

LESSON 3

Objective

Identify the effect of multiplying by 10.

Common Core State Standards

- **3.NBT.3** Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.

Number and Operations in Base Ten

Multiply by 10

Multiplying by 10 will illustrate the patterns in multiplication in a more obvious way than multiplying by other numbers. Students need to know that multiplying by 10 will result in a 0 in the ones place in the product. Through using manipulatives such as Base Ten Blocks, students will understand the patterns involved in multiplication.

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

Talk About It

Discuss the Try It! activity.

- Display a Place-Value Chart (BLM 3) and show a 1 in the ones place. **Ask:** *What do we get when we multiply by 10?* Students should explain that the 1 moves to the tens place, and a 0 is placed in the ones place. **Ask:** *How can we use the Place-Value Chart to show $13 \times 10 = 130$?*
- **Say:** *When you multiply by a multiple of 10, your answer will always have a 0 in the ones place.* **Ask:** *Why do you think this is true?* Have students skip-count by 10 on a number line to reinforce this concept.
- **Ask:** *If you had 15 teams with 20 students on each team, how could you find the total number of students?*

Solve It

With students, reread the problem. Have students write a short paragraph to explain how they can use place value to multiply 13×10 by adding a 0 to 13.

More Ideas

For other ways to teach about multiplying by 10—

- Have groups of students make stacks of 10 Color Tiles and use them to multiply various numbers by 10. After multiplying, students can check their work by counting the tiles. Have them record their answers to reinforce the pattern and conclude that in each case they added a 0 to the number they multiplied by 10.
- Have students work in groups using Base Ten Blocks to multiply larger multiples of 10. Supply a series of problems, such as 4×40 , 4×50 , 4×60 , and 4×70 . Help students see the pattern of multiplying and then adding 0—for example, 4×40 is solved by multiplying 4×4 and adding 0.

Formative Assessment

Have students try the following problem.

Mrs. McMahon wants to prepare a copy of a test for each of the 20 students in her class. The test is 3 pages long. How many pages will she prepare altogether?

- A. 6 B. 30 C. 60 D. 120

Try It! 30 minutes | Groups of 4

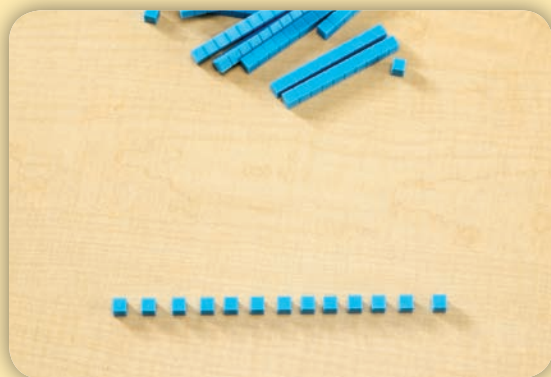
Here is a problem about multiplying by 10.

On Olympics Day at Baker Elementary School, students divide into 13 teams. Each team has 10 students. What is the total number of students?

Introduce the problem. Then have students do the activity to solve the problem. Distribute Base Ten Blocks to groups and explain that they will use them to multiply 13×10 .

Materials

- Base Ten Blocks (30 rods and 30 units per group)

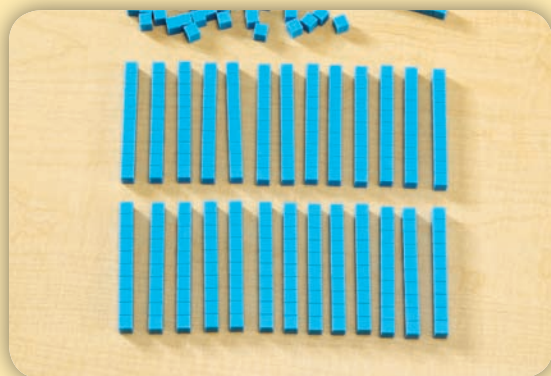


1. Write 13×10 on the board. Tell students to model 13 using 13 units.



2. Have students multiply 13×10 by replacing each unit with a rod. Have them count the rods to find the total. **Say:** *When you multiply by a 10, you can add a 0 to the other factor to find the product.*

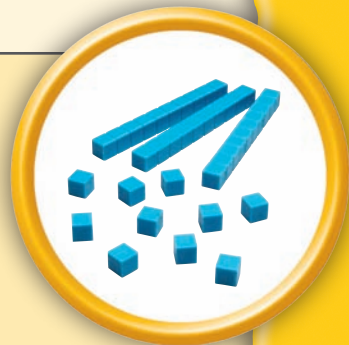
Invite students to model other problems, such as 8×10 or 15×10 .



3. **Ask:** *What if each team had 20 students? How can you multiply 13×20 ?* Guide students to line up 2 rows of 13 units each, then to replace each unit with a rod. Explain that this is the same as multiplying 13×2 , then adding a 0 to the product.

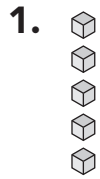
⚠ Look Out!

Students may not understand why multiplying by 10 will automatically result in a product with a 0 in the ones place. Have them create arrays for 1×10 , 2×10 , and so on through 10×10 to show how the number in every new row adds 10. Have students map this pattern on a Hundred Chart (BLM 1) to reinforce.



Use Base Ten Blocks to build each number. Use rods to find the product of each number modeled and 10.

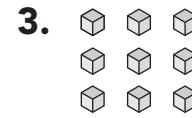
(Check students' work.)



$$\underline{5} \times 10 = \underline{50}$$



$$\underline{7} \times 10 = \underline{70}$$



$$\underline{9} \times 10 = \underline{90}$$

Build each problem using Base Ten Blocks. Then sketch the model. Write each product.

(Check students' models.)

4. $8 \times 10 = \underline{80}$

5. $15 \times 10 = \underline{150}$

6. $21 \times 10 = \underline{210}$

7. $8 \times 20 = \underline{160}$

8. $4 \times 20 = \underline{80}$

9. $7 \times 20 = \underline{140}$

Find the answer to each multiplication problem.

10. $3 \times 10 = \underline{30}$

11. $12 \times 10 = \underline{120}$

12. $24 \times 10 = \underline{240}$

13. $6 \times 20 = \underline{120}$

14. $9 \times 20 = \underline{180}$

15. $15 \times 20 = \underline{300}$

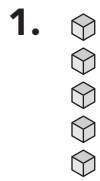


Answer Key

Challenge! Explain how Problems 11 and 13 have the same product when their factors are different.

Challenge: (Sample) The factors of Problem 11 are 12 and 10. The factors of Problem 13 are 6 and 20. You can work backward to rewrite $6 \times 20 = 6 \times 2 \times 10$. Then use the Associative Property: $(6 \times 2) \times 10 = 12 \times 10$.

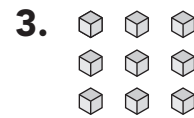
Use Base Ten Blocks to build each number. Use rods to find the product of each number modeled and 10.



$$\underline{\quad} \times 10 = \underline{\quad}$$



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4. $8 \times 10 = \underline{\quad}$

5. $15 \times 10 = \underline{\quad}$

6. $21 \times 10 = \underline{\quad}$

7. $8 \times 20 = \underline{\quad}$

8. $4 \times 20 = \underline{\quad}$

9. $7 \times 20 = \underline{\quad}$

Find the answer to each multiplication problem.

10. $3 \times 10 = \underline{\quad}$

11. $12 \times 10 = \underline{\quad}$

12. $24 \times 10 = \underline{\quad}$

13. $6 \times 20 = \underline{\quad}$

14. $9 \times 20 = \underline{\quad}$

15. $15 \times 20 = \underline{\quad}$

Name _____

Challenge! Explain how Problems 11 and 13 have the same product when their factors are different.

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