Objective

Simplify an expression by combining like terms.

Common Core State Standards

■ **6.EE.3** Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

Expressions and Equations

Combining Like Terms I

Students learned how to evaluate an expression in an earlier lesson. Now they will learn to consider the other action that can be performed with expressions: rewriting an expression. Expressions that contain like terms can be rewritten in simplest form by combining those like terms, a process known as *simplifying*.

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

Talk About It

Discuss the Try It! activity.

■ **Say:** *Use the Commutative Property of Addition to rearrange like terms next to each other. Combine terms in order, x, y, then constants.*

■ **Ask:** *Why would we want to combine like terms?*

Solve It

Reread the problem with students. Have them create the block pattern with their Algeblocks. Then have them draw the pattern on a sheet of paper and label what each block represents. Have students arrange the blocks in order and combine like terms. Have students write their simplified answer on a sheet of paper.

More Ideas

For other ways to teach about combining like terms—

■ Have students use Algeblocks® to create new block patterns, using several of each kind of block. Ask students to combine like terms to determine how many of each block they used.

■ Have students use Algebra Tiles™ to make various patterns or expressions and combine like terms.

■ Extend the activity to include negative coefficients. Have one student place 10 Algeblocks chosen at random on the positive side of the Basic Mat. Have a second student place 10 Algeblocks chosen at random on the negative side. Have students write a block-by-block expression of their results. Then have them group like blocks, remove zero pairs, and write the simplified expression.

Formative Assessment

Have students try the following problem.

Simplify the given expression.

$$6x + 1 + x + 2y + 3 + 2x + y + 4$$

A. $8x + xy + 2y + 8$ **B.** $8x + 3y + 7$

C. $12xy + 8$ **D.** $9x + 3y + 8$

Try It! 20 minutes | Pairs

Here is a problem about combining like terms.

Ana has created the sculpture shown here for a modern art exhibit at her school. She wants to name the sculpture according to the blocks it contains. She has identified the blocks (roughly in order) as 1 + x + 1 + y + x + 1 + y + 3 + x + x + y + 1 + x + x + 1 + x + y + y + 3. She realizes, however, that she has to simplify the expression. What is the correct name of her sculpture?
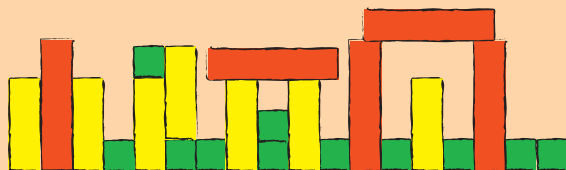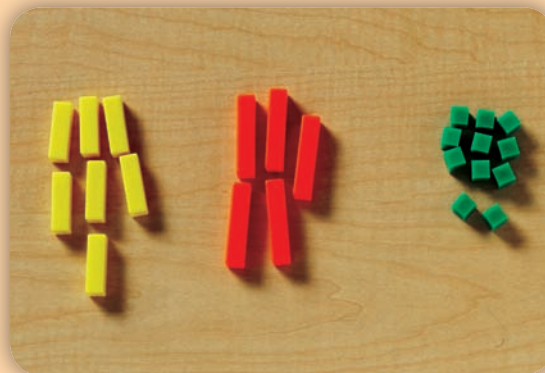
Introduce the problem. Then have students do the activity to solve the problem. Distribute Algeblocks to students.

Materials
• Algeblocks® (*x*, *y*, and unit blocks)

1. Have students use Algeblocks to re-create Ana's block design.

2. Have students combine all similar blocks in order from left to right—*x*, *y*, then units.

⚠ Look Out!

Watch for students who miscount terms or put the terms in the wrong order. Students may find it helpful to organize the Algeblocks groups in the correct order (*x*, *y*, and units). If they are using written notes, have them mark through the terms as they combine them so that they know what they have combined and what they have left to do.

3. Have students write the simplified expression on a sheet of paper next to the blocks.

Use Algeblocks to model the expression. Combine like terms. Write the terms. Then write the simplified expression. (Check students' work.)

1.
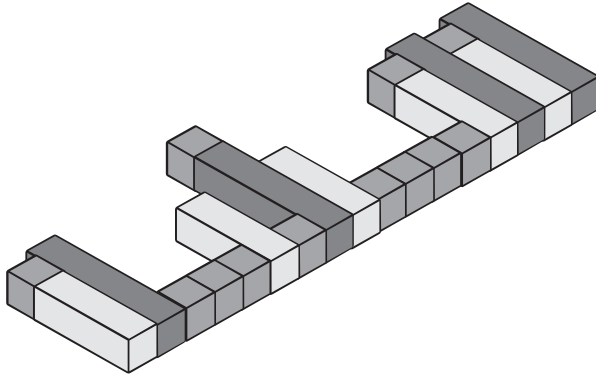
x terms: _____5_____

y terms: _____4_____

constant: _____12_____

= _____$5x + 4y + 12$_____

Using Algeblocks, model the expression. Combine like terms. Write the simplified expression.

2. $x + 2y + 3x + 5 + 2x + 3y + 2y + 6 + 4y + 5x + y + 4x$

_____$15x + 12y + 11$_____

Combine like terms. Write each expression in simplified form.

3. $5x + 3y + 5 + 4x + 3y + y + 8$

_____$9x + 7y + 13$_____

4. $6y + 4x + 2x + 9y + 3y + 2$

_____$6x + 18y + 2$_____

5. $8y + x + 2 + 6y + 4y + y$

_____$x + 19y + 2$_____

6. $x + 3y + 1 + 2x + 3x + y + 1$

_____$6x + 4y + 2$_____

7. $x + y + 10 + x + 6x + 10$

_____$8x + y + 20$_____

8. $10y + 4y + 2 + 4 + 2y + y + 5$

_____$17y + 11$_____

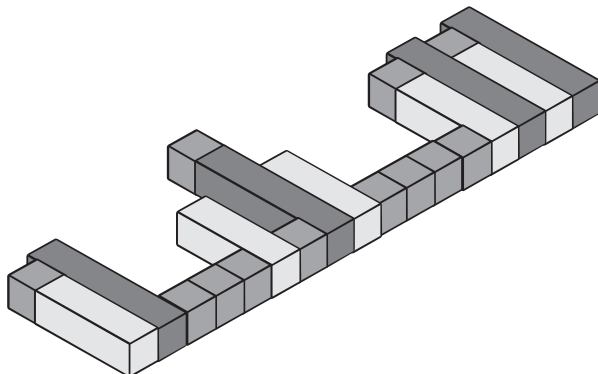**Challenge!**   Are x and x^2 like terms? Explain.

Challenge: (Sample) no; The terms do not have the same exponent. They are not like terms.

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Name _____

Use Algeblocks to model the expression. Combine like terms. Write the terms. Then write the simplified expression.

1.

x terms: _____

y terms: _____

constant: _____

= _____

Using Algeblocks, model the expression. Combine like terms. Write the simplified expression.

2. $x + 2y + 3x + 5 + 2x + 3y + 2y + 6 + 4y + 5x + y + 4x$

_____

Combine like terms. Write each expression in simplified form.

3. $5x + 3y + 5 + 4x + 3y + y + 8$

_____

4. $6y + 4x + 2x + 9y + 3y + 2$

_____

5. $8y + x + 2 + 6y + 4y + y$

_____

6. $x + 3y + 1 + 2x + 3x + y + 1$

_____

7. $x + y + 10 + x + 6x + 10$

_____

8. $10y + 4y + 2 + 4 + 2y + y + 5$

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Name _____

Challenge!   Are x and x^2 like terms? Explain.

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