Objective

Multiply integers.

The Number System

Multiply Integers I

Students have developed the meaning of multiplication of whole numbers by using representations such as equal-size groups, arrays, area models, and equal jumps on a number line. Some of these representations also work for multiplication with negative numbers. Understanding multiplication of integers prepares students for division of integers.

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

Talk About It

Discuss the Try It! activity.

■ **Say:** *When Ryan takes $5 out of his savings account, the integer –5 is used to describe the change in the amount of money in the account.* **Ask:** *When Ryan donates $5 to the food bank, what integer describes the change in the amount of money the food bank has?*

■ **Say:** *The multiplication in this problem is 3 × (–5). Compare this with 3 × 5.* **Ask:** *How are they the same? How are they different?*

Solve It

Reread the problem with students. The amount of money in Ryan's savings account decreases each Friday, so a negative number (–5) is used to represent the change. To show the change in Ryan's account after 3 Fridays, students model the equation $3 \times (-5) = -15$. Have students explain the model.

More Ideas

For other ways to teach about multiplying integers—

■ Have students use yellow and red Centimeter Cubes to model this and similar problems.

■ Summarize the rules for multiplying integers.

(1) The product of two positive integers is positive.
(2) The product of two negative integers is positive.
(3) The product of a positive integer and a negative integer is negative.

■ Using Two-Color Counters, have students model each rule. To model the product of two negative numbers, guide students to use repeated subtraction. To subtract groups of negative quantities from zero, first add red-yellow pairs. Then take away the red counters as appropriate.

Formative Assessment

Have students try the following problem.

In a computer game, you can win a maximum of 50 points and lose a maximum of 25 points in each round. What is the lowest possible score after three rounds?

A. –150   **B.** –75   **C.** –50   **D.** –25

Try It!   15 minutes | Pairs

Here is a problem about multiplying integers.

Ryan has a savings account. Every Friday he takes out $5 from the account and donates the money to the local food bank. What is the change in Ryan's account after three Fridays?

Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials.
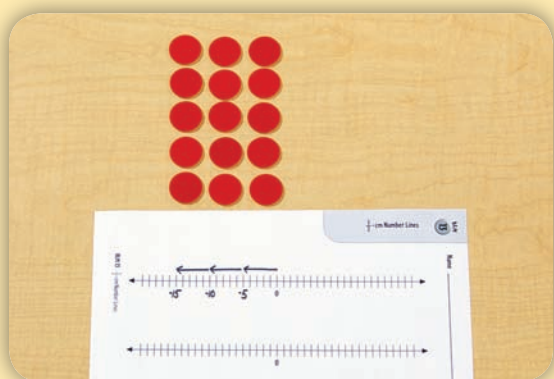
Materials
• Two-Color Counters (at least 20 per pair)
• BLM 5
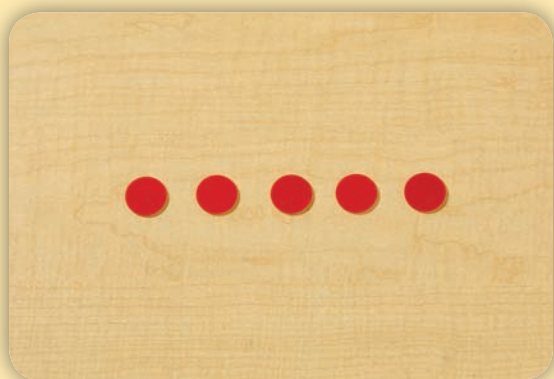
1. Say: *Let each red counter represent one dollar donated—which is one dollar less in Ryan's savings account, or −1. Use counters to show the change in Ryan's account when he makes one donation.* Students display 5 red counters.
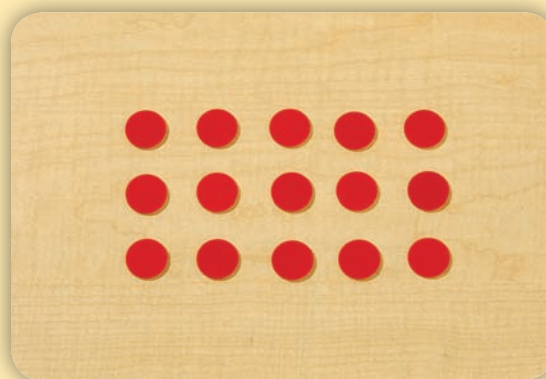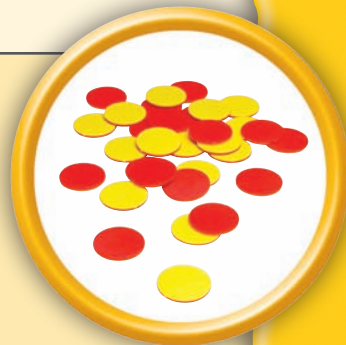
2. Say: *Now use counters to represent the change in Ryan's account after three Fridays. Organize the counters to show that there are three equal-size groups.* Students display 3 groups of red counters, with 5 in each group. **Ask:** *What amount of money is represented?*

⚠ Look Out!

Sometimes students will be reluctant to think of multiplication as repeated addition when negative numbers are involved. Remind them that 3 × 5 is *3 groups of 5*, or 5 + 5 + 5, and that this idea applies to negative numbers, too. That is, 3 × (−5) is *three times negative five, or 3 groups of −5,* or (−5) + (−5) + (−5).

3. Say: *Now model this problem on a number line.* **Ask:** *How can you show that Ryan has $5 less in his savings account each Friday, for three Fridays?* Starting at 0, students jump 5 units left three times, ending at −15.
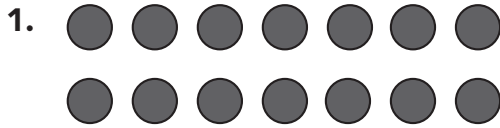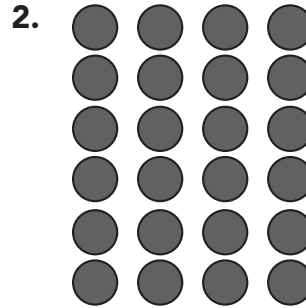
Use Two-Color Counters to model each multiplication problem. Use a number line to help. Write a number sentence for the product. (Check students' work.)

1.

$2 \times (-7) = -14$

2.

$6 \times (-4) = -24$

Using Two-Color Counters, model each multiplication problem. Sketch the model. Write the product.

3. $7 \times (-4)$

-28

4. $10 \times (-5)$

-50

Find each product.

5. $9 \times (-6)$ _____ -54

6. $-5 \times (-7)$ _____ 35

7. -4×11 _____ -44

8. 9×7 _____ 63

9. $-3 \times (-1)$ _____ 3

10. $8 \times (-7)$ _____ -56

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Answer Key

Challenge!   What do you notice about the product when the factors have different signs? What do you notice about the product when the factors have the same signs? Draw pictures to help.

Challenge: (Sample) When both factors have the same sign, the product is positive. When the factors have different signs, the product is negative.

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Name _____

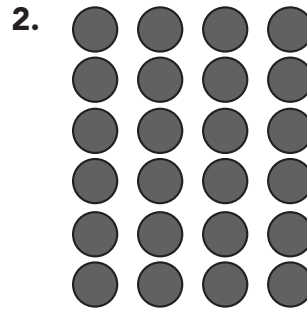**Use Two-Color Counters to model each multiplication problem.**
Use a number line to help. Write a number sentence for the product.

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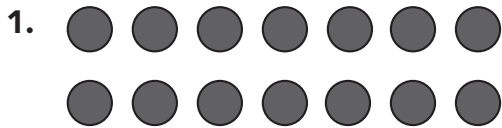
Using Two-Color Counters, model each multiplication problem. Sketch the model.
Write the product.

3. $7 \times (-4)$

4. $10 \times (-5)$

_____   _____

Find each product.

5. $9 \times (-6)$ _____

6. $-5 \times (-7)$ _____

7. -4×11 _____

8. 9×7 _____

9. $-3 \times (-1)$ _____

10. $8 \times (-7)$ _____

Name _____

Challenge!   What do you notice about the product when the factors have different signs? What do you notice about the product when the factors have the same signs? Draw pictures to help.

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$\frac{1}{2}$ -cm Number Lines

Name _____

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