger ones—will count to verify halves. Even for two of the same design with four cubes of one color and four cubes of another color, if the arrangement of colors within the design differs, as in the designs that follow, children will probably count to be sure each shows halves.

Extending the Activity

1. Ask children to take ten cubes of two colors and make a two-layer design made up of half of each color.
2. Challenge pairs of children to find the greatest number of ways to show halves using just four cubes.



In the course of the class discussion, children may be surprised to learn, for example, that three cubes in a six-cube design and five cubes in a ten-cube design both represent one half. As they look at more examples, children can begin to understand that the amount in the half depends on the amount in the whole and that the greater the number of cubes in the whole design, the greater the number of cubes in the half. Children will be exposed to the concept of equivalency as they see one half expressed as two out of four, three out of six, four out of eight, and so forth.

If the class is large enough, it is likely that there will be at least one design for each possible roll of the die. That means that there will be designs on display with 2, 4, 6, 8, 10, and 12 Snap Cubes. Some children may observe that there is always an even number of Snap Cubes in a design, even in cases when the number rolled is odd. Although they may not be able to connect the evenness to the doubling of each roll of the die, they may be able to use the even number pattern to conclude that it would not be possible to have a design with an odd number of Snap Cubes that shows halves.