

LESSON
3

Objective

Subtract integers.

Common Core State Standards

- **7.NS.1c** Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

The Number System

Subtract Integers I

After students show confidence with adding integers, they can learn to subtract integers. They will continue to use and develop their understanding of addition and subtraction as inverse operations. Previous work with fact families will help students to think flexibly as they add and subtract positive and negative numbers.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** *Is this problem about a subtraction problem or an addition problem?*
Discuss with students.
- **Ask:** *When you think about this problem in two different ways—as addition and as subtraction—do you get two different answers?*
- Have students write the two number sentences for this problem.

Solve It

Reread the problem with students. Notice that only red counters are used to solve the subtraction problem, $-8 - (-6) = -2$. Both yellow and red counters are used to solve the addition problem, $-8 + 6 = -2$. Make sure students understand both ways to think about this problem. Either way, Hannah still owes Rachel \$2 at the end.

More Ideas

For other ways to teach about subtracting integers—

- Students can use red and yellow Color Tiles to model the problem.
- Have students use Centimeter Cubes to find $-2 - (-5)$. Suggest that students use red cubes for negative numbers and yellow cubes for positive numbers. They start with 2 red cubes and need to take away 5. But there are only 2 cubes available to take away, so 3 red-yellow pairs (which equal 0) can be added. Then 5 red cubes are removed, and 3 yellow cubes are left.

Formative Assessment

Have students try the following problem.

The current temperature is -6°F and is expected to drop 10 degrees overnight. What is the expected low temperature overnight?

- A. -16°F B. -10°F C. -4°F D. 4°F

Try It! 15 Minutes | Pairs

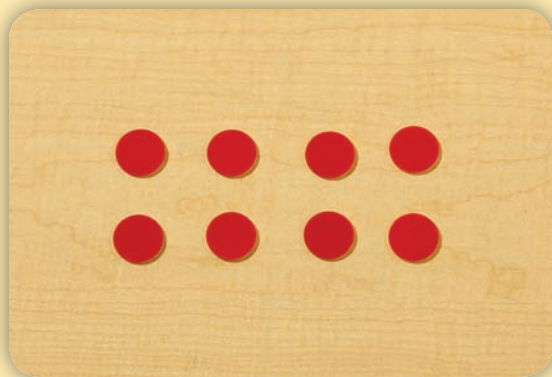
Here is a problem about subtracting integers.

At the bookstore, Hannah borrowed \$8 from her sister Rachel. At the waterpark a few days later, Rachel borrowed \$6 from Hannah. What is Hannah's standing with Rachel now? Does Hannah still owe Rachel any money?

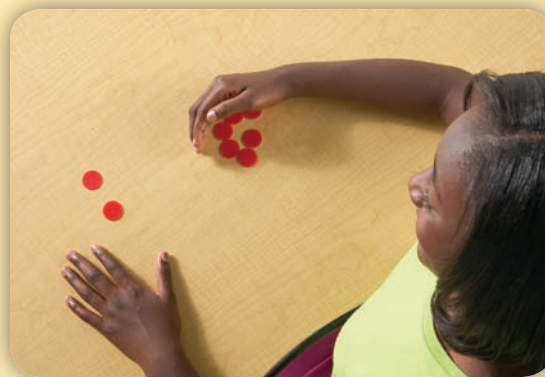
Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials.

Materials

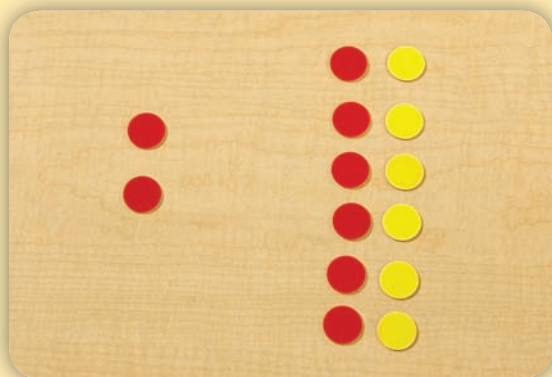
- Two-Color Counters (at least 20 per pair)



1. Say: Let each red counter represent one dollar owed, or -1 . Use counters to show Hannah's situation after borrowing \$8 from Rachel. Students place 8 red counters on the table.



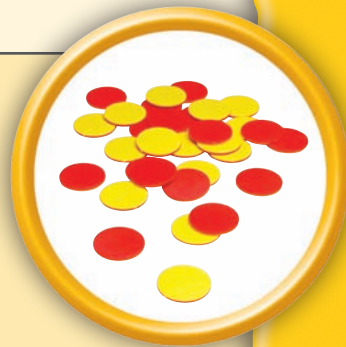
2. Say: Later, Rachel borrowed \$6 from Hannah. One way to think of this is that \$6 of Hannah's debt to Rachel is taken away. This is a subtraction problem: $-8 - (-6)$. Show this with the counters. Students take away 6 red counters, and 2 are left.



3. Say: You can also think that when Rachel borrowed \$6 from Hannah, it was the same as Hannah paying \$6 back to Rachel. It is an addition problem: $-8 + 6$. Show this with the counters. Students place 8 red counters, then add 6 yellow counters. They form 6 red-yellow pairs, and 2 red counters are left.

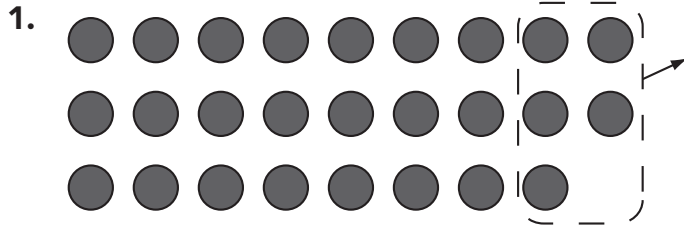
⚠ Look Out!

Students often get confused when they try to subtract a negative number, as in $-8 - (-6)$. When they *take away* 6 red counters from a set of 8, students see that they can actually subtract a negative number. In this activity they also see that subtracting negative 6 is the same as adding positive 6: $-8 - (-6) = -8 + 6$. Once students are convinced of this, encourage them to use this concept whenever they see a minus sign and a negative sign together. For example, $1 - (-4) = 1 + 4 = 5$.

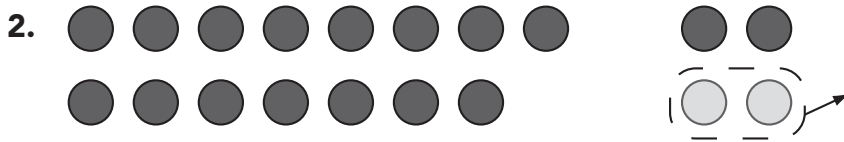


Use Two-Color Counters to model each subtraction problem. Write the number sentence for the difference.

(Check students' work.)



$-26 - (-5) = -21$



$-15 - 2 = -17$

Using Two-Color Counters, model each subtraction problem. Sketch the model. Find the difference.

3. $9 - (-4)$

4. $-14 - 5$

13

-19

Find each difference.

5. $21 - (-6)$ 27

6. $-15 - 7$ -22

7. $-4 - 12$ -16

8. $-9 - (-7)$ -2



Answer Key

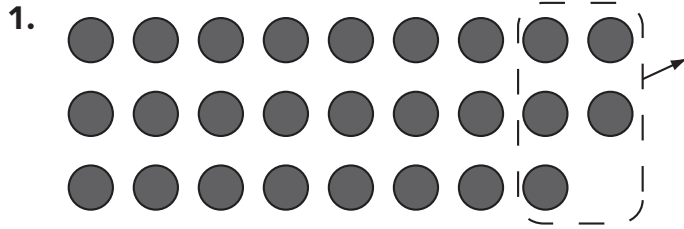
Challenge! Rewrite Questions 5–8 as addition problems. Find the sum. Did your answers change? Explain.

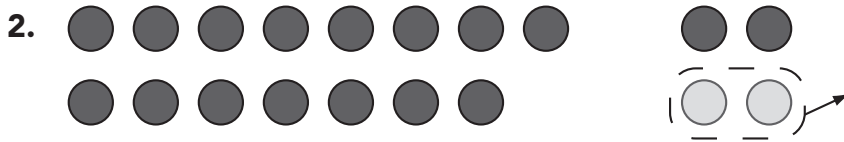
Challenge: (Sample) $21 + 6 = 27$; $-15 + (-7) = -22$; $-4 + (-12) = -16$; $-9 + 7 = -2$; No; Adding the opposite of a number is the same as subtracting a number.

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Use Two-Color Counters to model each subtraction problem. Write the number sentence for the difference.





Using Two-Color Counters, model each subtraction problem. Sketch the model. Find the difference.

3. $9 - (-4)$

4. $-14 - 5$

Find each difference.

5. $21 - (-6)$ _____

6. $-15 - 7$ _____

7. $-4 - 12$ _____

8. $-9 - (-7)$ _____

Name _____

Challenge! Rewrite Questions 5–8 as addition problems. Find the sum. Did your answers change? Explain.

Handwriting practice lines for student response.

