Week 2, Chapter 6, Lesson 6, Multiply Decimals by Powers of Ten

Standards

5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal or divided point when a decimal is multiplied by a power of 10. Use whole number exponents to denote powers of 10

Problem of the Day: Review

Gracia worked 8.2, 6.9, 10.1, 8.6, and 8.9 hours this week. She worked about 8 hours longer than last week. About how many hours did she work last week?

Essential Question:

At the end of this lesson, students should be able to explain how the exponent of each power of ten corresponds with placing a decimal point.

Power of Ten Activity

Target: Skill and Fluency

Materials: Index cards numbered 0-9

Give student an index card with a digit 0-9 written on it.
 Organize your cards to form a two- or three-digit number. For example, if you were given the cards 2, 4, and 7, you could form the number 247.
Multiply your number by 10. What is the product? See students' work.
Multiply your number by 100. What is the product? See students' work.
Multiply your number by 1,000. What is the product? See students' work.
Describe the pattern you notice when you multiply a whole number by a power of ten.
Annex the same number of zeros to the number as there are in the power of ten

Teach: Math in My World
Example 1
Read the example aloud. Write 32.25 × 10 as a vertical multiplication problem.
What is 32.25 × 10? 322.50
What do you notice about the location of the decimal point in 32.25 and 322.50? The decimal point is moved one place to the **right** in 322.50. Multiplying a decimal by 10 moves the decimal point one place to the right.
 Discuss powers of 10. Remind them that numbers like 10, 100, and 1,000 are powers of ten and can be written as exponents with a base of ten.
Point out the pattern in the table at the bottom of the page. Multiplying a decimal by a power of 10 moves the decimal point to the **right the same number of zeros in the power of ten**. For example, multiplying a decimal by 100 moves the decimal point two places to the right.

<u>Example 2</u>

Write 24.7×10^2 on the board.

What is 10^2? 100　　　How many zeros appear in the number 100? 2

How many places to the **right** will the decimal move when you multiply by 100? 2

When you place the decimal point in the product, you may sometimes need to annex a 0 to place the decimal point. What is 24.7×10^2? 2,470

<u>Synthesis</u>

Write a decimal number prominently on the board. Use a paper circle taped to the board as the decimal point. Say, When you multiply a decimal by 10, you move the decimal point one Move the paper circle one place to the right. place to the right. Display the following sentence frame: **____ zeros = ____ places.** Write a new decimal number and model multiplying by 100. Count the zeros and say, Move the decimal Two zeros equals two places. point two places. Have students use the sentence frame to guide you in solving other powers of ten problems

Practice & Apply

Independent Practice Based on your observations, you may choose to assign exercises as noted in the levels below:

Approaching Level Assign Exercises 5–11 (odd), 17, 20, 21.
Assign Exercises 11–14 (even), 16–21. On Level
Assign Exercises 10–21. Beyond Level

Common Error!

When multiplying a decimal by a power of 10, students may count the number of digits in the power of ten, rather than the number of zeros, to determine how many places the decimal point should move. Remind students to <u>disregard the 1 and count only the zeros</u>.

What Students Should Be Able To Do

Find a product like 0.67×10^3.

$0.67 \times 10^3 = 0.67 \times 1,000.$

Annex a 0.

0.6 7 0 → 6 7 0
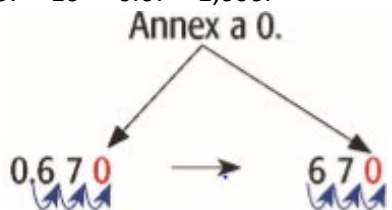
Multiplying a decimal by 1,000 moves the decimal point three places to the right.

<u>Essential Question:</u>

At the end of this lesson, students should be able to **explain** how the exponent of each power of ten corresponds with placing a decimal point.

Reteach Assignment