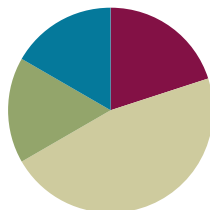


## Lesson 7

**Objective:** Use place value disks to represent two-digit by one-digit multiplication.

### Suggested Lesson Structure

■ Fluency Practice	(12 minutes)
■ Application Problem	(10 minutes)
■ Concept Development	(28 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (12 minutes)

- Sprint: Multiply Multiples of 10, 100, and 1,000 **4.NBT.1** (9 minutes)
- Multiply Mentally **4.NBT.4** (3 minutes)

### Sprint: Multiply Multiples of 10, 100, and 1,000 (9 minutes)

Materials: (S) Multiply Multiples of 10, 100, and 1,000 Sprint

Note: This Sprint will reinforce concepts taught and reviewed in G4–M3–Lessons 1–6.

### Multiply Mentally (3 minutes)

Materials: (S) Personal white boards

Notes: Reviewing these mental multiplication strategies will provide a foundation for students to succeed during the Concept Development.

T: (Write  $3 \times 2 = \underline{\quad}$ .) Say the multiplication sentence.

S:  $3 \times 2 = 6$ .

T: (Write  $3 \times 2 = 6$ . Below it, write  $40 \times 2 = \underline{\quad}$ .) Say the multiplication sentence.

S:  $40 \times 2 = 80$ .

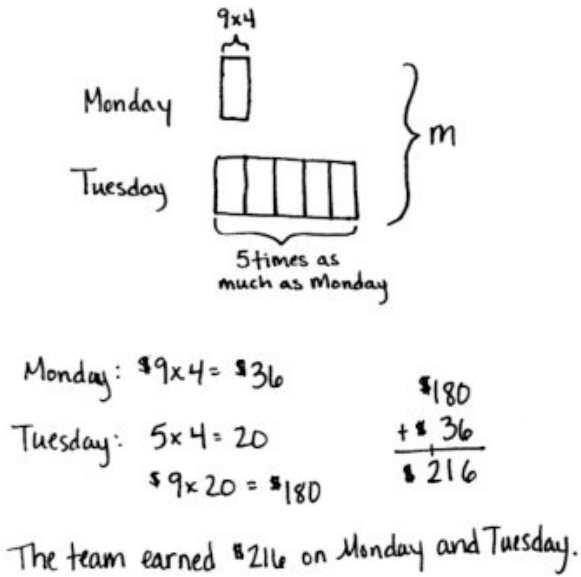
T: (Write  $40 \times 2 = 80$ . Below it, write  $43 \times 2 = \underline{\quad}$ .) Say the multiplication sentence.

S:  $43 \times 2 = 86$ .

Repeat process for the following possible sequence:  $32 \times 3$ ,  $21 \times 4$ , and  $24 \times 4$ , directing students to follow the format demonstrated for them.

**Application Problem (10 minutes)**

The basketball team is selling t-shirts for \$9 each. On Monday, they sell 4 t-shirts. On Tuesday, they sell 5 times as many t-shirts as on Monday. How much money did the team earn altogether on Monday and Tuesday?



Monday:  $9 \times 4 = 36$

Tuesday:  $5 \times 4 = 20$

$9 \times 20 = 180$

Monday:  $\$36$

Tuesday:  $\$180$

$\$180$   
 $+ \$36$   
 $\$216$

The team earned \$216 on Monday and Tuesday.



**NOTES ON MULTIPLE MEANS OF ENGAGEMENT:**

Extend the Application Problem for students above grade level with open-ended question, such as the following:

- What might be an explanation for the large difference in t-shirt sales between Monday and Tuesday?
- Based on your thought, what might be a strategy for generating the most money from t-shirt sales?
- Given the increase in t-shirts sold, should the team increase or decrease the price of the shirt? Explain your reasoning.

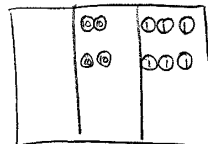
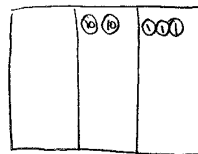
Note: This is a multi-step word problem reviewing multiplying by multiples of 10 from G4–M3–Lesson 6, including multiplicative comparison.

**Concept Development (28 minutes)**

Materials: (S) Personal white boards, place value charts

**Problem 1: Represent  $2 \times 23$  with disks, writing a matching equation and recording the partial products vertically.**

- T: Use your place value chart and draw disks to represent 23.
- T: Draw disks on your place value chart to show 1 more group of 23. What is the total value in the ones?
- S:  $2 \times 3 \text{ ones} = 6 \text{ ones} = 6$ .
- T: Write  $2 \times 3 \text{ ones}$  under the ones column. Let's record  $2 \times 23$  vertically.
- T: We record the total number for the ones below, just like in addition. (Record the 6 ones as shown to the right.)
- T: Let's look at the tens. What is the total value in the tens?
- S:  $2 \times 2 \text{ tens} = 4 \text{ tens} = 40$



$2 \times 2 \text{ tens} + 2 \times 3 \text{ ones}$   
 $\downarrow \quad \downarrow$   
 $4 \text{ tens} + 6 \text{ ones} = 46$

$$\begin{array}{r} 23 \\ \times 2 \\ \hline 6 \leftarrow 2 \times 3 \text{ ones} \\ + 40 \leftarrow 2 \times 2 \text{ tens} \\ \hline 46 \end{array}$$

- T: Write  $2 \times 2$  tens under the tens column. Let's represent our answer in the equation. We write 40 to represent the value of the tens.
- T: What is the total value represented by the disks?
- S: The total value is 46 because  $4 \text{ tens} + 6 \text{ ones} = 46$ .
- T: Notice that when we add the values that we wrote below the line that they add to 46, the product!

Repeat with  $3 \times 23$ .

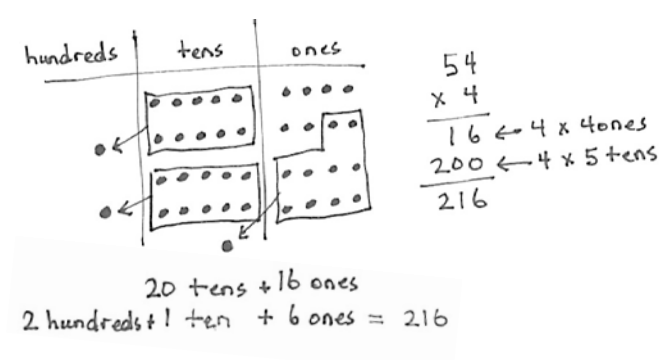
**Problem 2: Model and solve  $4 \times 54$ .**

- T: Draw disks to represent 54 on your place value chart. What is 54 in unit form?
- S: 5 tens 4 ones.
- T: Draw 3 more groups of 54 on your chart and then write the expression  $4 \times 54$  vertically on your board.
- T: What is the value of the ones now?
- S:  $4 \times 4 \text{ ones} = 16 \text{ ones}$ .
- T: Record the value of the ones. What is the value of the tens?
- S:  $4 \times 5 \text{ tens} = 20 \text{ tens}$ .
- T: Record the value of the tens.
- T: Add up the **partial products** you recorded. What is the sum?
- S: 216.
- T: Let's look at our place value chart to confirm.
- T: Can we change to make larger units?
- S: Yes, we can change 10 ones for 1 ten and 10 tens for 1 hundred twice.
- T: Show me. (Students change 10 smaller units for 1 larger.)
- T: What value is represented on the place value chart?
- S: 2 hundreds, 1 ten, and 6 ones.  
That's 216!

MP.4

**NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:**

Some learners may have difficulty drawing, tracking, and/or organizing number disks to represent  $4 \times 54$ . A similar demonstration of renaming in the tens and ones place can be shown through  $3 \times 34$ . Alternatively, students can model numerals, i.e., writing 4 instead of 4 ones disks.



Repeat with  $5 \times 42$ .

**Problem Set (10 minutes)**

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

### Student Debrief (10 minutes)

**Lesson Objective:** Use place value disks to represent two-digit by one-digit multiplication.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- What pattern do you notice in the answers to Problems 1(a), 1(b), 1(c), and 1(d)?
- Describe the renaming you had to do when solving Problem 2(a). How is it different from the renaming you had to do when solving Problem 2(b)?
- Why did some of the problems require you to use a hundreds column in the place value chart, but others did not?
- When you start solving one of these problems, is there a way to tell if you are going to need to change 10 tens to 1 hundred or 10 ones to 1 ten?
- How did the Application Problem connect to today’s lesson?
  - If we found the total number of shirts sold first (24) and then multiplied to find the total amount of money, what would our multiplication problem have been? ( $24 \times 9$ .)
  - What do the partial products for  $24 \times 9$  represent in the context of the word problem?
- Talk to your partner about which method you prefer: writing the partial products or using a place value chart with disks? Is one of these methods easier for you to understand? Does one of them help you solve the problem faster?

Handwritten student work for problems 1(a), 1(b), and 1(c). The student's name is Jack. Problem 1(a) shows  $1 \times 43$  with a place value chart (tens, ones) and a vertical multiplication problem:  $43 \times 1 = 43$ . Problem 1(b) shows  $2 \times 43$  with a place value chart and a vertical multiplication problem:  $43 \times 2 = 86$ . Problem 1(c) shows  $3 \times 43$  with a place value chart including a hundreds column and a vertical multiplication problem:  $43 \times 3 = 129$ .

Handwritten student work for problems 1(d), 2(a), 2(b), and 2(c). Problem 1(d) shows  $4 \times 43$  with a place value chart including a hundreds column and a vertical multiplication problem:  $43 \times 4 = 172$ . Problem 2(a) shows  $2 \times 36$  with a place value chart and a vertical multiplication problem:  $36 \times 2 = 72$ . Problem 2(b) shows  $3 \times 61$  with a place value chart and a vertical multiplication problem:  $61 \times 3 = 183$ . Problem 2(c) shows  $4 \times 84$  with a place value chart including a hundreds column and a vertical multiplication problem:  $84 \times 4 = 336$ .

**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Multiply.

1	$3 \times 2 =$		23	$7 \times 5 =$	
2	$30 \times 2 =$		24	$700 \times 5 =$	
3	$300 \times 2 =$		25	$8 \times 3 =$	
4	$3000 \times 2 =$		26	$80 \times 3 =$	
5	$2 \times 3000 =$		27	$9 \times 4 =$	
6	$2 \times 4 =$		28	$9000 \times 4 =$	
7	$2 \times 40 =$		29	$7 \times 6 =$	
8	$2 \times 400 =$		30	$7 \times 600 =$	
9	$2 \times 4000 =$		31	$8 \times 9 =$	
10	$3 \times 3 =$		32	$8 \times 90 =$	
11	$30 \times 3 =$		33	$6 \times 9 =$	
12	$300 \times 3 =$		34	$6 \times 9000 =$	
13	$3000 \times 3 =$		35	$900 \times 9 =$	
14	$4000 \times 3 =$		36	$8000 \times 8 =$	
15	$400 \times 3 =$		37	$7 \times 70 =$	
16	$40 \times 3 =$		38	$6 \times 600 =$	
17	$5 \times 3 =$		39	$800 \times 7 =$	
18	$500 \times 3 =$		40	$7 \times 9000 =$	
19	$7 \times 2 =$		41	$200 \times 5 =$	
20	$70 \times 2 =$		42	$5 \times 60 =$	
21	$4 \times 4 =$		43	$4000 \times 5 =$	
22	$4000 \times 4 =$		44	$800 \times 5 =$	

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**B** Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

Multiply.

1	$4 \times 2 =$		23	$9 \times 5 =$	
2	$40 \times 2 =$		24	$900 \times 5 =$	
3	$400 \times 2 =$		25	$8 \times 4 =$	
4	$4000 \times 2 =$		26	$80 \times 4 =$	
5	$2 \times 4000 =$		27	$9 \times 3 =$	
6	$3 \times 3 =$		28	$9000 \times 3 =$	
7	$3 \times 30 =$		29	$6 \times 7 =$	
8	$3 \times 300 =$		30	$6 \times 700 =$	
9	$3 \times 3000 =$		31	$8 \times 7 =$	
10	$2 \times 3 =$		32	$8 \times 70 =$	
11	$20 \times 3 =$		33	$9 \times 6 =$	
12	$200 \times 3 =$		34	$9 \times 6000 =$	
13	$2000 \times 3 =$		35	$800 \times 8 =$	
14	$3000 \times 4 =$		36	$9000 \times 9 =$	
15	$300 \times 4 =$		37	$7 \times 700 =$	
16	$30 \times 4 =$		38	$6 \times 60 =$	
17	$3 \times 5 =$		39	$700 \times 8 =$	
18	$30 \times 5 =$		40	$9 \times 7000 =$	
19	$6 \times 2 =$		41	$20 \times 5 =$	
20	$60 \times 2 =$		42	$5 \times 600 =$	
21	$4 \times 4 =$		43	$400 \times 5 =$	
22	$400 \times 4 =$		44	$8000 \times 5 =$	

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Name \_\_\_\_\_

Date \_\_\_\_\_

1. Represent the following expressions with disks, regrouping as necessary, writing a matching expression, and recording the partial products vertically as shown below.

a.  $1 \times 43$

tens	ones
● ● ● ●	● ● ●

$1 \times 4 \text{ tens} + 1 \times 3 \text{ ones}$

$$\begin{array}{r}
 43 \\
 \times 1 \\
 \hline
 3 \rightarrow 1 \times 3 \text{ ones} \\
 40 \rightarrow 1 \times 4 \text{ tens} \\
 \hline
 43
 \end{array}$$

b.  $2 \times 43$

tens	ones

c.  $3 \times 43$

hundreds	tens	ones

d.  $4 \times 43$

hundreds	tens	ones

2. Represent the following expressions with disks, regrouping as necessary. To the right, record the partial products vertically.

a.  $2 \times 36$

b.  $3 \times 61$

c.  $4 \times 84$

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Represent the following expressions with disks, regrouping as necessary. To the right, record the partial products vertically.

a.  $6 \times 41$

b.  $7 \times 31$

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Represent the following expressions with disks, regrouping as necessary, writing a matching expression, and recording the partial products vertically.

a.  $3 \times 24$

b.  $3 \times 42$

c.  $4 \times 34$

2. Represent the following expressions with disks, regrouping as necessary. To the right, record the partial products vertically.
- a.  $4 \times 27$
- b.  $5 \times 42$
3. Cindy says she found a shortcut for doing multiplication problems. When she multiplies  $3 \times 24$ , she says, “ $3 \times 4$  is 12 ones, or 1 ten and 2 ones. Then there’s just 2 tens left in 24, so add it up and you get 3 tens and 2 ones.” Do you think Cindy’s shortcut works? Explain your thinking in words and justify your response using a model or partial products.