

## Grade 4 Mathematics

### Number and Number Relations: Lesson 8

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol ( $\Rightarrow$ ) by them.

*Purpose of Lesson 8:*

- In this lesson, the tutor and the students will
  - ✓ multiply numbers by 10's and 100's, and
  - ✓ multiply 2- and 3-digit numbers by 1-digit numbers.

*Equipment/Materials Needed:*

- Copies of Student Sheets 24 – 26
- Paper and pencils

*Preparations before beginning Lesson 7:*

- Run off 2 or 3 copies of Student Sheet 24 for each student.
- Run off 1 copy of Student Sheets 25 – 26 for each student.
- Have paper and pencils available.

## Lesson 8: Number and Number Relations

⇒ Give Student Sheet 24 to the students.

Say:

**Multiplication can be shown as a rectangle. One of the factors is the length and one is the width. On the grid paper, to show the product of  $1 \times 10$ , draw a rectangle with a width of 1 and a length of 10. How many blocks are in the rectangle? (10) Label the rectangle  $1 \times 10 = 10$ .**

**$1 \times 10$  is the same as 1 group of 10, which equals 10. Draw rectangles that show 2 times 10; 3 times 10; 4 times 10; and 5 times 10. Label each rectangle. If I multiply a number between 1 and 9, times 10, what kind of numbers do I get? (Numbers that are multiples of 10, 2 digit numbers, 10, 20, 30, etc.)**

**Now I want you to draw rectangles to show  $2 \times 20$  and  $4 \times 10$ . What did you notice? (The rectangles have the same number of blocks, 40.) Draw rectangles to show  $2 \times 30$  and  $6 \times 10$ . What do you notice? (The rectangles have the same number of blocks, 60.) Draw rectangles to show  $3 \times 20$  and  $6 \times 10$ . What do you notice? (The rectangles have the same number of blocks, 60.) Do you have to draw the rectangles to find the number of blocks? (No.) What patterns are you seeing? Hopefully the students will see that they are really multiplying  $2 \times 2 \times 10$  or  $4 \times 10 = 40$ . For  $3 \times 30$ , the product is the same as  $3 \times 3 \times 10$  or  $9 \times 10 = 90$ . Can you tell me the product of  $4 \times 30$ ;  $5 \times 30$ ;  $8 \times 50$  without drawing rectangles? (120, 150, 400)**

**Draw a rectangle that shows  $10 \times 10$ . What is the product of  $10 \times 10$ ? (100) What is the product of 1 ten x 1 ten? (1 hundred)**

⇒ Write the following chart on the board.

$10 \times 10 = 100$	$1 \text{ ten} \times 1 \text{ ten} =$	1 hundred
$20 \times 10 = 200$	$2 \text{ tens} \times 1 \text{ ten} =$	2 hundreds
$20 \times 30 = 600$	$2 \text{ tens} \times 3 \text{ tens} =$	6 hundreds
$40 \times 50 = 2000$	$4 \text{ tens} \times 5 \text{ tens} =$	20 hundreds or 2 thousands.

Say:

**Look at the chart I have just put on the board. Do you see any patterns? (When we multiply tens times tens, we get hundreds; but sometimes the hundreds are so big that we have to change them into thousands.)**

**Tell me what the following products would equal?  $50 \times 70$  (35 hundreds or 3500);  $60 \times 60$  (36 hundreds or 3600);  $40 \times 80$  (32 hundreds or 3200)**



⇒ Draw this example on the board.

$$\begin{array}{r} 23 = 20 + 3 \\ \times 2 = \quad \times 2 \\ \hline \end{array}$$

$$40 + 6 = 46$$

Write 23 as  $20 + 3$ .

Then multiply  $2 \times 3$  and  $2 \times 20$ .

$$\text{Add: } 40 + 6 = 46.$$

⇒ You may want to have the students find the cost of 3 videos. Discuss the different ways that they are doing the problems; or you may want to move to 4 videos, if you feel that they don't need more practice on problems without regrouping.

$$\begin{array}{r} 23 \\ 23 \\ + 23 \\ \hline 69 \end{array}$$

3 groups of 23

|| ...  
|| ...  
|| ...

$$\begin{aligned} 3 \times 23 &= 3 \times 20 + 3 \times 3 \\ &= 60 + 9 = 69 \end{aligned}$$

||||| : : : : .

$$\begin{array}{r} 23 = 20 + 3 \\ \times 3 \quad \times 3 \\ \hline \end{array}$$

$$60 + 9 = 69$$

$$\begin{array}{r} 23 \\ \times 3 \\ \hline \end{array}$$

$$69$$

Say:

**Let's find the cost of 4 videos. Use any method that you like; but be ready to discuss your method.** This one now involves regrouping. Hopefully they are beginning to move away from repeated addition. **Did anyone draw 4 groups of 23. If you did, tell us what you did.**

⇒ Draw 4 groups of 23.

|| ...  
|| ...  
|| ...  
|| ...

Say:

**This time when you combine the ones, you get 12 ones, which is the same as 1 ten and 2 ones. When you combine the tens, you have 8 tens plus the 1 ten from the 12 ones. The answer is 92.**

Say:

**Did anyone think of 23 as 20 + 3. Tell us what you did.**

Some students may show  $4 \times 23 = 4 \times 20 + 4 \times 3 = 80 + 12 = 92$  or some may show it this way.

$$\begin{array}{r} 23 = 20 + 3 \\ \times 4 \quad \times 4 \\ \hline \end{array}$$

$80 + 12 = 92$

Say:

**Did anyone do it another way?** Some will use the standard method.

$\begin{array}{r} 1 \\ 23 \\ \times 4 \\ \hline 92 \end{array}$	<b>Multiply 4 ones times 3 ones. This operation gives 12 ones. 12 ones = 1 ten + 2 ones. Write the 2 in the ones place. So that you don't forget the 1 ten, write a small 1 above the 2 tens. Multiply 4 ones times 2 tens. This operation gives 8 tens. Remember to add the 1 ten to get 9 tens. Write the 9 in the tens column.</b>
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Say:

**Find the cost of 5 videos (\$115) and 8 videos. (\$184)** If you want to, have them explain their methods.

⇒ Give Student Sheet 25. This activity will give practice on multiplication of 2-digit numbers by 1-digit numbers, while helping students with conversions. Answers:

- 1) 300 minutes
- 2) 96 inches
- 3) 216 inches
- 4) 128 gallons
- 5) 175 days
- 6) She forgot to think of 36 as 3 tens + 6 ones and forgot to add it to the 2 tens x 8 tens. (OR) She thought that 4 ones times 2 tens gives 8 hundreds.
- 7) She multiplied 5 ones x 3 ones and got 15 ones, but she wrote the 1 in the ones column and carried the 5 as 5 tens.
- 8) She multiplied 4 ones x 8 ones and got 32 ones, but carried a 1 ten instead of 3 tens.

⇒ Give students the following problem. You may want to write it on the board.

Say:

**The VCR's at ABC store are priced at \$235 each. Make a table to help you find the cost of 2, 4, and 8 VCR's.**

Students have a hard time making charts, so it is important to practice this skill as often as possible. **What do you think should go into the chart? What should be the categories? What do they know? What do they have to find out?** The chart should look something like the one below.

Number of VCR's	Total Cost
1	235
2	
4	
8	

Say:

**How would you find the cost of 2 VCR's?** (Addition:  $235 + 235 = 470$ )  
 Breaking apart:  $2 \times 235 = 2 \times 200 + 2 \times 30 + 2 \times 5 = 400 + 60 + 10 = 470$   
 or:  $235 = 200 + 30 + 5$

$$\begin{array}{r} 235 \\ \times 2 \\ \hline 470 \end{array}$$

The Standard Method

$$\begin{array}{r} \overset{1}{2}35 \\ \times 2 \\ \hline 070 \end{array}$$

**Multiply 2 ones times 5 ones. You get 10 ones, which is the same as 1 ten. Write the 0 ones in the ones column; and to help you remember**

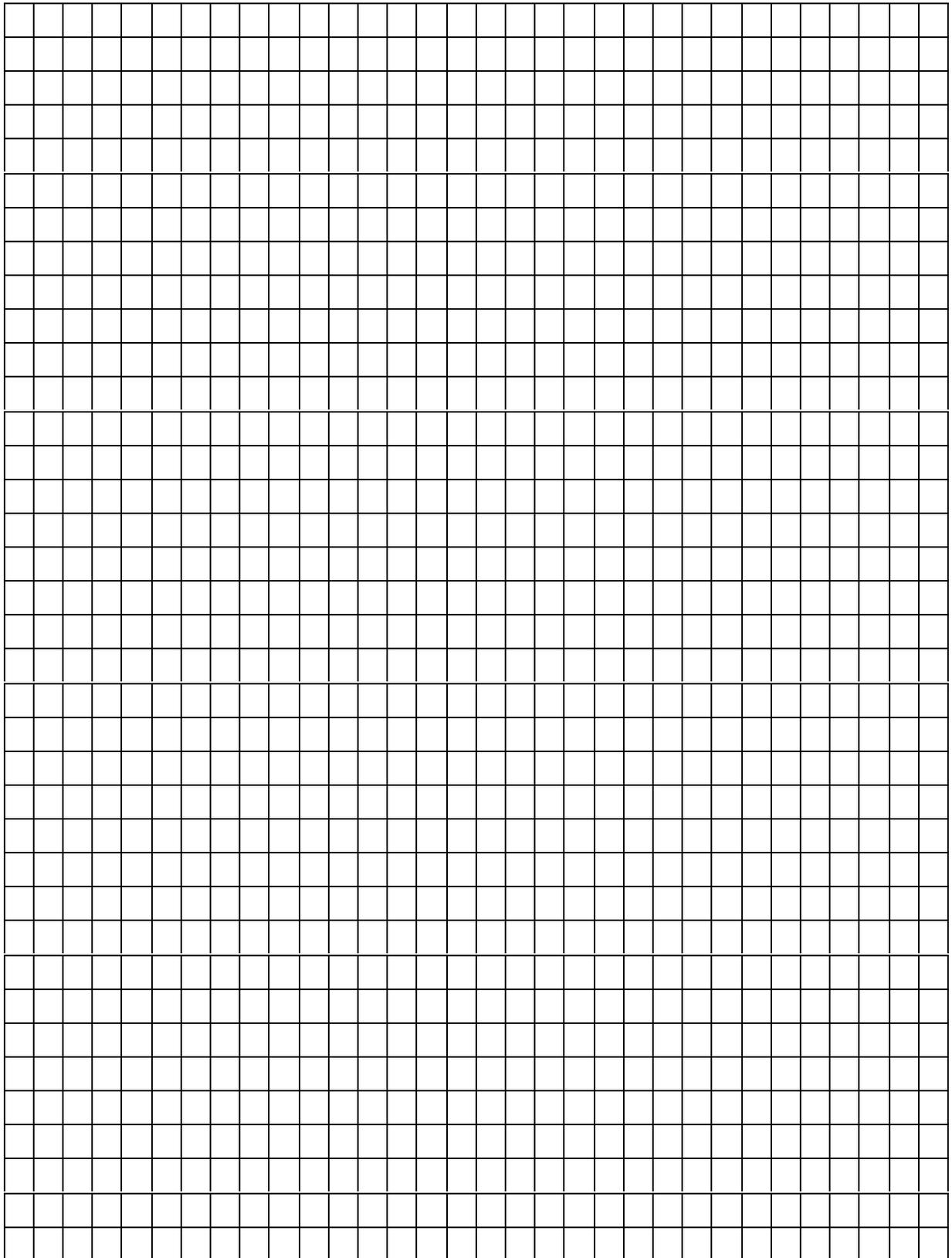
**the 1 ten, write a small 1 above the 3 tens. Then multiply 2 ones times 3 tens. You get 6 tens. Remember to add the other ten for 7 tens. Write the 7 in the tens column. Then multiply 2 ones times 2 hundreds. You get 4 hundreds. Write the 4 in the hundreds column.** For more practice, have the students find the cost of 4 and 8 VCR's. (\$940, \$1880)

⇒ Give Student Sheet 26. This activity will give practice on multiplication of 2-digit number by 1-digit numbers, while helping students with conversions. Answers:

- |                                  |                                         |               |
|----------------------------------|-----------------------------------------|---------------|
| 1) 2160 minutes                  | 2) 1775 milliliters                     | 3) 2720 grams |
| 4) 3325 milligrams               | 5) 850 calories                         | 6) 920 cm     |
| 7) He forgot to carry the 1 ten. | 8) He carried 1 ten rather than 3 tens. |               |

⇒ Have one student summarize today's lesson.

**Student Sheet 24 (Number: Lesson 8)**



## Student Sheet 25 (Number: Lesson 8)

**Work the following problems. Be sure to label your answers.**

1. There are 60 minutes in 1 hour. How many minutes are in 5 hours?

\_\_\_\_\_

2. There are 12 inches in 1 foot. How many inches are in 8 feet?

\_\_\_\_\_

3. There are 36 inches in 1 yard. How many inches are in 6 yards?

\_\_\_\_\_

4. There are 4 quarts in 1 gallon. How many quarts are in 32 gallons?

\_\_\_\_\_

5. There are 7 days in 1 week. How many days are in 25 weeks?

\_\_\_\_\_

**Your friend worked the following problems incorrectly. Explain what she did wrong.**

$$\begin{array}{r} 6. \quad 29 \\ \quad \times 4 \\ \hline 836 \end{array}$$

$$\begin{array}{r} 7. \quad 43 \\ \quad \times 5 \\ \hline 251 \end{array}$$

$$\begin{array}{r} 8. \quad 68 \\ \quad \times 4 \\ \hline 252 \end{array}$$

## Student Sheet 26 (Number: Lesson 8)

**Work the following problems. Be sure to label your answers.**

1. There are 360 seconds in 1 hour. How many minutes are in 6 hours?  
\_\_\_\_\_
2. There are 355 milliliters in 1 soda can. How many milliliters in 5 cans?  
\_\_\_\_\_
3. A loaf of bread weighs 680 grams. How much would 4 loaves weigh?  
\_\_\_\_\_
4. If a can of chicken and noodle soup contains 475 milligrams of sodium (salt), how many milligrams are in 7 cans of the soup?  
\_\_\_\_\_
5. If there are 170 calories in 1 ounce of mixed nuts, how many calories are in 5 ounces? \_\_\_\_\_
6. Jerry had to cut 8 boards each 115 cm long to make a sign about the game. How long will the sign be? \_\_\_\_\_

**Your friend worked the following problems incorrectly. Explain what he did wrong.**

7. 
$$\begin{array}{r} 136 \\ \times 2 \\ \hline 2612 \end{array}$$

8. 
$$\begin{array}{r} 149 \\ \times 4 \\ \hline 576 \end{array}$$