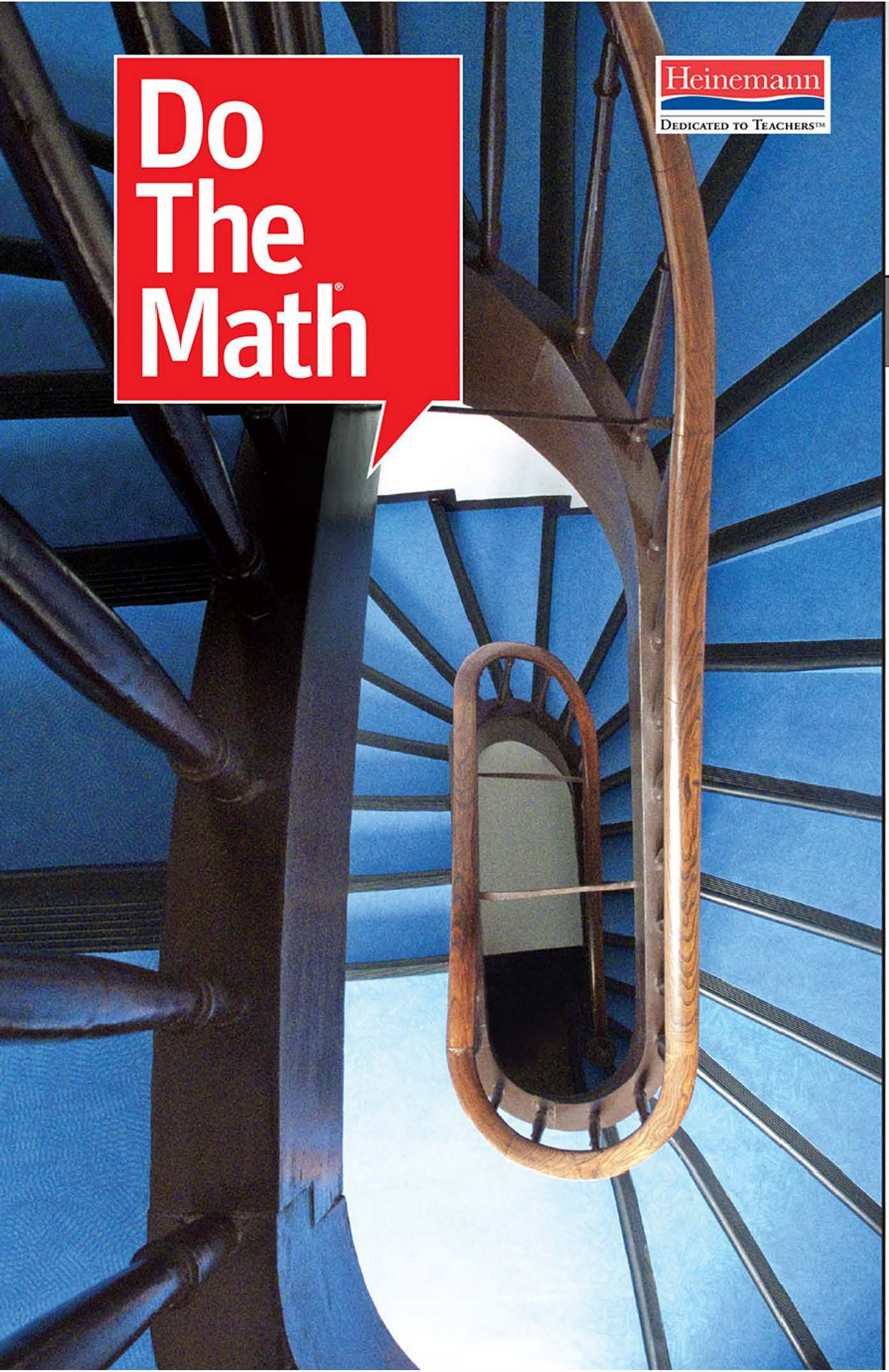

Do The Math®

Heinemann
DEDICATED TO TEACHERS™

Teacher Guide

Multiplication & Division

Created By

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Do The Math®

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Teacher Guide

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About the Program

Do The Math®

Introduction to *Do The Math Now!*

The Lessons

Additional Resources

LESSON 1 Splitting numbers into place-value parts to multiply

Lesson Summary

Students use the splitting strategy to multiply one-digit factors by the factors 11 to 19.

Assess

Administer the Unit 3: Beginning-of-Unit Assessment before beginning today's instruction.

Objectives

- Introduce key math vocabulary: *place value*.
- Use the Distributive Property.
- Recall products for facts through 12 × 12.
- Calculate products with one-digit factors times two-digit factors.
- Communicate ideas with key math vocabulary: *factor, place value,* and *product*.

Materials

- ***WorkSpace*** pages 85, 86, 190, and 195–198
- ***Math Vocabulary*** **chart**
- **Unit 3: *Do The Math Community News***

Interactive Whiteboard Tools

WorkSpace pages and manipulatives for Lesson 1 are provided on the *Interactive Whiteboard Tools* CD-ROM.

Preparation

Unit 3: *Do The Math Community News*
Make 1 copy for each student from page 368 or the *TeacherSpace* CD-ROM.

Unit 3: Beginning-of-Unit Assessment
Make 1 copy of the assessment for each student from pages 349–350 or the *TeacherSpace* CD-ROM.

Language Development

Key Math Vocabulary

ENGLISH	SPANISH
factor	*factor*
place value	valor posicional
product	*producto*

Academic Vocabulary

ENGLISH	SPANISH
split	separar

WHOLE GROUP

STEP 1 Demonstrate using the splitting strategy to solve 4 × 15.

❶ Introduce the lesson.

Today we'll use the splitting strategy to multiply two-digit factors by one-digit factors.

❷ Present a problem.

Write the following problem on the board.

4×15

I'll use the splitting strategy to figure the product.

I could split 15 several ways. For instance, I could split it into 8 plus 7, or I could split it into 4 plus 11. But I choose to split it into 10 plus 5.

Why does splitting 15 into 10 plus 5 make the problem easier?

Have students think, pair, share.
(Because 10 is easy to multiply.)

Splitting 15 into 10 plus 5 also splits it into its place-value parts.

Point to the 1 in 15.

The 1 is in the tens place. The 1 has a value of 10.

Point to the 5 in 15.

The 5 is in the ones place. It has a value of 5.

Write this on the board as shown.

4×15

$10 + 5$ 15 is 1 ten and 5 ones

Do The Math Community News

Distribute the copies of the *News*.

This *News* provides directions for playing *Pathways,* which offers students practice multiplying through 12 × 12.

WHOLE GROUP

STEP 2 Introduce math vocabulary.

❶ Explain *place value*.

💬 ***The 1 in 18 has a value of 10. The value of the 8 is 8. We can say that 18 is 1 ten and 8 ones.***

Write this on board.

18 = 1 ten + 8 ones

💬 ***When we split 18 into 10 and 8 we say that we split it into its place-value parts.***

Write place value on the *Math Vocabulary* chart.

💬 ***The position of a digit tells its value. If 8 is in the ones place, its value is 8. If the 8 is in the tens place, its value is 80. If 8 is in the hundreds place, its value is 800. This is what we mean by* place value.**

Math Vocabulary

- place value 888 → 800, 80, 8

This shows only a partial view of your *Math Vocabulary* chart.

❷ Students read and write the vocabulary.

Have students say *place value* and copy the word and example onto *WorkSpace* page 190. Then have them read the definition in the glossary beginning on page 195.

❸ Demonstrate multiplying 4 × 15.

💬 ***Now, instead of 4 times 15, I can solve two easier multiplication problems: 4 times 10 and 4 times 5. Then I can add the products.***

💬 ***What is 4 times 10?*** (40) ***What is 4 times 5?*** (20) ***What is 40 plus 20?*** (60) ***So 4 times 15 is 60.***

Write the equations on the board.

4×15

$10 + 5$ 15 is 1 ten and 5 ones

$4 \times 10 = 40$

$4 \times 5 = 20$

$40 + 20 = 60$

$4 \times 15 = 60$

❹ Revisit the meaning of the digits in 15.

Point to the equation $4 \times 10 = 40$.

💬 ***Where does the 10 come from?***
(The 1 in 15 has a value of 10.)

Point to the equation $4 \times 5 = 20$.

💬 ***Where does the 5 come from?***
(The 5 in 15 has a value of 5.)

💬 ***When 15 is split into its place-value parts, we say that the 1 has a value of 10 and the 5 has a value of 5. The position, or place, of the digits tells you its value—that is how we get the term "place value."***

CONTINUE

WHOLE GROUP

STEP 3 Demonstrate the splitting strategy for 14 × 6.

❶ Present a problem.

Write *14 × 6* on the board.

14 × 6

We can split 14 into its place-value parts to make it easier to multiply. 14 split into its place-value parts is 10 plus 4.

Now we can multiply 10 times 6 and 4 times 6—both problems are easier to figure mentally.

What is 10 times 6? (60)

What is 4 times 6? (24)

What is 60 plus 24? (84)

Write the equations on the board.

14 × 6
10 × 6 = 60
4 × 6 = 24
60 + 24 = 84
14 × 6 = 84

❷ Review the place-value parts of 14.

Point to the equation 10 × 6 = 60.

Where does the 10 come from? (When we split 14 into its place-value parts, the 1 in 14 has a value of 10.)

Point to the equation 4 × 6 = 24.

Where does the 4 come from? (When we split 14 into its place-value parts, the 4 in 14 has a value of 4.)

WHOLE GROUP

STEP 4 Guide students to solve a problem using place-value splitting.

❶ Present a problem.

Erase the board and write the following problem.

17 × 5

❷ Guide students to solve the problem.

Which number will we split? (17) ***How can you split 17 into its place-value parts?*** (10 plus 7)

We can multiply each of the parts of 17 times 5. What two equations can I write?
(10 × 5 = 50 and 7 × 5 = 35)

17 × 5
10 × 5 = 50
7 × 5 = 35

What do we do to find the product of 17 times 5? (add 50 and 35)

What is 50 + 35? (85)

Write the equations on the board.

17 × 5
10 × 5 = 50
7 × 5 = 35
50 + 35 = 85
17 × 5 = 85

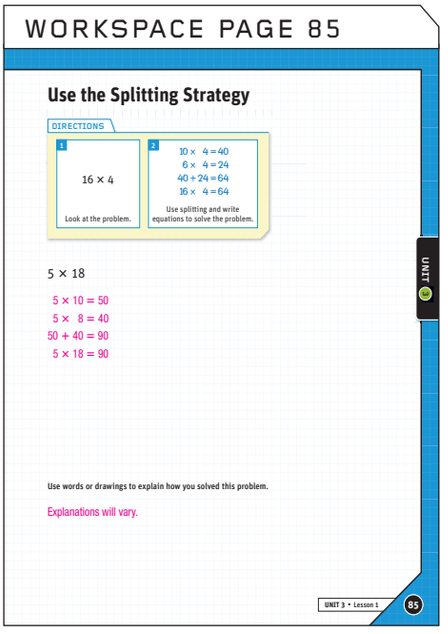
PARTNERS

STEP 5 Students solve a problem using splitting.

❶ Partners solve a problem.

Have students turn to *WorkSpace* page 85.

Solve the first problem on page 85 with your partner. Use the splitting strategy and write your equations to show how you figured the product. You may work together to solve the problem or work independently and then share your equations with each other when you finish the problem.


WORKSPACE PAGE 85

Use the Splitting Strategy

DIRECTIONS

1 16 × 4 — Look at the problem.

2 10 × 4 = 40; 6 × 4 = 24; 40 + 24 = 64; 16 × 4 = 64 — Use splitting and write equations to solve the problem.

5 × 18

5 × 10 = 50
5 × 8 = 40
50 + 40 = 90
5 × 18 = 90

Use words or drawings to explain how you solved this problem.

Explanations will vary.

UNIT 3 • Lesson 1 85

❷ Students explain how they solved 5 × 18.

As students share their solutions, record their equations on the board.

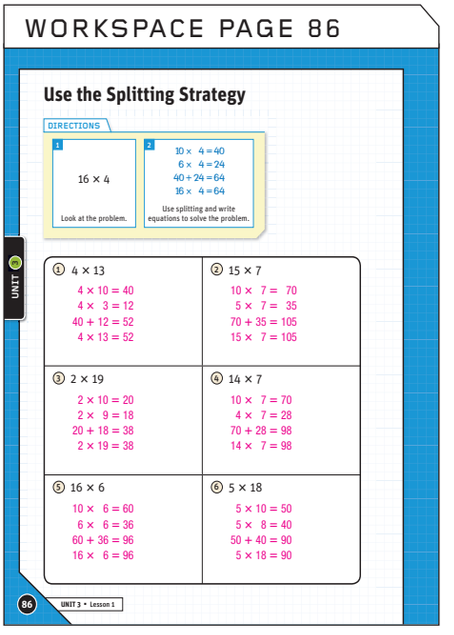
$5 \times 18 =$
$5 \times 10 = 50$
$5 \times 8 = 40$
$50 + 40 = 90$
$5 \times 18 = 90$

PARTNERS

STEP 6 Students practice multiplying using the splitting strategy.

❶ Students complete *WorkSpace* pages 85 and 86.

Now you will complete the other problems on page 85 and then solve the problems on page 86. You may work with your partner.


WORKSPACE PAGE 86

Use the Splitting Strategy

DIRECTIONS

1 16 × 4 — Look at the problem.

2 10 × 4 = 40; 6 × 4 = 24; 40 + 24 = 64; 16 × 4 = 64 — Use splitting and write equations to solve the problem.

① 4 × 13 4 × 10 = 40 4 × 3 = 12 40 + 12 = 52 4 × 13 = 52	② 15 × 7 10 × 7 = 70 5 × 7 = 35 70 + 35 = 105 15 × 7 = 105
③ 2 × 19 2 × 10 = 20 2 × 9 = 18 20 + 18 = 38 2 × 19 = 38	④ 14 × 7 10 × 7 = 70 4 × 7 = 28 70 + 28 = 98 14 × 7 = 98
⑤ 16 × 6 10 × 6 = 60 6 × 6 = 36 60 + 36 = 96 16 × 6 = 96	⑥ 5 × 18 5 × 10 = 50 5 × 8 = 40 50 + 40 = 90 5 × 18 = 90

UNIT 3

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SUPPORTING INSTRUCTION

The order of the factors doesn't matter when using splitting to calculate products. For example, for 4 × 15, or 4 groups of 15, students can use the splitting strategy by thinking: 4 groups of 10 plus 4 groups of 5. This is written $(4 \times 10) + (4 \times 5) = \_\_\_$.

For 15 × 4, or 15 groups of 4, students can use the splitting strategy by thinking 10 groups of 4 plus 5 groups of 4. This is written $(10 \times 4) + (5 \times 4) = \_\_\_$.

Without concrete models, the focus of the problem is on the quantities represented by the numbers themselves.

STOP