➤ Do some investigating to find other patterns called "stepping stones."

➤ Draw your own "stepping stones" pattern and explain how you arrived at your pattern.

Student Activity Sheet, page 46 . . .

What's In Your Sock Drawer?

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CONCEPTS: Mathematical Reasoning, Number Sense, Algebra
SKILLS: Using problem solving, logical thinking, and basic skills
MATHEMATICS STANDARDS: Gr 3: NS 2.0, AF 1.1, 1.2; Gr 4: MR 2.0; Gr 5: AF 1.2, MR 1.2; Gr 6: AF 1.2; Gr 7: AF 1.1
GRADES: 3–7
MATERIALS: White and brown cubes (optional), Student Activity Sheet (page 47)

DESCRIPTION
Simple and familiar situations are great ways to introduce students to problem solving, algebraic thinking, and making and solving algebraic equations. This sort of problem is even better if you can use the same situation, but gradually make the required operations more complex.

Almost every student wears socks and has a sock drawer, so problems with two colors of socks in a drawer are a familiar and nonthreatening situation. The problems on the Student Activity Sheet on page 47 can be done mentally or with simple problem solving and basic skills since the numbers are small, but they also lend themselves nicely to help students see how a word problem can be translated and then solved, using an algebraic equation.

For example, if students were given the following problem:

If you have only brown socks and white socks, 12 socks in all, and 4 of them are white, how many are brown?

a 3rd grader might write the equation $4 + \square = 12$. A 6th grader might write:
$$b + w = 12 \text{ and } w = 4$$
$$b + 4 = 12$$
$$b = 8$$

Try the Sock Drawer problems on the Activity Sheet with your students. When they think they have found the correct answer to each problem, ask them to explain their reasoning by returning to the word problem.

EXTENSION
After your students have solved these Sock Problems, have them make up a new Sock Problem of their own, and trade their problem for other students' problems. Your students will probably want to try three-colored Sock Problems; go slow by having them do a lot of two-colored Sock Problems first. Three-colored Sock Problems can be more than twice as hard!

Student Activity Sheet, page 47 . . .

What's In Your Sock Drawer?

Paul Giganti, Jr.

Use algebraic thinking to solve these Sock Drawer problems.

1. You have WHITE socks and BROWN socks. You have 10 socks in all, but you only have 4 WHITE socks. How many of each color sock do you have?

2. You have WHITE and BROWN socks. You have 12 socks in all. You have half as many WHITE socks as BROWN socks. How many of each color sock do you have?

3. You have WHITE socks and BROWN socks. You have 18 socks in all, but the same number of each color. How many of each color sock do you have?

4. You have WHITE socks and BROWN socks. You have 8 BROWN socks in all, but you have 2 more WHITE socks than BROWN socks. How many of each color sock do you have?

5. You have WHITE socks and BROWN socks. You have 14 socks in all, but you have 6 fewer WHITE socks than BROWN socks. How many of each color sock do you have?

6. You have WHITE socks and BROWN socks. You have 16 socks in all, but you have 3 times as many WHITE socks as BROWN socks. How many of each color sock do you have?

7. You have WHITE socks and BROWN socks. You have 10 BROWN socks in all, but you have double that number of WHITE socks. How many of each color sock do you have?

8. You have WHITE socks and BROWN socks. You have 30 socks in all. 1/3 of all the socks are WHITE. How many of each color sock do you have?

9. You have WHITE and BROWN socks. You have 50 socks in all, but you have 2 WHITE socks for every 3 BROWN socks. How many of each do you have?

10. You have WHITE socks and BROWN socks. You have 60 socks in all, but you have more than 4 times as many WHITE socks as BROWN socks, but less than 5 times as many BROWN socks. How many of each color sock could you have?