LESSON 6

Objective

Multiply and divide decimals to hundredths.

Common Core State Standards

- **5.NBT.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Number and Operations in Base Ten

Multiply and Divide Decimals

As students multiply and divide decimals, they use and develop concepts such as multiplication as repeated addition and division as sharing. These are concepts that students learned when they worked with whole numbers and fractions. After completing this activity, students should know when to add, subtract, multiply, or divide to solve a real-world decimal problem.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** *How does repeated addition help you model the problem?*
- **Ask:** *In Step 2, why do you regroup the units first and then the rods?*
- **Ask:** *In Step 4, why do you regroup in the opposite order that you regrouped in Step 2, from flats to rods instead of from units to rods?*

Solve It

Reread the problem with students. Have them count the total number of rods and units after they regroup. Remind them to regroup 10 units as one rod, 10 rods as one flat, and one flat as 10 rods as necessary.

More Ideas

For other ways to teach multiplying and dividing decimals—

- Have students use Base Ten Blocks and Hundredths Grids (BLM 11) to multiply a decimal by a whole number, such as 0.4 × 2. Have them model 0.4 using 4 rows of a grid, remove the rods, and shade the rows in one color. Then have them repeat the model below the first model. Have students count the tenths.
- Have students use Base Ten Blocks to divide a decimal by a whole number, such as 1.5 ÷ 3. Have them model 1.5 and then regroup the one flat as 10 rods. Now have them use repeated subtraction to group 3 rods at a time until no rods remain.

Formative Assessment

Have students try the following problem.

Katrina can swim 5 meters in 4.35 seconds. How long does it take her to swim 1 meter?

A. 0.81 second **B.** 0.87 second **C.** 0.91 second **D.** 0.95 second

Try It! 30 minutes | Groups of 4

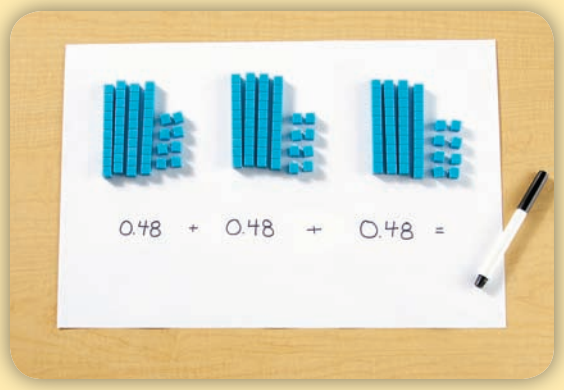
Here is a problem about multiplying and dividing decimals.

Diego bought 3 DVDs from an online store. If one DVD weighs 0.48 pound, what is the shipping weight of 3 DVDs? Diego also bought 3 copies of a book online. The total shipping weight for the books is 2.37 pounds. What is the shipping weight of one book?

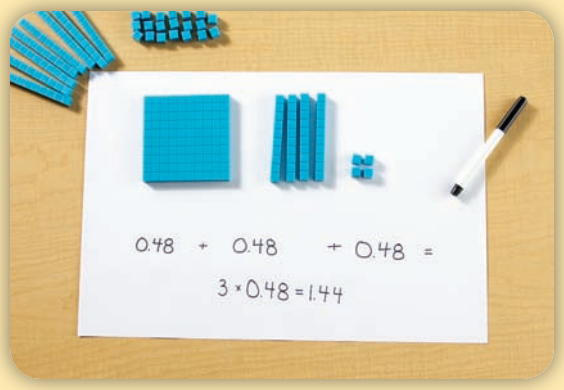
Introduce the problem. Then have students do the activity to solve the problem. Distribute Base Ten Blocks, paper, and pencils. Tell students that a flat represents 1.0. Have students determine what a rod and a unit represent.

Materials

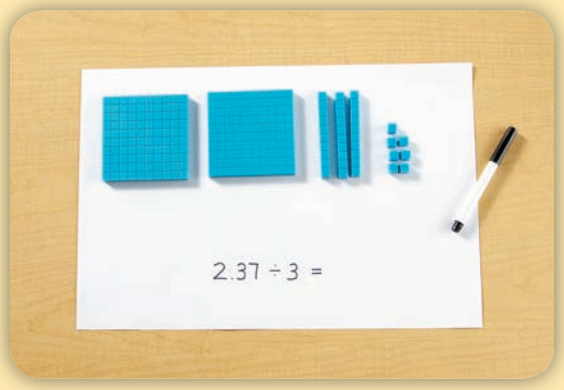
- Base Ten Blocks (2 flats, 21 rods, and 30 units per group)
- paper (11" x 17"; 2 sheets per group)
- pencils (1 per group)



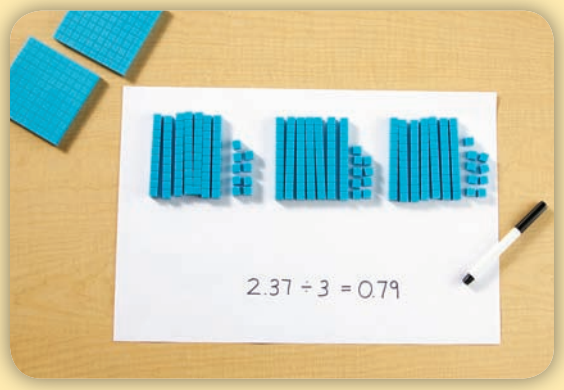
1. Say: *Multiplication is repeated addition, so you can model the problem as 0.48 + 0.48 + 0.48.* Have students model the problem as 3 sets of 4 rods and 8 units and write *0.48 + 0.48 + 0.48* = on the first sheet of paper.



2. Say: *Combine the rods and units.* Have students group the rods and group the units. **Say:** *Regroup the units as rods and the rods as flats.* **Ask:** *What is the total shipping weight of the DVDs?* Have students write *3 × 0.48 = 1.44* below the first equation.



3. Say: *The total shipping weight of three books is 2.37 pounds.* **Ask:** *What is the shipping weight of one book? What do you need to do to solve the problem?* Have students use the Base Ten Blocks to model 2.37 and write *2.37 ÷ 3* = on the second sheet of paper.



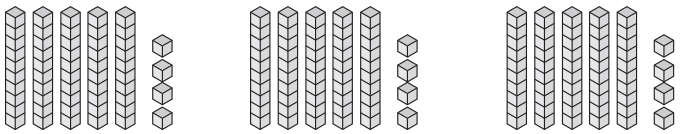
4. Say: *To form 3 equal groups, you must first regroup the flats as rods and then share them equally among the groups.* Have students form the 3 equal groups. **Say:** *Now regroup the rods as units and share them equally among the groups.* **Ask:** *What is the weight of one book?* Finally, have students complete the equation, *2.37 ÷ 3 = 0.79.*

Answer Key

Let the flat represent a whole (1). Use Base Ten Blocks to model multiplication of decimals. Write a number sentence to show the product. Sketch the product.

(Check students' work.)

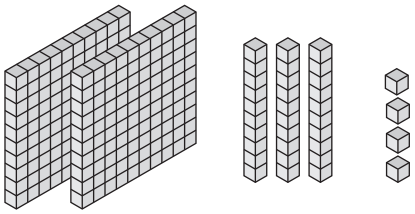
1.



0.54 × 3 = 1.62

Let the flat represent a whole (1). Use Base Ten Blocks to model division by 3. Write a number sentence to show the quotient. Sketch the quotient.

2.



2.34 ÷ 3 = 0.78

Find each product or quotient.

3. 2.56 ÷ 2

1.28

4. 1.32 × 4

5.28

5. 0.48 × 3

1.44

6. 6.39 ÷ 3

2.13

7. 5.08 ÷ 4

1.27

8. 4.22 × 2

8.44

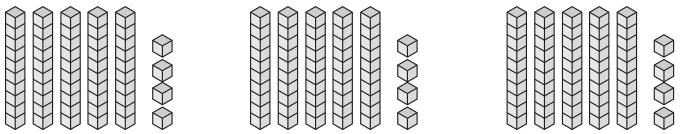
Answer Key

Challenge! Describe what you did differently in Problems 1 and 2.

Challenge: (Sample) In Problem 1, I used repeated addition to show multiplication. In Problem 2, I used equal sharing to show division.

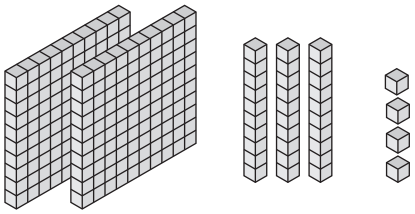
Name _____

Let the flat represent a whole (1). Use Base Ten Blocks to model multiplication of decimals. Write a number sentence to show the product. Sketch the product.

1. 

_____

Let the flat represent a whole (1). Use Base Ten Blocks to model division by 3. Write a number sentence to show the quotient. Sketch the quotient.

2. 

_____

Find each product or quotient.

3. 2.56 ÷ 2

_____

4. 1.32 × 4

_____

5. 0.48 × 3

_____

6. 6.39 ÷ 3

_____

7. 5.08 ÷ 4

_____

8. 4.22 × 2

_____

Name _____

Challenge! Describe what you did differently in Problems 1 and 2.