LESSON 3·2

Extend the Facts

How can we apply basic facts when multiplying large numbers?

Students use blocks to model a multiplication fact, such as 7 groups of 3 (7 × 3). They extend this fact to 7 groups of 3 blocks-of-10 (7 × 30) and to 7 groups of 3 blocks-of-100 (7 × 300).

Objectives

- To use place value to extend students' knowledge of basic facts to multiply larger numbers.
- To observe, describe, and extend patterns

Materials

Each group will need:

- 300 blocks
- 1 *Extend the Facts* activity sheet **per student**

◆ Class Introduction 15 MIN.

- Begin by reviewing basic multiplication facts (1 × 1, … 9 × 9), then distribute blocks to each group of students.

Have students model the following series of problems:

2 groups of 4 single blocks
2 groups of 4 blocks-of-10
2 groups of 4 blocks-of-100

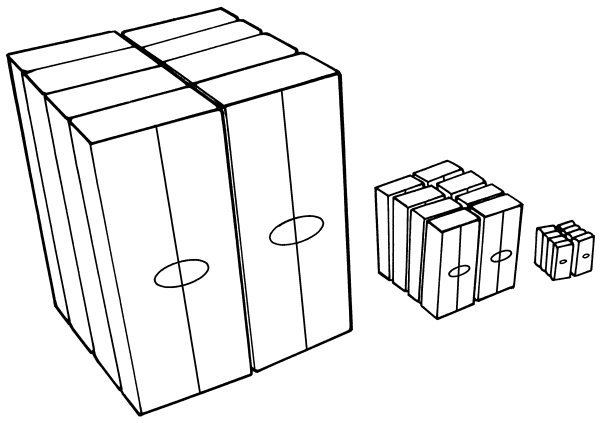
Ask,

How many single blocks are there? *(8)* **How many blocks-of-10?** *(8)* **How many blocks-of-100?** *(8)*

(Note: These answers are quite obvious to students because the images are the same except for size.)

To emphasize the relationship between these three problems, write number sentences and talk about them using parallel language.

2 × 4 = 8	**2 × 4 = 8**
2 × 4 tens = 8 tens	**2 × 40 = 80**
2 × 4 hundreds = 8 hundreds	**2 × 400 = 800**



- Repeat, having students make 7 groups of 3 using single blocks, blocks-of-10, and blocks-of-100 (if there are enough blocks in the classroom - if not, students can predict). Again ask,

How many single blocks are there? *(21)* **How many blocks-of-10?** *(21)* **How many blocks-of-100?** ***(21)***

Record the number sentences and talk about them using parallel language.

7 × 3 = 21	**7 × 3 = 21**
7 × 3 tens = 21 tens	**7 × 30 = 210**
7 × 3 hundreds = 21 hundreds	**7 × 300 = 2100**

Ask students to imagine building these problems with single blocks in an array instead. Grouping things into tens makes these kinds of problems much easier.

- Next ask students to set out 5 blocks-of-10. Ask,

What number do these blocks show? *(50)* **How can you show 3 × 50?** *(make 3 groups of 5 blocks-of-10)*

Have students make the 3 equal groups then ask,

How many blocks-of-10 are there? *(15)* **What number do these blocks show?** *(150)*

Repeat with blocks-of-100, having the students first set out 5 blocks-of-100 and tell the number represented. Then have the students represent 3 × 500 and write the corresponding multiplication sentence. (3 × 500 = 1500)

- Finally, present the examples 5 × 40 and 4 × 200. Have students predict the answers and explain their thinking. They can use blocks to check their predictions.

◆ Group Activity 20 MIN.

- Distribute the activity sheets and explain the *Extend the Facts* activity. Tell students that they will model the problem that is given, then model it again with blocks-of-10. There are also some challenge problems at the bottom of the sheet; students do not need to model these problems.

◆ Closure 20 MIN.

- Have a student from each group write a product (an answer) from one of their problems on the board.

  Ask the rest of the students to determine which multiplication fact is related to this answer. Then have them write the multiplication sentence for this answer.

  For example, one student puts the answer "240" on the board. Other students in the class determine that the fact related to this answer is $4 \times 6 = 24$. The multiplication sentence should be: $4 \times 60 = 240$.

Answer:
240

Fact:
$4 \times 6 = 24$

Multiplication Sentence:
$4 \times 60 = 24$

Assessment

- Do students see the connection between basic facts and extended facts?
- Do students choose the correct number of blocks-of-10 and blocks-of-100 when making the product?
- Do students name the number for the product correctly?
- Do the students predict the answers or use blocks each time?
- Can students make predictions for larger powers of 10?

Name

Extend the Facts

Problem	We chose this related problem with blocks-of-10.	
Example: $7 \times 3 = \underline{21}$ *7 groups of 3 blocks is 21 blocks*	Example: $7 \times$ <u>3 tens</u> $=$ <u>21 tens</u> *7 groups of 3 blocks-of-10 is 21 blocks-of-10*	Example: $7 \times$ <u>30</u> $= \underline{210}$ *7 groups of 30 is 210*
$4 \times 6 =$ _____	$4 \times$ _____ $=$ _____	$4 \times$ _____ $=$ _____
$2 \times 8 =$ _____	$2 \times$ _____ $=$ _____	$2 \times$ _____ $=$ _____
$3 \times 9 =$ _____	$3 \times$ _____ $=$ _____	$3 \times$ _____ $=$ _____
$5 \times 5 =$ _____	$5 \times$ _____ $=$ _____	$5 \times$ _____ $=$ _____
Challenge: Predict these answers.		
$4 \times 8000 =$ _____	$6 \times 900 =$ _____	$50 \times 70 =$ _____