



Name: _____

Date: _____

Student Exploration: Multiplying with Decimals

Vocabulary: area model, product

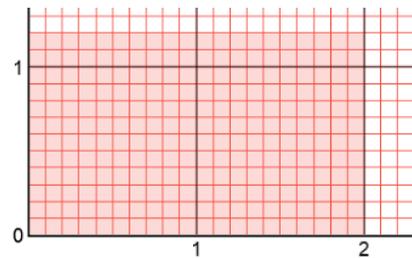
Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

- Mrs. Lee takes two calcium pills a day to help strengthen her bones. Each pill contains 1,200 milligrams of calcium. How many milligrams are in two pills? _____
- How did you calculate how many milligrams are in the two pills? _____

- There are 1000 milligrams in a gram, so there are 1.2 grams of calcium in each vitamin pill. How many grams of calcium does Mrs. Lee consume? _____

Gizmo Warm-up

To find how many grams of calcium are in a certain number of vitamins, you will need to multiply two numbers to find their **product**. You can model multiplication with an **area model**, like the one shown in the *Multiplying with Decimals Gizmo™*. The Gizmo grid is divided into black squares that represent whole units. Each black square contains 100 smaller red grid squares, each representing one hundredth.



- What does the horizontal (x) axis of the grid represent? _____
- What does the vertical (y) axis of the grid represent? _____
- Click and drag in the grid so that the **Number of vitamins** is 2 and the **Grams of calcium per vitamin** is 1.2. This is shown in the image above.
 - How many of the red squares are shaded? (Hint: Look above the grid.) _____
 - What does this number represent? _____
 - How many grams of calcium are in these two vitamins? _____



Activity: Multiplying decimals	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Shade the entire grid so that there are three vitamins and each vitamin has 2 g of calcium. 	 calcium will 3 vitamins
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- Mrs. Lee takes three vitamins with calcium. Each vitamin contains 2 grams of calcium.
 - How many grams of calcium are contained in the three vitamins? _____
 - How many of the large black squares are shaded on the grid? _____
 Each large square represents 1 unit (or, in this case, 1 gram of calcium).
 - How many of the small, red squares are shaded? _____
 Each small square represents 1 hundredth (0.01) of a unit, or 0.01 grams of calcium.
 - How does the area of the shaded region relate to the total amount of calcium? _____

- Turn on **Show number line**. Place your cursor over the red and green dots.
 - What do the green dots represent? _____
 - What does the red dot represent? _____
- Click and drag in the grid to model 2 vitamins, each containing 0.8 grams of calcium.
 - Without paying attention to the exact number of shaded squares, estimate the shaded area. _____
 - How many of the hundredths squares are shaded? _____
 - What is $2 \cdot 0.8$? _____
 - Fill in the blank: The number 0.8 (8 tenths) is equal to 8 divided by _____.
 - How does the product $2 \cdot 0.8$ compare to the product $2 \cdot 8$? _____
 Explain why. _____
 - Give a rule for positioning the decimal point when you multiply a decimal in tenths by a whole number. _____

(Activity continued on next page)



Activity (continued from previous page)

4. Use the Gizmo to model taking half a vitamin when the whole vitamin has 0.9 g of calcium.

A. What multiplication expression is modeled here? _____

B. What is the approximate area of the shaded region? _____

C. What is $0.5 \cdot 0.9$? _____

D. How does this compare to $5 \cdot 9$? _____

E. How do you position the decimal point when you multiply two decimals in tenths?

5. Challenge: Notice that the product of two numbers smaller than 1 is less than either number.

Explain why this is true. _____

6. Without using a calculator, solve each of the following multiplication problems. Show your work. When possible, check your answers with the Gizmo.

A. $1.9 \cdot 2$

B. $2.7 \cdot 1.1$

C. $7.6 \cdot 0.8$

7. Ron is measuring his living room for carpeting. The room is 20.5 feet by 14.1 feet. Write an estimate, and then find the area of the room, showing your work to the right.

Estimate: _____ Actual: _____

8. Challenge: Ron's living room has a ceiling that is 9.8 feet high.

A. What is a good estimate for the volume of the living room? _____

B. What is the actual volume of the room? Show your work to the right.

