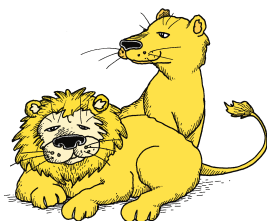


### Multiplication at the Zoo

Mrs. Dewey's class is going on a field trip to the zoo. She asks questions while the students are looking at the animals. The students have note pads with them, but sometimes it is hard to write.

- Solve the following problems as if you were on the field trip. Solve them in your head or use a few quick notes.
  - Think about ways that will make the multiplication easy to do like doubling or breaking numbers apart.
  - Be prepared to show what you wrote down and to tell what you were thinking.
1. The Safari Tour takes people in a mini-bus on a tour of the zoo. The bus holds 26 people. It leaves three times each day. How many people can take the tour in one day?
  2. There are five sea lions at the zoo. The class watched the zookeeper feed them. The zookeeper told the class that she measured out 32 pounds of fish for each sea lion. How many pounds of fish did she feed the sea lions altogether?
  3. Jerome bought 7 pencils decorated with zoo animals at the gift shop. Each pencil cost 49¢. How much did he spend on pencils?
  4. Each lion at the zoo eats 8 to 9 pounds of meat a day. About how much meat does a zoo lion eat in a month?



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### Student Guide

### Multiplication at the Zoo

#### Questions 1–15 (SG p. 154–157)

Strategies will vary.

- 1.\* 78 people; Possible strategy: I thought, “ $26 = 25 + 1$ .  $3 \times 25$  is like 3 quarters which is 75¢.  $3 \times 1 = 3$ . I wrote down:  $75 + 3 = 78$ .”
- 2.\* 160 pounds of fish; Possible strategy: I thought, “ $32 = 30 + 2$ .  $5 \times 30 = 150$ .  $5 \times 2 = 10$ .  $150 + 10 = 160$  pounds.”
3. \$3.43; Possible strategy: I thought, “49 is close to 50”  $7 \times 50¢ = \$3.50$ . Subtract 7¢ and you get \$3.43.”
4. About 250 pounds of meat a month; Possible strategy: “I can’t get an exact answer because the number of days in a month changes and so does the number of pounds a lion eats in a day. I used 30 days in a month.  $8 \times 30 = 240$  and  $9 \times 30 = 270$ . So, I estimate between 240 and 270 pounds.”
5. A.\*176 (See Figure 6 in Lesson Guide 8.)  
 B. 246  
 C. 423  
 D. 130
6. A. Nila broke apart 28 into 20 and 8. She showed it as  $20 + 8$ .  
 B. She multiplied both 20 and 8 by 7 to get 140 and 56.  
 C. She added 140 and 56 to get 196.
7. A. Sara broke apart 28 into 20 and 8. She showed it as a rectangle with width 7 and length 28. She broke the rectangle into two parts:  $7 \times 20$  and  $7 \times 8$ .  
 B. She calculated the area of each section,  $7 \times 20 = 140$  and  $7 \times 8 = 56$ .  
 C. She added the two areas,  $140 + 56 = 196$ .
8. A. Both broke apart 28 into 20 and 8, and multiplied each part by 7.  
 B. Both broke apart 28 the same way, but Sara showed hers by drawing a picture.

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Jerome and Tanya described how they solved the problem  $28 \times 7$ :

Jerome said, “I changed the problem. It is easier to multiply by 25 than by 28—I think about money. 25 is like a quarter. I know 7 quarters are worth \$1.75, so  $25 \times 7 = 175$ . Then I found  $3 \times 7 = 21$  and added that. I got  $175 + 21 = 196$ .”



Tanya said, “I broke 30 apart into  $28 + 2$ . So I changed the problem to  $30 \times 7$ , since that is easier. Then I subtracted  $2 \times 7$ . I multiplied  $30 \times 7 = 210$  and  $2 \times 7 = 14$  in my head. Then I wrote  $210 - 14 = 196$ .”

5. Find exact answers for the problems below. Use methods similar to Jerome’s and Tanya’s. Be ready to show or tell how you solve each one.
- A.  $8 \times 22$     B.  $41 \times 6$     C.  $9 \times 47$     D.  $26 \times 5$

### Discuss



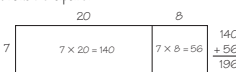
Nila and Sara wanted to solve  $28 \times 7$  using paper and pencil. They broke 28 into tens and ones.

Nila said, “I used expanded form. This is what I wrote.”

$$\begin{array}{r} 28 = 20 + 8 \\ \times 7 \quad \quad \times 7 \\ \hline 140 + 56 = 196 \end{array}$$



Sara said, “I used expanded form like Nila. I drew a picture to show how I broke 28 apart.”



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

9. A.  $46 = 40 + 6$   

$$\begin{array}{r} \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} \times 8 \\ \hline 320 + 48 = 368 \end{array}$$

B.  $37 = 30 + 7$   

$$\begin{array}{r} \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} \times 6 \\ \hline 180 + 42 = 222 \end{array}$$

C.  $84 = 80 + 4$   

$$\begin{array}{r} \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} \times 7 \\ \hline 560 + 28 = 588 \end{array}$$

10. A. 
$$\begin{array}{|c|c|} \hline 90 & 3 \\ \hline \end{array}$$
  

$$\begin{array}{|c|c|} \hline 6 & \begin{array}{l} 6 \times 90 = 540 \\ 6 + 3 = 18 \end{array} \\ \hline \end{array}$$

$93 \times 6 = 540 + 18 = 558$

B. 
$$\begin{array}{|c|c|} \hline 70 & 7 \\ \hline \end{array}$$
  

$$\begin{array}{|c|c|} \hline 7 & \begin{array}{l} 7 \times 70 = 490 \\ 7 \times 7 = 49 \end{array} \\ \hline \end{array}$$

$77 \times 7 = 490 + 49 = 539$

C. 
$$\begin{array}{|c|c|} \hline 30 & 4 \\ \hline \end{array}$$
  

$$\begin{array}{|c|c|} \hline 8 & \begin{array}{l} 8 \times 30 = 240 \\ 8 \times 4 = 32 \end{array} \\ \hline \end{array}$$

$34 \times 8 = 240 + 32 = 272$

11. Strategies will vary.

- A. 126
- B. 220
- C. 602
- D. 156
- E. 468
- F. 81

12. Responses will vary. Possible strategy for 11A:

I broke apart 21 into 20 and 1.  
 $6 \times 20 = 120$ , and  $6 \times 1 = 6$ ,  $120 + 6 = 126$ .

Possible strategy for 11D:  $40 \times 4 = 160$ ;  
 $160 - 4 = 156$

13.  $124; 62 + 62 = 124$

$124 + 124 = 248$

6. Look at Nila's solution.  
 A. How did Nila break apart 28? How did she show that?  
 B. What did Nila do next?  
 C. What was Nila's last step?



7. Look at Sara's solution.  
 A. How did Sara break apart 28? How did she show that?  
 B. What did Sara do next?  
 C. What was Sara's last step?



8. A. How are Nila and Sara's solution alike?  
 B. How are they different?

9. Solve the following problems using Nila's expanded form method.  
 A.  $46 \times 8$       B.  $37 \times 6$       C.  $84 \times 7$

10. Use Sara's rectangle method to solve the following:  
 A.  $93 \times 6$       B.  $77 \times 7$       C.  $34 \times 8$

Solve the following problems. Find exact answers. Be prepared to show your strategy.

- Which problems can you solve in your head by breaking numbers apart and putting them back together?
- Which problems can you solve by making a few quick notes?
- With which problems do you need to use paper-and-pencil?



11. A.  $21 \times 6$       B.  $44 \times 5$       C.  $86 \times 7$   
 D.  $39 \times 4$       E.  $52 \times 9$       F.  $27 \times 3$

12. Choose a problem from Question 11 that you can solve using mental math or a few quick notes. Explain your thinking.

13. Here is how Luis solved  $5 \times 35$ . Use doubles to solve  $4 \times 62$ .

I used doubles.  
 $35 + 35 = 70$   
 $70 + 70 = 140$   
 $140 + 35 = 175$   
 $5 \times 35 = 175$

✓ **Check-In: Questions 14-15**

14. Solve the following problems.
- Decide whether you need an exact answer or an estimate.
  - Then, decide whether you can solve it in your head or whether you will need paper and pencil. If you use paper and pencil, show your work.
  - If you use mental math, be ready to explain how you solved it.
- A. There are 22 students in Mrs. Dewey's class. Ming plans to bring cookies to class on his birthday. He wants to be sure that everyone gets the same number of cookies. If he brings five cookies for each student, how many should he bring?
- B. Nicholas is laying tile in a hallway. The hall will have 7 rows of tiles with 86 tiles in each row. How many tiles do they need?
- C. Maya is buying school supplies. She has \$3.00. Erasers are 58¢ each. Does she have enough money to buy 5 erasers? Show or tell how you know. 
- D. Maya buys 4 pads of paper that cost 99¢ each. If she pays with a \$5 bill how much change will she receive? 
15. Choose a problem from Question 14 that you can solve using mental math. Show or tell what was "in your head."

Complete the *What Were They Thinking* pages in your *Student Activity Book* for more multiplication practice.

 **Homework**

For the problems below, do as much work in your head as you can. Use methods like Jerome's, Tanya's, Nila's, Sara's, or one of your own.

1. At Raye School, there are 3 fourth-grade classes. If there are 26 students in each class, how many fourth-graders are there at the school?
2. The parking lot at a shopping center has five rows for cars to park. Each row has spaces for 98 cars. How many cars can park in the lot?
3. January, March, May, and July each have 31 days. How many days are in all four months together?
4. Between three and five students in Mrs. Dewey's class are absent each day in January and February. Estimate the total number of absences in the two months.
5. There are 52 cards in one deck of cards. How many cards are in six decks?

**Check-In: Questions 14–15 (SG p. 157)**

14. A. 110  
 B. 602  
 C. Yes; Possible estimation strategy:  $5 \times 60¢ = 3.00$ . Since 58¢ is less than 60¢, she will have enough money.  
 D. \$1.04.
15. Possible strategies for 14A and 14D above.  
 14A. Possible strategy:  $22 \times 5 = 20 \times 5 + 2 \times 5 = 100 + 10 = 110$ .  
 14D. Possible strategy:  $4 \times 100 = 400$ , so  $4 \times 99¢ = 400¢ - 4¢ = \$3.96$ .  
 Counting up:  $\$3.96 \times (4¢) = \$4$ .  
 $\$4 + (\$1) = \$5$ .  
 So, she will get \$1.04 in change.

**Homework (SG p. 157)**

1. 78 fourth graders
2. 490 cars
3. 124 days
4. 120 absences; estimates will vary. Possible strategy: about 4 absences per day  $\times$  30 days = 120 absences.
5. 312 cards

Student Activity Book

What Were They Thinking?

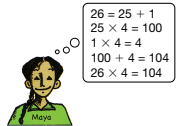
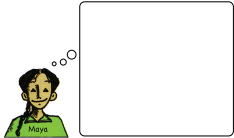
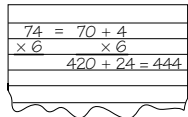
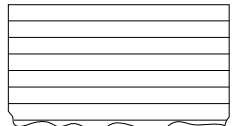
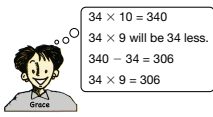

Questions 1–5 (SAB pp. 135–136)

1.  $28 = 25 + 3$                        $25 \times 3 = 75$   
 $3 \times 3 = 9$                                $75 + 9 = 84$   
 $28 \times 3 = 84$
2.  $36 = 30 + 6$   
 $\times 8 = \quad \times 8$   
 $240 + 48 = 288$
3.  $23 \times 10 = 230$   
 $23 \times 9$  will be 23 less  
 $230 - 23 = 207$   
 $23 \times 9 = 207$
4. Cut 84 in half to get 42.  
 Double 5 to get 10.  
 $42 \times 10 = 420$   
 $5 \times 84 = 420$
5. Strategies will vary. One possible strategy is shown for each.
  - A. 24 is half of 48.  
 10 is double 5.  
 $10 \times 24 = 240$   
 $5 \times 48 = 240$
  - B.  $76 = 70 + 6$   
 $\times 8 = \quad \times 8$   
 $560 + 48 = 608$
  - C.  $26 \times 10 = 260$   
 $26 \times 9$  would be 26 less.  
 $260 - 26 = 234$   
 $26 \times 9 = 234$

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Name \_\_\_\_\_ Date \_\_\_\_\_

**What Were They Thinking?**

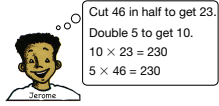

1. Here is how Maya solved  $26 \times 4$ .                      Show how Maya would solve  $28 \times 3$ .  


2. Here is how Jacob solved  $74 \times 6$ .                      Use the same method to solve  $36 \times 8$ .  


3. Here is how Grace solved  $34 \times 9$ .                      Show how Grace would solve  $23 \times 9$ .  



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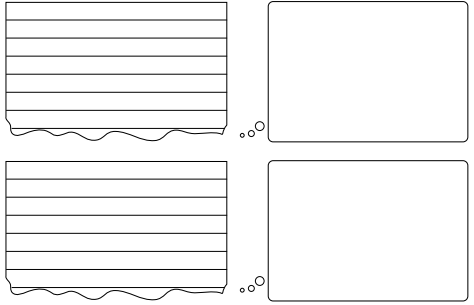
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Name \_\_\_\_\_ Date \_\_\_\_\_

4. Jerome knows that 5 is half of 10. Here is how he solved  $5 \times 46$ .  


5. Solve the following problems.
  - Solve at least one problem using paper and pencil and at least one problem using mental math.
  - Show your paper-and-pencil solutions on the note pads. Show your mental math solutions in the thought bubbles.

A.  $48 \times 5$                       B.  $8 \times 76$                       C.  $26 \times 9$



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