TWO-COLOR PATTERNS

- Patterns
- Counting
- Comparing

Getting Ready

What You'll Need

Snap Cubes, 80 in 2 different colors per group

Paper towel tube or rolled tube of construction paper

Pattern Stick recording sheets, 2 per group, page 104

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

Overview

Children create various patterns with two different colors of Snap Cubes. In this activity, children have the opportunity to:

- analyze patterns
- predict what will happen next in a pattern
- compare patterns

The Activity

Although most children will have "gotten" the pattern long before the end, children will build confidence by having their guesses supported by slowly revealing the cubes one by one.

If all children use the same two colors in the On Their Own, *it will be easier for them to compare results.*

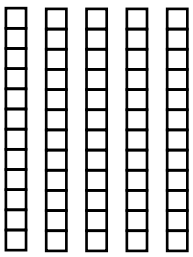
Introducing

- Prepare a Snap Cube stick that is 12 cubes long and has a pattern of alternating blue and red cubes. Hide the stick in the paper towel tube.
- Show children the tube. Explain that inside the tube is a stick of Snap Cubes. Then ask them to guess what the stick looks like.
- Push the stick out of the tube so that only two cubes are showing. Ask children to guess which color will come next.
- Show the third cube and ask what color the fourth cube will be.
- Show the fourth cube. Call on volunteers to predict the color of the fifth cube and to give a reason for their prediction.
- Continue to show cubes one by one and ask for predictions about the color of the next cube until you have revealed the entire stick.
- Show how to record the stick on a *Pattern Stick* recording sheet.
- Repeat the activity with Snap Cube sticks that reflect these patterns:
  blue-red-red-blue-red-red-blue-red-red-blue-red-red
  blue-blue-red-red-blue-blue-red-red-blue-blue-red-red

On Their Own

How many different pattern sticks can you make using only 2 colors of Snap Cubes?

- With a partner, make a 2-color pattern stick that is 12 Snap Cubes long. Make sure that someone else will be able to predict your pattern by seeing only some of the cubes.
- Share your pattern with another pair. Check each other's patterns.
- Record your patterns by coloring squares on a recording sheet that looks like the one shown here.
- Keep on making and recording pattern sticks until none of you can find any different ones.
- Make sure you can describe each of your patterns.



The Bigger Picture

Thinking and Sharing

Invite children to share and discuss the patterns they created. Call on volunteers to bring up their sticks and group the ones that are the same. Alternatively, you may wish to have children post their recording sheets.

You may wish to have children share their patterns by revealing them one cube at a time—as indicated in the Introducing*—and having classmates predict the rest of the colors in the pattern.*

Use prompts such as these to promote class discussion:

- Are any of the patterns the same? How are they the same?
- (Show two patterns that are different.) What makes these different?
- How can you tell where a pattern starts to repeat?
- Which pattern has more cubes of one color than another? How can you tell without counting?
- How can you tell what the 15th cube in any pattern would be?
- How many cubes of each color would you need to make a pattern stick twice as long as the one you like best? Explain.

Drawing

Have children draw a train of four Snap Cubes in two different colors, then lengthen the train by repeating the pattern twice more to complete a drawing of a 12-cube pattern stick.

Extending the Activity

1. Ask children to choose one of their pattern sticks and figure out how many cubes of each color they would need to make a stick three times as long; then ten times as long.
2. Tell children that they can change the pattern sticks they see into patterns they can *hear*. Lead children to agree on a "code," creating a sound for each color. For example, when they see a red cube, they might

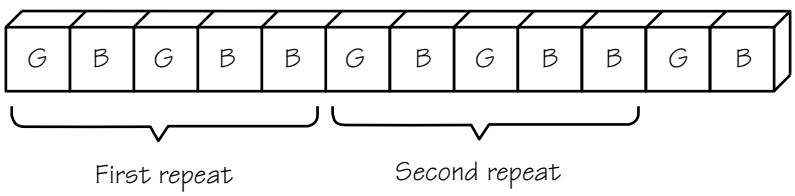
Teacher Talk

Where's the Mathematics?

After developing many patterns and seeing them displayed, children begin to analyze patterns in terms of number and color. Younger children usually notice the alternation of color as they describe a pattern, whereas older children are more likely to attach a number to each of the colors.

The way children analyze the likenesses and differences between two pattern sticks will vary. Some children may compare a pattern stick that displays alternating green and blue cubes with another pattern stick that displays alternating red and white cubes, saying that the two sticks are different because the colors are different. Placing the sticks side by side may help children to see that although the colors are different, the patterns are the same in the way they repeat. Wherever the first stick is red, the second is green, and wherever the first is blue, the second is white.

This activity also provides an opportunity for children to see that repetition is required before a pattern is established. For example, just looking at the first two cubes does not provide enough information to predict which color will show next. Even seeing two full repeats of a pattern may not be enough to predict accurately. Some patterns can be deceiving, especially patterns that have a long repeat. A pattern like the one that follows may have children thinking that they have seen two repeats after they have seen just the first four cubes: green, blue, green, blue. Consequently, you may want to encourage children to look for three repeats of a pattern to ensure that they will not be fooled by these "tricky" patterns.



clap their hands. When they see a green cube, they might slap their thighs. So, when a child holds up a pattern stick that shows the pattern red-green-green, children will interpret it as clap-slap-slap.

3. Have children imagine that they had four cubes in each of three colors. Then have them draw all the different patterns they can make with those twelve cubes.

If children can identify where a pattern begins to repeat, they can easily answer questions about which pattern stick has more of one color than another. If two pattern sticks have the same number of cubes in a repeat and the first stick has more blue cubes in the repeat than the second, then the first stick will have more blue cubes. Some children will even be able to use the number of cubes in one repeat to help them predict the color of the 15th cube in the pattern. For example, if a repeat of a pattern is red-green-green, a child may be able to figure out that the pattern ends with the 3rd, 6th, 9th, and 12th cubes, so the 15th cube will also end the pattern and will be green.

Asking children to predict the number of colors needed to make their pattern stick twice as long will require children to use proportional thinking. Many children will want to use Snap Cubes to double the length of the 12-cube pattern stick to verify their predictions.

A child who is trained to look for patterns expects to finds them. He or she expects things to "make sense." A child who sees patterns, sees the events in the day-to-day world as continuous, connected, and related. This can spill over into the area of problem solving. A child may become more persistent in trying to solve a problem because he or she expects the problem to have a solution. If the first solution is not correct, children will keep looking until they find one that works.
