

## RAINBOW VARIABLES

In this lesson, students select collections of Rainbow Cubes containing two colors. They describe the collections using mathematical clues in two forms—sentences and equations. This activity helps link the language of variables to real objects in preparation for more abstract work in algebra. Use when you introduce the concept of a variable and to develop algebraic thinking.

### Classroom Organization

Eight groups of four sharing materials  
Working independently

### Materials

Each group of four students will need these materials:

- 125 Rainbow Cubes
- 1 copy of Rainbow Variables Recording Sheet, page A.124
- Half sheets of blank paper
- Markers to match cubes



[Source: Connections-Linking Manipulatives to Mathematics – Grade 7 © 1991 Creative Publications]

**A.121**

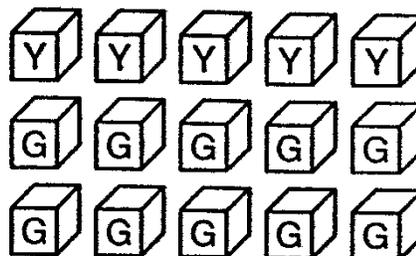
## Introducing the Problem

Sometimes you use clues when you're trying to figure out a problem or solve a mystery. Today we're going to use words and equations to make up clues about mystery groups of Rainbow Cubes.

## Exploring with Rainbow Cubes

1. Tell students to take a collection of cubes that contains five yellow and ten green.
2. Ask, **What are some statements you can make about this collection that don't tell the actual numbers of cubes?** Students may suggest sentences like these:

There are fifteen cubes altogether.  
There are five more green than yellow.  
There are five fewer yellow than green.  
There are twice as many green as yellow.  
There are half as many yellow as green.



3. Ask, **What are some equations you can write about this collection? Use  $y$  for yellow and  $g$  for green.** Help students translate their sentences into equations like these:

$$y + g = 15$$

$$y + 5 = g$$

$$g - 5 = y$$

$$2y = g$$

$$\frac{1}{2}g = y$$

4. Say, **Listen to some clues about a new collection. See if you can figure out the number of cubes of each color.** Tell students the equations first, then read the sentences while they check.

$$b + p = 11 \quad \text{There are eleven cubes altogether.}$$

$$p + 3 = b \quad \text{There are three more blue than pink. (four pink, seven blue)}$$

5. Try a few more examples, then tell students to make up their own collections and clues.

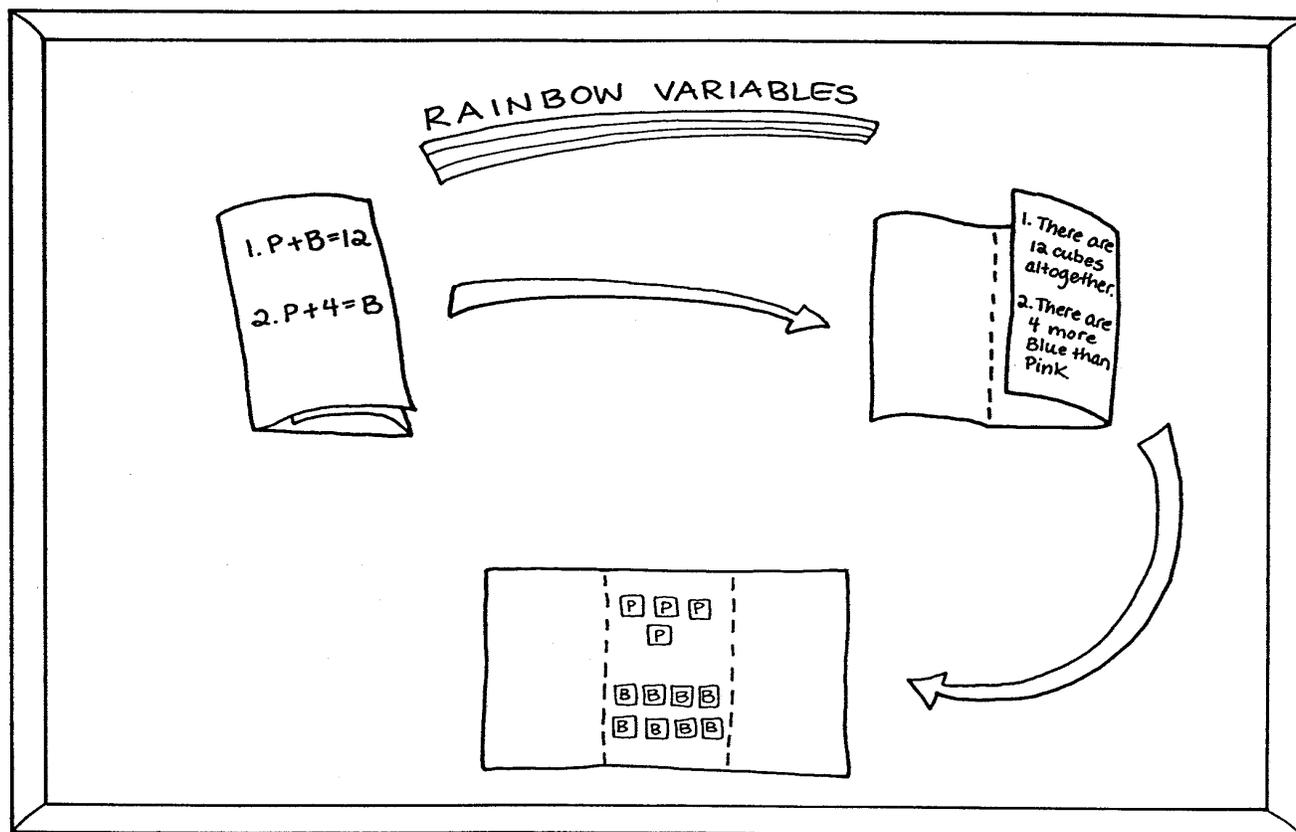
## Recording the Connection

1. Working independently, students should choose collections containing two colors of cubes. They should make a clue card for each collection following the directions on the recording sheet.
2. Have each student make clue cards for four different collections.

[Source: [Connections-Linking Manipulatives to Mathematics – Grade 7](#) © 1991 Creative Publications]

## Reporting and Displaying

Once the groups have made their clue cards, they can use them as problems for their classmates. Students should exchange cards and try to figure out the collections based on the clues.



## Suggestions

Tell students to try a card by looking first at the equations, then at the sentences. Reverse the procedure on the next card. Ask students to tell what they found out about these two methods.

If your class is especially good at Rainbow Variables and you want to extend the activity, try having them use cubes in three colors. In this case, they should tell the total number of cubes and provide two clues.

For additional activity ideas, see *Algebra Thinking*, Creative Publications, Catalog Number 33310.

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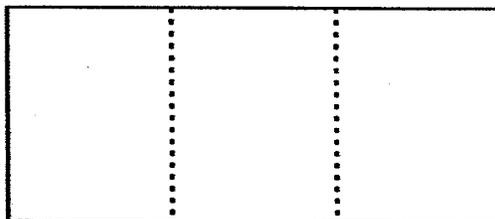
## Rainbow Variables

Follow these steps to make a clue card:

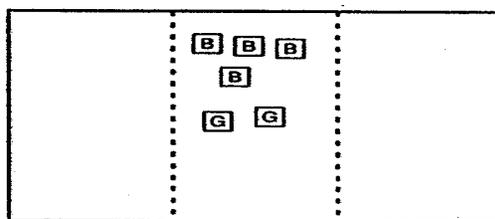
1. Choose Rainbow Cubes in two colors.



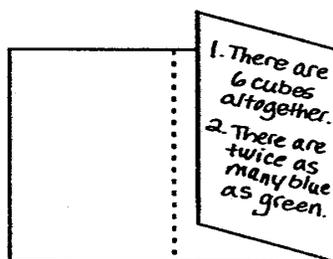
2. Take a half sheet of blank paper and fold into thirds.



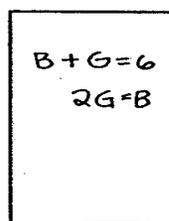
3. On the center space, draw and color squares to match your cubes.



4. Fold over the right flap. Write two sentences that give clues about the cubes. One clue should tell the total.



5. Fold over the left flap. Write two equations to match your sentences.



6. Check your clues carefully!

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