Standards
California Common Core:
6.NS.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

6.EE.2a: Write expressions that record operations with numbers and with letters standing for numbers.

6.EE.2c: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

6.EE.3: Apply the properties of operations to generate equivalent expressions.

6.EE.4: Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Essential Questions
How can you write and evaluate an expression that represents a real-life problem?
How can you write an expression that represents an unknown quantity?
Does the order in which you perform an operation matter?
How do you use mental math to multiply two numbers?

Key Term
An algebraic expression is an expression that may contain numbers, operations, and one or more symbols.

Parts of an algebraic expression are called terms.

A symbol that represents one or more numbers is called a variable.

The numerical factor of a term that contains a variable is a coefficient.

Students will...
Use order of operations to evaluate algebraic expressions.
Use variables to represent numbers in algebraic expressions.
Write algebraic expressions.
Use properties of operations to generate equivalent expressions.
Use the Distributive Property to find products.
Use the Distributive Property to simplify algebraic expressions.
Use the Distributive Property to produce equivalent expressions.
Solve real-life problems.

Game
• A Trick for You

This is available online in the Game Closet at www.bigideasmath.com.
An Information Wheel can be used to organize information about a concept. Write the concept in the middle of the “wheel.” Then write information related to the concept on the “spokes” of the wheel. Related information can include, but is not limited to: vocabulary words or terms, definitions, formulas, procedures, examples, and visuals. This type of organizer serves as a good summary tool because any information related to a concept can be included.

### Key Ideas

#### Commutative Properties
- Changing the order of addends or factors does not change the sum or product.
  
  \[ \begin{align*}
  a + b &= b + a \\
  a \cdot b &= b \cdot a
  \end{align*} \]

#### Associative Properties
- Changing the grouping of addends or factors does not change the sum or product.
  
  \[ \begin{align*}
  (a + b) + c &= a + (b + c) \\
  (a \cdot b) \cdot c &= a \cdot (b \cdot c)
  \end{align*} \]

#### Multiplication Properties of Zero and One
- The product of any number and 0 is 0.
  
  \[ a \cdot 0 = 0 \]

- The product of any number and 1 is that number.
  
  \[ a \cdot 1 = a \]

#### Addition Property of Zero
- The sum of any number and 0 is that number.
  
  \[ a + 0 = a \]

#### Distributive Property
- To multiply a sum or difference by a number, multiply each number in the sum or difference by the number outside the parentheses. Then evaluate.
  
  \[ \begin{align*}
  a(b + c) &= ab + ac \\
  a(b - c) &= ab - ac
  \end{align*} \]

#### Factoring an Expression
- You can use the Distributive Property to factor expressions.
  
  \[ \begin{align*}
  ab + ac &= a(b + c) \\
  ab - ac &= a(b - c)
  \end{align*} \]

### What’s the Point?

The ability to use algebraic expressions and properties is very useful in real life for events like buying uniforms for a sports team. Have your student research how much it would cost to buy hats, socks, pants, and shirts for their school’s softball team. What is the total cost for uniforms for all of the players on the team? Is there more than one way to set up the expression(s)?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 3: Shadow Drawings STEM Video is available online at www.bigideasmath.com.