

LESSON 6

Objective

Multiply integers.

Common Core State Standards

- **7.NS.2a** Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

The Number System

Multiply Integers II

Everyday situations that can be represented by negative numbers, such as money owed, points lost, and descent from an elevation, help students to gain facility in computing with integers. Once they can perform addition and subtraction of integers, students can advance to the multiplication of integers.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** What does descent mean? Would that be represented as a positive number or a negative number? How should we represent the descent of 4 meters for the first minute on the Algeblocks® Basic Mat?
- **Ask:** What number represents the location of the spelunker after she has descended for 2 minutes?
- **Ask:** You now have 6 groups of 4 unit blocks on the mat. What number represents the level, relative to the surface, of the spelunker after 6 minutes?

Solve It

Reread the problem with the students. Discuss the meaning of *ascent* and *descent*. Make sure that students understand how to represent each direction with integers. Ask the students to write a math sentence to represent a descent of 4 meters per minute for 6 minutes: $6 \times (-4) = -24$.

More Ideas

For another way to teach about multiplication of integers—

- Have students draw a vertical number line with zero labeled at the top. Students should use Centimeter Cubes to mark the descent of the spelunker for each minute. Have them mark on the number line the position of the spelunker at the end of each minute. Ask them to repeat the activity for different numbers of minutes and different rates of descent.

Formative Assessment

Have students try the following problem.

A bank charges a penalty of \$35 for each check returned for insufficient funds. Suppose that a customer miscalculates his balance and writes three bad checks. Which equation expresses the effect of the penalty on his checking account?

- A. $(-3) \times (-35) = 105$
- B. $3 \times (-35) = -105$
- C. $3 \times 35 = 105$
- D. $(-3) \times 35 = -105$

Try It! 15 minutes | Pairs

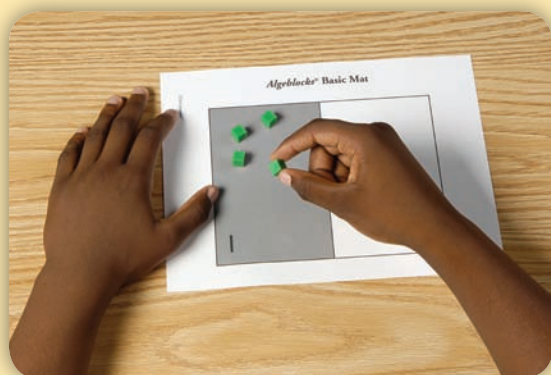
Here is a problem about multiplication of integers.

A spelunker descends into a crevasse at the rate of 4 meters per minute. What number represents her level, relative to the surface, after 6 minutes? Write a math sentence to describe this.

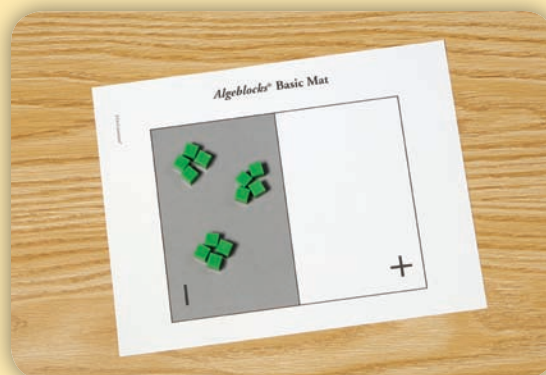
Introduce the problem. Then have students do the activity to solve the problem. Make sure that students understand how to represent a descent on their Algeblocks Basic Mats. Distribute the materials.

Materials

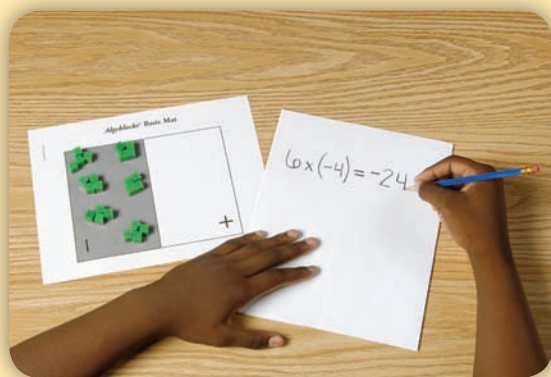
- Algeblocks® units
- BLM 4
- BLM 6
- Algeblocks Factor Track



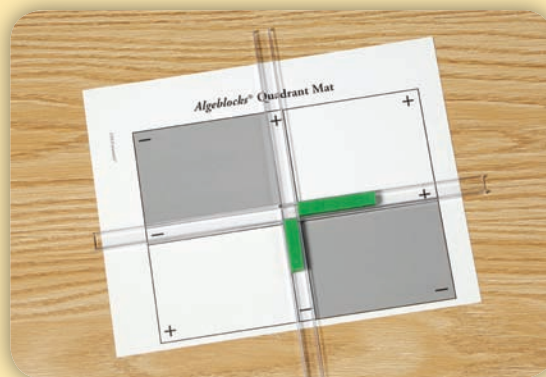
- 1.** Have students place 4 unit blocks on the negative section of their Algeblocks Basic Mat.
Say: Now you have represented the location of the spelunker after the first minute of her descent.



- 2. Say:** Continue placing groups of 4 unit blocks until you have represented the spelunker's 6-minute descent.



- 3.** Have students complete putting 6 groups of 4 unit blocks on the left side of their mats.
Ask: How many unit blocks do you have on your mat? What is the depth of the spelunker after 6 minutes? **Say:** Write a math sentence to represent the spelunker's final location.

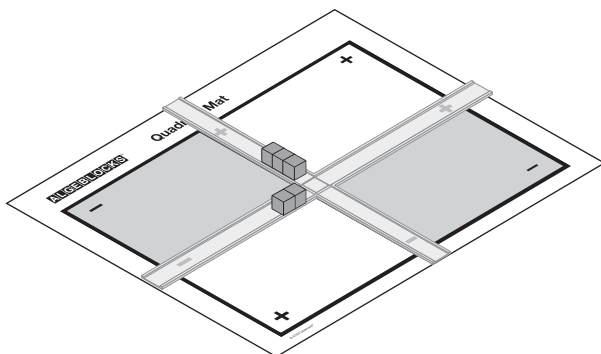


- 4.** Have students use their Algeblocks Quadrant Mats and Factor Tracks. **Say:** Represent $6 \times (-4)$ on the Algeblocks Quadrant Mat. Allow time for students to do this. **Say:** Now remove the track and read your answer. Is it the same answer you got before?

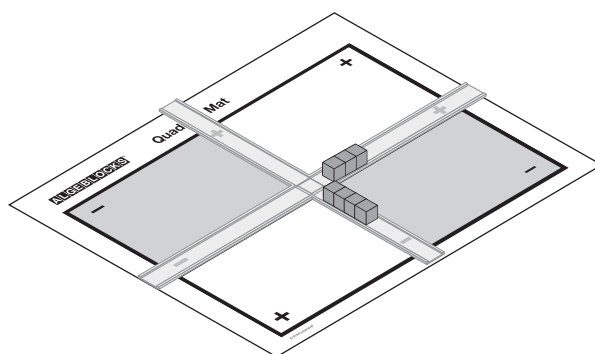
Use Algeblocks unit blocks, a Quadrant Mat, and a Factor Track. Model each integer multiplication sentence. Find each product.

(Check students' work.)

1. $-2 \times 3 =$ -6

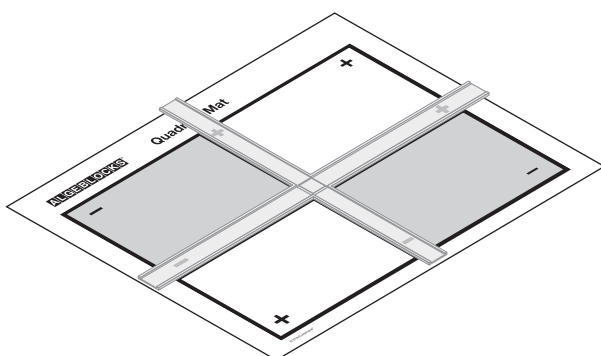


2. $3 \times (-4) =$ -12

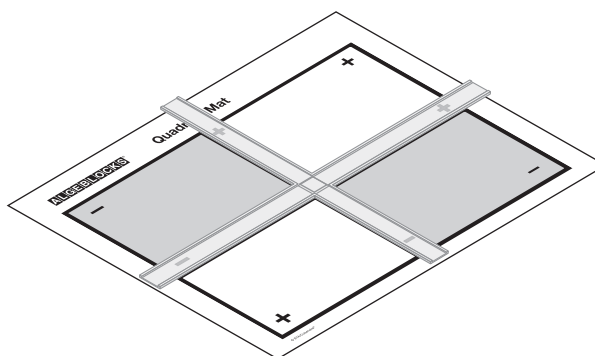


Using Algeblocks unit blocks, a Quadrant Mat, and a Factor Track, model each multiplication sentence. Sketch the model. Find the product.

3. $-8 \times (-2) =$ 16



4. $5 \times (-4) =$ -20



Find each product.

5. $3 \times (-6) =$ -18

6. $-7 \times (-3) =$ 21

7. $-8 \times 12 =$ -96

8. $-9 \times 5 =$ -45

9. $-5 \times (-6) =$ 30

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

11. $11 \times (-6) =$ -66

12. $-4 \times (-1) =$ 4

Answer Key

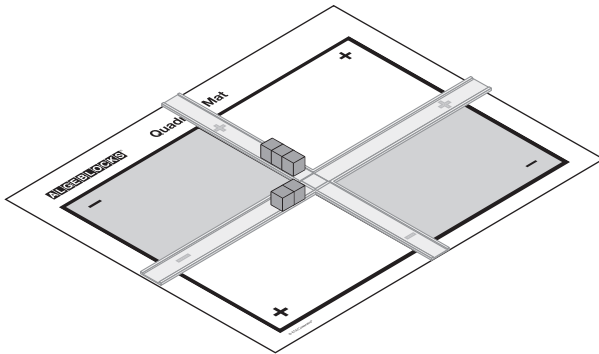
Challenge! If the product of two integers is positive, what can you conclude about the factors? Draw a picture to help.

Challenge: (Sample) If the product is positive, that means that either both factors are positive or both factors are negative.

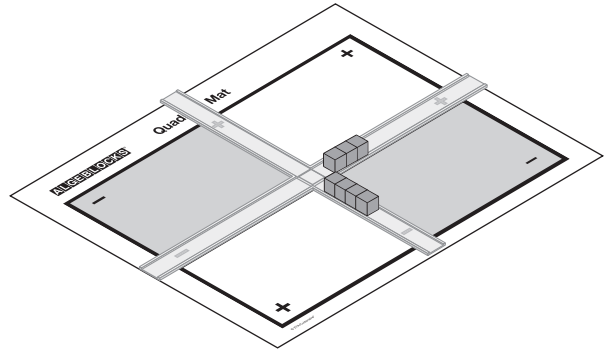
This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Use Algeblocks unit blocks, a Quadrant Mat, and a Factor Track. Model each integer multiplication sentence. Find each product.

1. $-2 \times 3 =$ _____

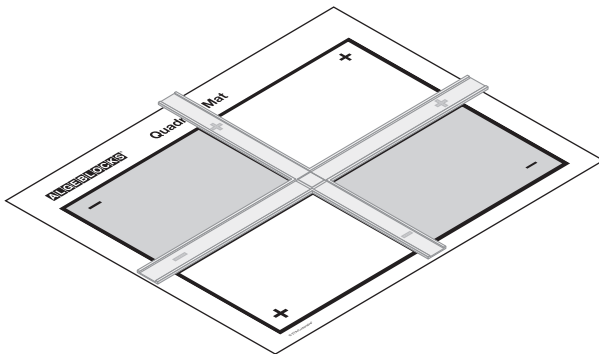


2. $3 \times (-4) =$ _____

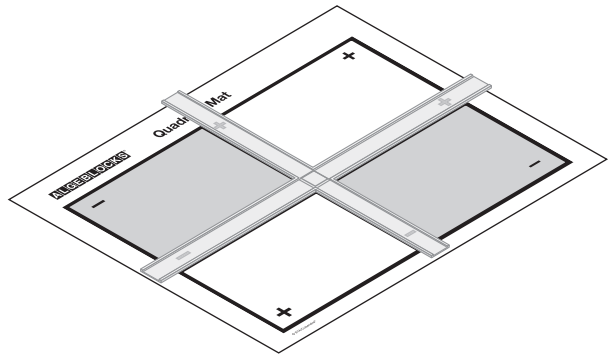


Using Algeblocks unit blocks, a Quadrant Mat, and a Factor Track, model each multiplication sentence. Sketch the model. Find the product.

3. $-8 \times (-2) =$ _____



4. $5 \times (-4) =$ _____



Find each product.

5. $3 \times (-6) =$ _____

6. $-7 \times (-3) =$ _____

7. $-8 \times 12 =$ _____

8. $-9 \times 5 =$ _____

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

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

11. $11 \times (-6) =$ _____

12. $-4 \times (-1) =$ _____

Name _____

Challenge! If the product of two integers is positive, what can you conclude about the factors? Draw a picture to help.

[illegible]

Name _____

BLM

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Algeblocks® Basic Mat



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Name _____

BLM

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Algeblocks® Quadrant Mat

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