Student Guide

Questions 1–13 (SG pp. 280–282)

1.* Answers will vary. One possible response for 26×4: double 26 is 52 and double 52 is 104.

2.* No, some strategies work better for some students than for others.

3.* No, some strategies work better for some problems than for others. Using money makes sense for 26×4 because I can think about the problem as 25×4. 38×10 cannot be thought of with quarters, maybe dimes. But simply multiplying by 10 is a better strategy.

4.* Both methods break 22 into 2 tens (or 20) and 2 ones. The 100 comes from 5×20, the 10 from 5×2. The answer is $100 + 10 = 110$.

5. A.

	20	7	
7	$7 \times 20 = 140$	$7 \times 7 = 49$	$140 + 49 = 189$

$$\begin{array}{r} 27 \\ \times\ 7 \\ \hline \end{array} \quad = 20 + 7 \quad \begin{array}{r} \\ \times\ 7 \\ \hline \end{array}$$

$$140 + 49 = 189$$

B.

	30	8	
8	$8 \times 30 = 240$	$8 \times 8 = 64$	$240 + 64 = 304$

$$\begin{array}{r} 38 \\ \times\ 8 \\ \hline \end{array} \quad = 30 + 8 \quad \begin{array}{r} \\ \times\ 8 \\ \hline \end{array}$$

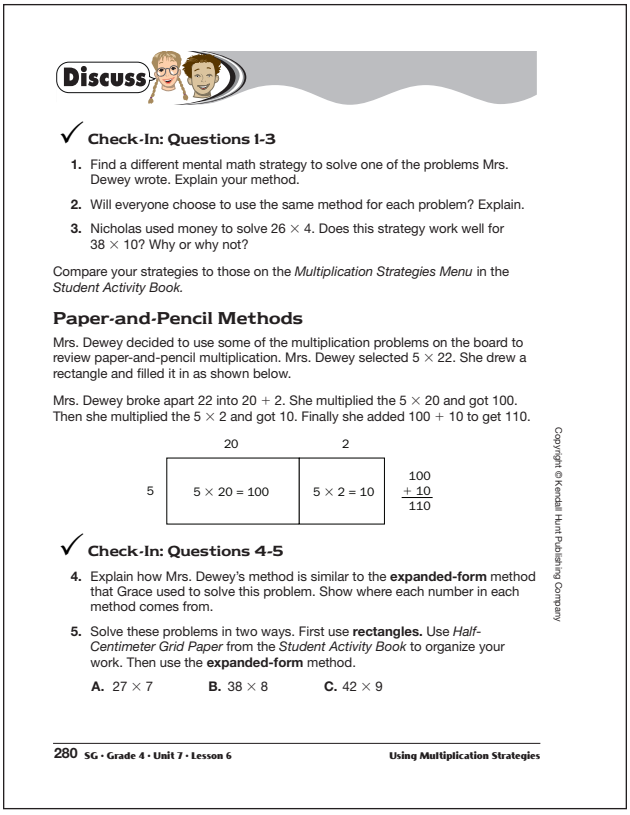
$$240 + 64 = 304$$

C.

	40	2	
9	$9 \times 40 = 360$	$9 \times 2 = 18$	$360 + 18 = 378$

$$\begin{array}{r} 42 \\ \times\ 9 \\ \hline \end{array} \quad = 40 + 2 \quad \begin{array}{r} \\ \times\ 9 \\ \hline \end{array}$$

$$360 + 18 = 378$$



Discuss

✓ **Check-In: Questions 1-3**

1. Find a different mental math strategy to solve one of the problems Mrs. Dewey wrote. Explain your method.
2. Will everyone choose to use the same method for each problem? Explain.
3. Nicholas used money to solve 26×4. Does this strategy work well for 38×10? Why or why not?

Compare your strategies to those on the *Multiplication Strategies Menu* in the *Student Activity Book*.

Paper-and-Pencil Methods

Mrs. Dewey decided to use some of the multiplication problems on the board to review paper-and-pencil multiplication. Mrs. Dewey selected 5×22. She drew a rectangle and filled it in as shown below.

Mrs. Dewey broke apart 22 into $20 + 2$. She multiplied the 5×20 and got 100. Then she multiplied the 5×2 and got 10. Finally she added $100 + 10$ to get 110.

	20	2	
5	$5 \times 20 = 100$	$5 \times 2 = 10$	$100 + 10 = 110$

✓ **Check-In: Questions 4-5**

4. Explain how Mrs. Dewey's method is similar to the **expanded-form** method that Grace used to solve this problem. Show where each number in each method comes from.
5. Solve these problems in two ways. First use **rectangles.** Use *Half-Centimeter Grid Paper* from the *Student Activity Book* to organize your work. Then use the **expanded-form** method.

A. 27×7 **B.** 38×8 **C.** 42×9

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***Answers and/or discussion are included in the lesson.**

Mrs. Dewey said, "Who can show us other paper-and-pencil ways to multiply?" Again, many hands went up. Mrs. Dewey wrote 87 × 6 on the board. Jerome said he could solve the problem using the **all-partials** method. Ana said she could solve it using the **compact** method.

Here is Jerome's and Ana's work.

$$\begin{array}{r} 87 \\ \times\ 6 \\ \hline 480 \\ +\ 42 \\ \hline 522 \end{array} \begin{array}{l} \\ \\ (6 \times 80) \\ (6 \times 7) \\ \\ \end{array} \qquad \begin{array}{r} {\scriptstyle 4}\ \ \\ 87 \\ \times\ 6 \\ \hline 522 \end{array}$$

Jerome **(all-partials)** Ana **(compact)**

6. Why did Jerome multiply 6 × 80 instead of 6 × 8? How is the all-partials method like the expanded-form method?

7. Why did Ana write a small 4 above the 8 when using the compact method? How did she use the 4 to get her final answer?

8. Solve these problems in two ways. Use the all-partials and compact methods.

A. 93 × 6 **B.** 67 × 4 **C.** 7 × 42

Tanya noticed that when using the all-partials method, Jerome started by multiplying 6 times the tens, then 6 times the ones in 87. She wondered if the order mattered. Tanya tested her idea. She solved the problem this way:

$$\begin{array}{r} 87 \\ \times\ 6 \\ \hline 42 \\ +\ 480 \\ \hline 522 \end{array} \begin{array}{l} \\ \\ (6 \times 7) \\ (6 \times 80) \\ \\ \end{array}$$

9. A. What did Tanya discover about the order for this problem?

B. Solve Question 8C using the all-partials method in a different order. Does the order matter?

Fill in the missing numbers in the multiplication problems below. Make sure you can explain what to multiply to get each partial product.

10.
$$\begin{array}{r} 62 \\ \times\ 7 \\ \hline 14 \\ \square \\ \hline 434 \end{array} \begin{array}{l} \\ (7 \times 2) \\ (7 \times 60) \\ \\ \end{array}$$

11.
$$\begin{array}{r} 89 \\ \times\ 3 \\ \hline \square \\ 240 \\ \hline 267 \end{array}$$

12.
$$\begin{array}{r} 23 \\ \times\ 8 \\ \hline 24 \\ \square \\ \hline 184 \end{array}$$

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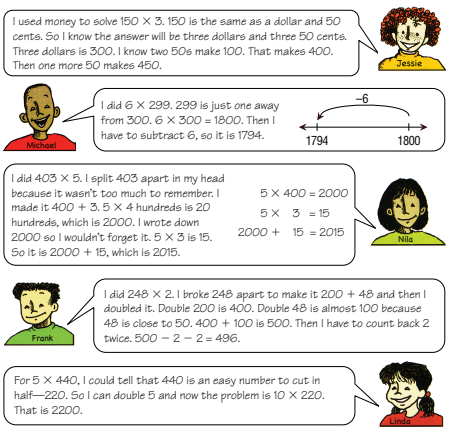
Strategies for Larger Numbers

Mrs. Dewey then asked her class about numbers larger than 100. She said, "Do you think you can multiply a number that is larger than 100 by using the same strategies?"

She wrote these problems on the board for her students and asked them to solve the problems using whatever strategy they chose.

150 × 3	6 × 299	403 × 5
248 × 2	140 × 10	5 × 440

Here is what some of her students had to say.



13. Solve these problems using any strategy you choose:

A. 601 × 4 **B.** 666 × 5 **C.** 198 × 7 **D.** 643 × 10

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6. Jerome broke 87 into parts, 80 and 7, and multiplied each part separately. He multiplied 6 × 80 because the 8 in 87 means 80, not 8. In both methods, the tens and ones are multiplied separately.

7. The small 4 stands for the 4 tens in 42, which Ana got when she multiplied 6 × 7. She added 4 tens to 48 tens which was her answer to 6 × 80.

8. A.
$$\begin{array}{r} 93 \\ \times\ 6 \\ \hline 540 \\ 18 \\ \hline 558 \end{array} \qquad \begin{array}{r} {\scriptstyle 1}\ \ \\ 93 \\ \times\ 6 \\ \hline 558 \end{array}$$

B.
$$\begin{array}{r} 67 \\ \times\ 4 \\ \hline 240 \\ 28 \\ \hline 268 \end{array} \qquad \begin{array}{r} {\scriptstyle 2}\ \ \\ 67 \\ \times\ 4 \\ \hline 268 \end{array}$$

C.
$$\begin{array}{r} 42 \\ \times\ 7 \\ \hline 280 \\ 14 \\ \hline 294 \end{array} \qquad \begin{array}{r} {\scriptstyle 1}\ \ \\ 42 \\ \times\ 7 \\ \hline 294 \end{array}$$

9. A. The order doesn't matter in the all-partials method in this problem.

B. The order will not matter.

10. 420

11. 27

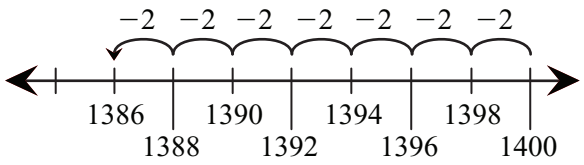
12. 160

13. Responses will vary. Possible responses are:

A.* Partition 601 into 600 + 1. 4 × 600 is 2400; 4 × 1 = 4; 2400 + 4 = 2404.

B.* Halve 666 and double 5. Half of 666 is 333. 333 × 10 is 3330.

C.* 198 is 2 less than 200; 200 × 7 = 1400; subtract 2 seven times to get 1386.



D.* 643 × 10 = 6430

***Answers and/or discussion are included in the lesson.**

Student Guide

Homework

Questions 1–5 (SG p. 283)

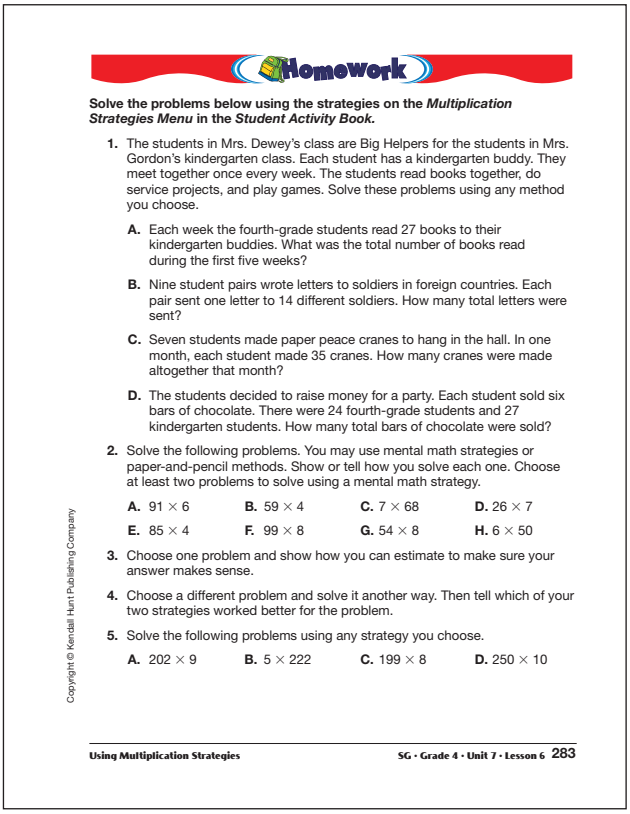
1. **A.** 135 books
   B. 126 letters
   C. 245 cranes
   D. 24 + 27 = 51 students
   51 × 6 = 306 chocolate bars
2. Methods and strategies will vary.
   A. 546 **B.** 236 **C.** 476 **D.** 182
   E. 340 **F.** 792 **G.** 432 **H.** 300
3. Estimation strategies will vary. Possible response for Question B: 60 × 4 = 240; 236 is close.
4. Answers will vary.
5. Strategies will vary. Possible strategies:
   A. 1818; 200 × 9 = 1800 and 2 × 9 = 18; 1800 + 18 = 1818.
   B. 1110; Half of 222 is 111 and 10 × 111 is 1110.
   C. 1592; 200 × 8 = 1600; 1600 − 8 = 1592.
   D. 250 × 10 = 2500

Teacher Guide

Two-Digit Multiplication Quiz

Questions 1–3 (TG)

1. Strategies and methods will vary. One possible method is given for each.
   A.
   $$\begin{array}{r} 63 \\ \times\ 7 \\ \hline 420 \\ 21 \\ \hline 441 \end{array}$$
   B. 6 × 50 = 300
   300 − 6 = 294
   C. Possible estimation strategy is: 6 × 50 = 300, 294 is close to 300. 294 is a reasonable solution.
2. An efficient strategy would be to multiply 100 × 3 and then subtract 9 to get 291. While reading student explanations, look for evidence that they thought about the numbers in the problem before choosing a strategy.
3. Ike started using the expanded form.
   $$\begin{array}{r} 67 \\ \times\ 3 \\ \hline \end{array} \quad \begin{array}{r} = 60 + 7 \\ \times\ 3 \\ \hline \end{array}$$
   180 + 21 = 201



Homework

Solve the problems below using the strategies on the *Multiplication Strategies Menu* in the *Student Activity Book*.

1. The students in Mrs. Dewey's class are Big Helpers for the students in Mrs. Gordon's kindergarten class. Each student has a kindergarten buddy. They meet together once every week. The students read books together, do service projects, and play games. Solve these problems using any method you choose.
   A. Each week the fourth-grade students read 27 books to their kindergarten buddies. What was the total number of books read during the first five weeks?
   B. Nine student pairs wrote letters to soldiers in foreign countries. Each pair sent one letter to 14 different soldiers. How many total letters were sent?
   C. Seven students made paper peace cranes to hang in the hall. In one month, each student made 35 cranes. How many cranes were made altogether that month?
   D. The students decided to raise money for a party. Each student sold six bars of chocolate. There were 24 fourth-grade students and 27 kindergarten students. How many total bars of chocolate were sold?
2. Solve the following problems. You may use mental math strategies or paper-and-pencil methods. Show or tell how you solve each one. Choose at least two problems to solve using a mental math strategy.
   A. 91 × 6 **B.** 59 × 4 **C.** 7 × 68 **D.** 26 × 7
   E. 85 × 4 **F.** 99 × 8 **G.** 54 × 8 **H.** 6 × 50
3. Choose one problem and show how you can estimate to make sure your answer makes sense.
4. Choose a different problem and solve it another way. Then tell which of your two strategies worked better for the problem.
5. Solve the following problems using any strategy you choose.
   A. 202 × 9 **B.** 5 × 222 **C.** 199 × 8 **D.** 250 × 10

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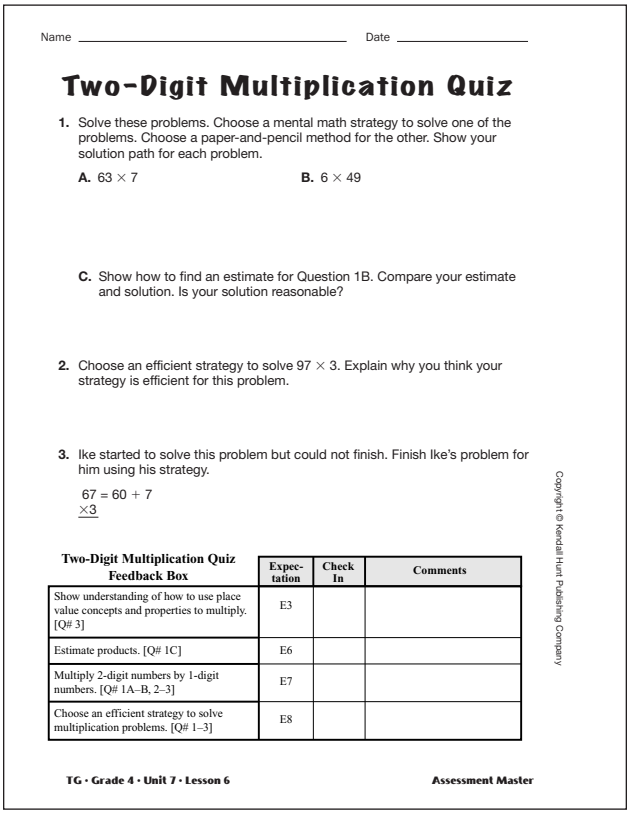

Name _____ Date _____

Two-Digit Multiplication Quiz

1. Solve these problems. Choose a mental math strategy to solve one of the problems. Choose a paper-and-pencil method for the other. Show your solution path for each problem.
   A. 63 × 7 **B.** 6 × 49
   C. Show how to find an estimate for Question 1B. Compare your estimate and solution. Is your solution reasonable?
2. Choose an efficient strategy to solve 97 × 3. Explain why you think your strategy is efficient for this problem.
3. Ike started to solve this problem but could not finish. Finish Ike's problem for him using his strategy.
   67 = 60 + 7
   ×3

Two-Digit Multiplication Quiz Feedback Box	Expectation	Check In	Comments
Show understanding of how to use place value concepts and properties to multiply. [Q# 3]	E3		
Estimate products. [Q# 1C]	E6		
Multiply 2-digit numbers by 1-digit numbers. [Q# 1A–B, 2–3]	E7		
Choose an efficient strategy to solve multiplication problems. [Q# 1–3]	E8		

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Teacher Guide