

# **Objective**

Write a two-step equation to solve a real-world problem.

#### Common Core State Standards

■ 7.EE.4a Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

# **Expressions and Equations**

# Problem Solving: Two-Step Linear Equations

Up until now, students have been working with one-step linear equations. This activity demonstrates the use of Algeblocks<sup>®</sup> as an aid to representing and solving two-step linear equations.

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

# Talk About It

Discuss the Try It! activity.

- Ask: How do we know that 19 = 4b + 7 is the correct equation? What does the 19 represent? What does the 4b represent? What does the 7 represent?
- Ask: What can we remove from both sides of the equation that will still allow the equation to stay balanced?
- Ask: If 4 blocks equal 12, what does each block equal? What does the block represent?
- Ask: What does b represent? How many bushes did Lauren trim?

### Solve It

Reread the problem with students. **Say:** *Explain how you determined the number of bushes Lauren trimmed.* **Ask:** *How much would Lauren earn if she trimmed 6 bushes?* **12** *bushes?* 

### **More Ideas**

For another way to teach about two-step linear equations-

Have students create a table of values and use the XY Coordinate Pegboard to display a graph that shows how much Lauren can earn for mowing larger lawns.

# **Formative Assessment**

Have students try the following problem.

Solve for y. 3y - 12 = y - 18 A. y = 5 B. y = -5 C. y = -3 D. y = 3

#### Try It! 15 minutes | Pairs

Here is a problem about solving a two-step equation.

During the summer, Lauren mows her neighbor's lawn. She is paid \$7 for mowing the lawn and an additional \$4 for each bush she trims. If she was paid \$19, how many bushes did she trim?

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



**1.** Have students create a table that reflects the information given in the story problem. Use this table to generate an equation.



**3.** Have students remove 7 unit blocks from each side by making zero pairs, leaving them with 12 unit cubes on the left and 4 *b* blocks on the right. These should be arranged in equal groups as shown. From here, have students divide both sides by the number of equal groups (4). The result is b = 3. Remind students that *b* represents the number of bushes that Lauren trimmed.





**2.** Have students represent this equation with Algeblocks, using the yellow *x* blocks to represent the number of bushes (*b*) Lauren trimmed and the green unit blocks for dollar amounts.



Watch for students who do not reverse the order of operations when solving the equation. Remind students that when solving equations they are "undoing" the operations.



**Answer Key** 

Use Algeblocks and an Algeblocks Sentences Mat to model the equation shown. Write the equation. Write the equation after the first step and write the solution.



Using Algeblocks and an Algeblocks Sentences Mat, model the equation. Sketch the model, the first step, and the solution.

**2.** 2x + 9 = 13



Solve each equation.

**3.** 4x + 10 = 9x

*x* = 2

y = 5

y = 2

- **5.** 6y + 10 = 8y
- **7.** 10y = 6y + 8





y = 1

- **6.** 2x + 12 = 5x
- **8.** 4*y* + 3 = 7*y*

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# **Answer Key**

**Challenge!** Describe the two steps you used to solve the equations on the previous page. Choose an equation, show the step, and explain the reason for each step.

Challenge: (Sample) The first step is to add or subtract one of the constant terms from both sides. The second step is to divide both sides of the equation by the coefficient on the variable term.



Use Algeblocks and an Algeblocks Sentences Mat to model the equation shown. Write the equation. Write the equation after the first step and write the solution.



Using Algeblocks and an Algeblocks Sentences Mat, model the equation. Sketch the model, the first step, and the solution.

**2.** 2x + 9 = 13



#### Solve each equation.

**3.** 4x + 10 = 9x

**4.** 5x = 12 + x

**5.** 6y + 10 = 8y

**6.** 2x + 12 = 5x

**7.** 10y = 6y + 8

**8.** 4y + 3 = 7y

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**Challenge!** Describe the two steps you used to solve the equations on the previous page. Choose an equation, show the step, and explain the reason for each step.



150 BLM 7 Algeblocks Sentences Mat

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