## Operations and Algebraic Thinking

# Decomposing Numbers

In order to become fluent in math and feel comfortable manipulating numbers, children must find flexible and creative ways to break apart, or decompose, numbers to form equivalent representations. For example, knowing that 4 can be represented as 3 + 1 or 2 + 2 enables children to think of 7 + 4 as 7 + 3 + 1 or 7 + 2 + 2.

**Try It!** *Perform the Try It! activity on the next page.*

## Talk About It

Discuss the Try It! activity.

■ Display the two complete trains used for the activity. **Ask:** *How many Snap Cubes® are in each train? How are the trains different?* **Say:** *Even though the trains are made up of different numbers of red and blue cubes, both trains have five cubes in all.*

■ Display the train from Step 2. **Ask:** *How many red cubes? How many blue cubes?* (Point to the expression 1 + 4 as you ask children to repeat after you.) **Say:** *This train of five cubes is made of one red cube and four blue cubes. One plus four is five.*

■ Display the train from Step 3. **Ask:** *How many red cubes? How many blue cubes?* (Point to the expression 2 + 3 as you ask children to repeat after you.) **Say:** *This train of five cubes is made of two red cubes and three blue cubes. Two plus three is five.*

## Solve It

With children, reread the problem. Then have children draw pictures to show at least two ways the 5 games can be put into the two game drawers. Encourage children to share and discuss their drawings with their classmates.

## More Ideas

For other ways to teach about decomposing numbers—

■ After children have mastered decomposing numbers from 2 through 5, have them complete the same Try It! activity with Snap Cubes using numbers from 6 through 10.

■ Have children work in pairs. Instruct one child in each pair to use two different colors of Snap Cubes and put together a specific number of cubes in random order. Then tell the other child in each pair to separate the cubes and make one train for each color while completing this sentence:
_____ plus _____ is _____ .

## Formative Assessment

Have children try the following problem.

*Carl has 4 carrot sticks. He piled them this way. Draw another way Carl can pile his carrot sticks.*
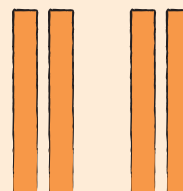
## Try It!

Here is a problem about decomposing the number 5.

*During classroom cleanup time, it's Jodi's job to put the 5 classroom games in the 2 game drawers. How can Jodi find the number of different ways she can put the 5 games in the game drawers?*

Introduce the problem. Then have children do the activity to solve the problem. Distribute 10 Snap Cubes to each pair of children.
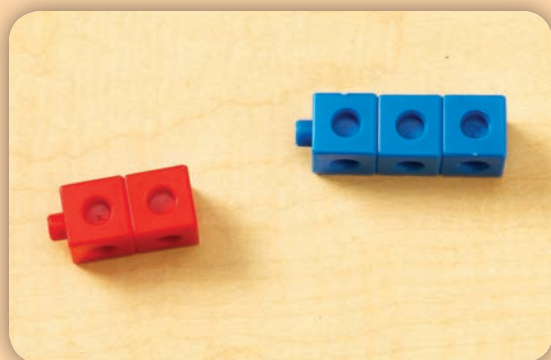
### Materials
• Snap Cubes® (5 red and 5 blue per pair)
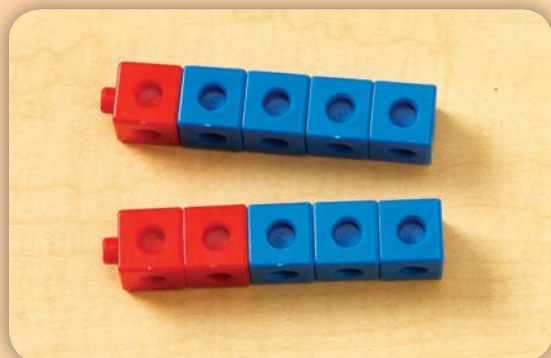


**1.** Instruct children to make two 5-cube trains (one is made of 1 red and 4 blue cubes and the other is made of 2 red and 3 blue cubes). Then have children compare the trains. Guide children to the conclusion that the trains have the same number of cubes (5), but each train has a different number of red and blue cubes. Write the number *5* on the board.
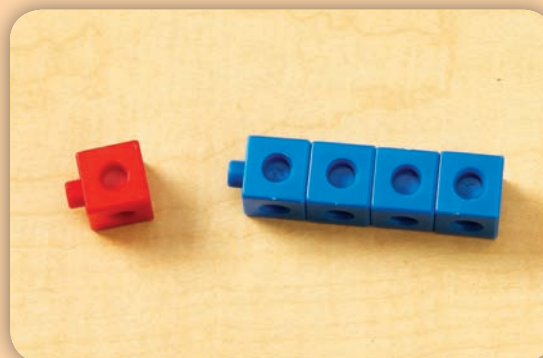


**2.** Display the train with 1 red cube and 4 blue cubes. Instruct children to break this train apart by removing the red cube. Help children to recognize that the train of 1 red cube and the train of 4 blue cubes together made up 5 cubes. Below the number 5 on the board, write *1 + 4*.

### ⚠ Look Out!

Watch for children who are having a difficult time understanding that a number can be made of and broken apart into two groups in different ways. Have these children work with a set of 5 cubes that are all the same color. This way, children will be able to see that no matter how they break their set of 5 cubes apart (1 + 4 or 2 + 3), they always make up a train of 5 cubes.
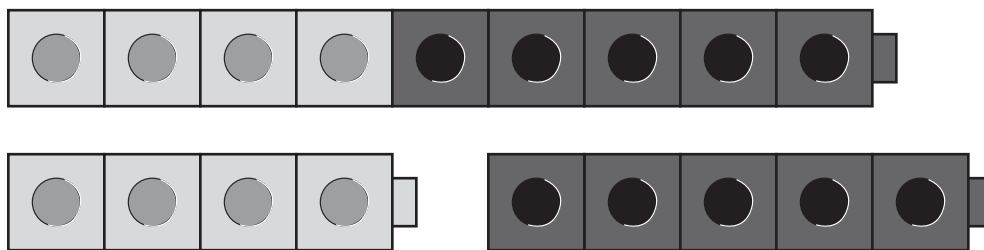


**3.** Display the train of 2 red cubes and 3 blue cubes. Have children break this train apart into two trains. Help children to recognize that the train of 2 red cubes and the train of 3 blue cubes together made up 5 cubes. Below 1 + 4 on the board, write *2 + 3*. Encourage children to see if they can find other ways to break 5 into groups.

Check children's work.

**1.**



$$9 = \underline{\quad 4 \quad} + \underline{\quad 5 \quad}$$

**2.**

$$9 = \underline{\qquad} + \underline{\qquad}$$

## Directions

**1.** Use 9 Snap Cubes®. Build the train shown. Break the train as shown. Fill in the number sentence to show the parts.   **2.** Use Snap Cubes in two colors to make 9 in a different way. Draw your train. Fill in the number sentence to show the parts. Can you make 9 in other ways?

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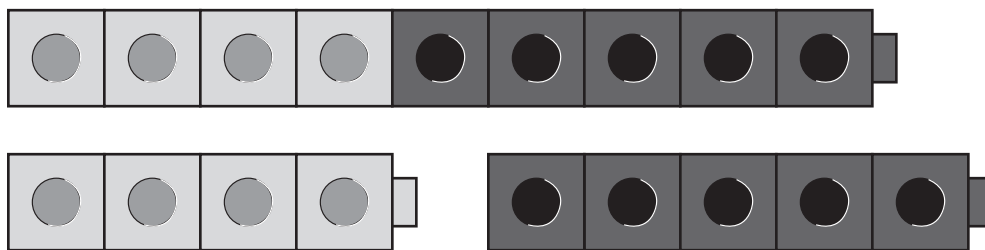
Check children's work.

## Challenge

Draw a straight line across your paper. Draw 7 flowers in the top space. Color some yellow and some pink. Write the number of yellow flowers. Draw a plus sign. Write the number of pink flowers.

Now draw 7 flowers in the bottom space. Color these flowers to show a different way to make 7. Write the number of yellow flowers. Draw a plus sign. Write the number of pink flowers.

Name _____

**1.**

$9 =$ _____ $+$ _____

**2.**

$9 =$ _____ $+$ _____

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