

**Do  
The  
Math<sup>®</sup>**

**Heinemann**  
DEDICATED TO TEACHERS<sup>™</sup>

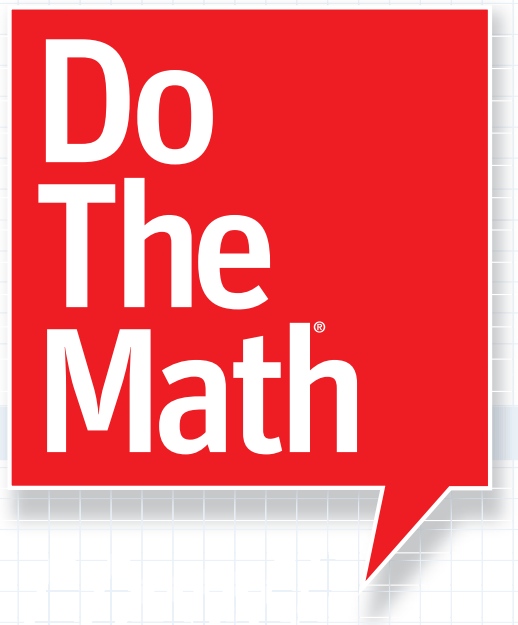
Teacher  
Guide



Multiplication  
& Division

Created By

**Marilyn Burns**



# Multiplication & Division

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## Teacher Guide

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# About the Program



## ➤ Introduction to *Do The Math Now!*

Program Overview From Marilyn Burns .....	iv
Proven Instructional Strategies .....	vi
Program Materials .....	x
Program Structure .....	xii

## ➤ The Lessons

<b>UNIT</b> <b>1</b>	<b>Build a Foundation for Multiplication</b> ..... 1–67
	<b>LESSONS 1–5</b>
	Understanding the Meaning of Multiplication ..... 1
	<b>LESSONS 6–10</b>
	Practicing Multiplication Facts ..... 23
	<b>LESSONS 11–15</b>
	Connecting Multiplication to Arrays, Rectangles, and the Multiplication Chart ..... 45
	 Measure Student Understanding With the End-of-Unit Assessment ..... 67
<b>UNIT</b> <b>2</b>	<b>Develop Multiplication Number Sense</b> ..... 69–135
	<b>LESSONS 1–5</b>
	Identifying Patterns on the Multiplication Chart ..... 69
	<b>LESSONS 6–10</b>
	Using the Strategy of “Splitting” to Multiply ..... 91
	<b>LESSONS 11–15</b>
	Learning to Multiply by Multiples of 10 ..... 113
	 Measure Student Understanding With the End-of-Unit Assessment ..... 135
<b>UNIT</b> <b>3</b>	<b>Use Place-Value Strategies to Multiply</b> ..... 137–201
	<b>LESSONS 1–5</b>
	Using the Distributive Property to Multiply ..... 137
	<b>LESSONS 6–10</b>
	Making Estimates and Figuring Products ..... 157
	<b>LESSONS 11–15</b>
	Solving Multi-Digit Multiplication Problems ..... 179
	 Measure Student Understanding With the End-of-Unit Assessment ..... 201

## UNIT 4

### Connect Multiplication and Division ..... 203–269

#### LESSONS 1–5

Solving Division Grouping Problems ..... 203

#### LESSONS 6–10

Understanding Divisibility by 2, 5, and 10 ..... 225

#### LESSONS 11–15

Calculating Quotients and Remainders ..... 247



Measure Student Understanding With the  
End-of-Unit Assessment ..... 269

## UNIT 5

### Use Place-Value Strategies to Divide ..... 271–337

#### LESSONS 1–5

Solving Division Problems in Contexts ..... 271

#### LESSONS 6–10

Solving Division Problems With Three-Digit Dividends ..... 293

#### LESSONS 11–15

Extending Division to Two-Digit Divisors ..... 315



Measure Student Understanding With the  
End-of-Unit Assessment ..... 337

## ► Additional Resources

Objectives Tracker ..... 339



Beginning-of-Unit and End-of-Unit Assessments ..... 341

Assessment Answer Keys ..... 361

*Do The Math Community News* ..... 366

Teacher Glossary ..... 371

Index ..... 379

Teacher Notes ..... 385

# 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  $12 \times 12$ .
- 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	<i>factor</i>
place value	<i>valor posicional</i>
product	<i>producto</i>

### Academic Vocabulary

ENGLISH	SPANISH
split	<i>separar</i>



## WHOLE GROUP

## STEP 1

**Demonstrate using the splitting strategy to solve  $4 \times 15$ .**

### 1 Introduce the lesson.

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

### 2 Present a problem.

Write the following problem on the board.

$$4 \times 15$$

*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.

$$\begin{array}{l} 4 \times 15 \\ \swarrow \quad \searrow \\ 10 + 5 \end{array} \quad 15 \text{ is 1 ten and 5 ones}$$



## Do The Math

## Community News

### Distribute the copies of the News.

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



**Last Lesson** Students completed Unit 2 and the End-of-Unit Assessment.

**Lesson 1** Students practice multiplying one-digit factors by the factors 11 to 19.

**Next Lesson** Students continue to practice multiplying one-digit factors by the factors 11 to 19.



WHOLE GROUP

## STEP 2

### Introduce math vocabulary.

#### 3 Demonstrate multiplying $4 \times 15$ .

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.

$$\begin{array}{r} 4 \times 15 \\ \swarrow \quad \searrow \\ 10 + 5 \end{array} \quad \begin{array}{l} 15 \text{ is 1 ten and 5 ones} \\ 4 \times 10 = 40 \\ 4 \times 5 = 20 \\ 40 + 20 = 60 \\ 4 \times 15 = 60 \end{array}$$

#### 4 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.”

#### 1 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.

$$18 = \underline{1} \text{ ten} + \underline{8} \text{ ones}$$

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.

#### 2 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.

CONTINUE

# LESSON 1 Splitting numbers into place-value parts to multiply



WHOLE GROUP

STEP 3

**Demonstrate the splitting strategy for  $14 \times 6$ .**

## 1 Present a problem.

Write  $14 \times 6$  on the board.

$$14 \times 6$$

*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.

$$14 \times 6$$

$$10 \times 6 = 60$$

$$4 \times 6 = 24$$

$$60 + 24 = 84$$

$$14 \times 6 = 84$$

## 2 Review the place-value parts of 14.

Point to the equation  $10 \times 6 = 60$ .

*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  $4 \times 6 = 24$ .

*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.**

## 1 Present a problem.

Erase the board and write the following problem.

$$17 \times 5$$

## 2 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?*

*( $10 \times 5 = 50$  and  $7 \times 5 = 35$ )*

$$17 \times 5$$

$$10 \times 5 = 50$$

$$7 \times 5 = 35$$

*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.

$$17 \times 5$$

$$10 \times 5 = 50$$

$$7 \times 5 = 35$$

$$50 + 35 = 85$$

$$17 \times 5 = 85$$

# STEP 5

## Students solve a problem using splitting.

### 1 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

$10 \times 4 = 40$   
 $6 \times 4 = 24$   
 $40 + 24 = 64$   
 $16 \times 4 = 64$

Use splitting and write equations to solve the problem.

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

UNIT 3 • Lesson 1

85

### 2 Students explain how they solved $5 \times 18$ .

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

$$\begin{aligned}
 5 \times 18 &= \\
 5 \times 10 &= 50 \\
 5 \times 8 &= 40 \\
 50 + 40 &= 90 \\
 5 \times 18 &= 90
 \end{aligned}$$

# STEP 6

## Students practice multiplying using the splitting strategy.

### 1 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

$10 \times 4 = 40$   
 $6 \times 4 = 24$   
 $40 + 24 = 64$   
 $16 \times 4 = 64$

Use splitting and write equations to solve the problem.

<div>① <math>4 \times 13</math></div> $4 \times 10 = 40$ $4 \times 3 = 12$ $40 + 12 = 52$ $4 \times 13 = 52$	<div>② <math>15 \times 7</math></div> $10 \times 7 = 70$ $5 \times 7 = 35$ $70 + 35 = 105$ $15 \times 7 = 105$
<div>③ <math>2 \times 19</math></div> $2 \times 10 = 20$ $2 \times 9 = 18$ $20 + 18 = 38$ $2 \times 19 = 38$	<div>④ <math>14 \times 7</math></div> $10 \times 7 = 70$ $4 \times 7 = 28$ $70 + 28 = 98$ $14 \times 7 = 98$
<div>⑤ <math>16 \times 6</math></div> $10 \times 6 = 60$ $6 \times 6 = 36$ $60 + 36 = 96$ $16 \times 6 = 96$	<div>⑥ <math>5 \times 18</math></div> $5 \times 10 = 50$ $5 \times 8 = 40$ $50 + 40 = 90$ $5 \times 18 = 90$

UNIT 3 • Lesson 1

86

## SUPPORTING INSTRUCTION

The order of the factors doesn't matter when using splitting to calculate products. For example, for  $4 \times 15$ , 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  $(4 \times 10) + (4 \times 5) = \underline{\hspace{2cm}}$ .

For  $15 \times 4$ , 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  $(10 \times 4) + (5 \times 4) = \underline{\hspace{2cm}}$ .

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

**STOP**