Grade 3 Chapter 4 Table of Contents

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Investigation worksheets include a model strategy on the Reteach worksheets and provide problems requiring several alternate strategies on the Homework Practice and Skills Practice worksheets.

**Assessment Options** The assessment masters in the *Chapter 4 Resource Masters* offer a wide variety of assessment tools for monitoring progress as well as final assessment.

**Individual Progress Checklist** This checklist explains the chapter’s goals or objectives. Teachers can record whether a student’s mastery of each objective is beginning (B), developing (D), or mastered (M). The checklist includes space to record notes to parents as well as other pertinent observations.

**Chapter Diagnostic Assessment** This one-page test assesses students’ grasp of skills that are needed for success in the chapter.

**Chapter Pretest** This one-page quick check of the chapter’s concepts is useful for determining pacing. Performance on the pretest can help you determine which concepts can be covered quickly and which specific concepts may need additional time.

**Mid-Chapter Review** This one-page chapter test provides an option to assess the first half of the chapter. It includes both multiple-choice and free-response questions.

**Quizzes** Three free-response quizzes offer quick assessment opportunities at appropriate intervals in the chapter.

**Vocabulary Test** This one-page test focuses on chapter vocabulary. It is suitable for all students. It includes a list of vocabulary words and questions to assess students’ knowledge of the words.

**Oral Assessment** This two-page test consists of one page for teacher directions and questions and a second page for recording responses. Although this assessment is designed to be used with all students, the interview format focuses on assessing chapter content assimilated by ELL students.

**Chapter Project Rubric** This one-page rubric is designed for use in assessing the chapter project. You may want to distribute copies of the rubric when you assign the project and use the rubric to record each student’s chapter project score.

**Foldables Rubric** This one-page rubric is designed to assess the Foldables graphic organizer. The rubric is written to the students, telling them what you will be looking for as you evaluate their completed Foldables graphic organizer.

**Leveled Chapter Tests**
- **Form 1** assesses basic chapter concepts through multiple-choice questions.
- **Form 2A** is primarily for those who may have missed the Form 1 test. It may be used as a retest for students who received additional instruction following the Form 1 test.
- **Form 2B** is designed for students with a below-level command of the English language.
- **Form 2C** is a free-response test.
- **Form 2D** is written for students with a below-level command of the English language.
- **Form 3** is a free-response test written for above-level students.
- **Extended-Response Test** is an extended response test for on-level students.

**Student Recording Sheet** This one-page recording sheet is for the standardized test in the Student Edition.

**Cumulative Standardized Test Practice** This three-page test, aimed at on-level students, offers multiple-choice questions and free-response questions.

**Answers**
The answers for the Anticipation Guide and Lesson Resources are provided as reduced pages with answers appearing in black. Full size line-up answer keys are provided for the Assessment Masters.
Teacher’s Guide to Using the
Chapter 4 Resource Masters

The Chapter 4 Resource Masters includes the core materials needed for Chapter 4. These materials include worksheets, extensions, and assessment options. The answers for these pages appear at the back of this booklet.

All of the materials found in this booklet are included for viewing and printing on the TeacherWorks Plus™ CD-ROM.

Chapter Resources

**Graphic Organizer** (page 1) This master is a tool designed to assist students with comprehension of grade-level concepts. While the content and layout of these tools vary, their goal is to assist students by providing a visual representation from which they can learn new concepts.

**Student Glossary** (page 2) This master is a study tool that presents the key vocabulary terms from the chapter. You may suggest that students highlight or star the terms they do not understand. Give this list to students before beginning Lesson 4–1. Remind them to add these pages to their mathematics study notebooks.

**Anticipation Guide** (page 6) This master is a survey designed for use before beginning the chapter. You can use this survey to highlight what students may or may not know about the concepts in the chapter. There is space for recording how well students answer the questions before they complete the chapter. You may find it helpful to interview students a second time, after completing the chapter, to determine their progress.

**Game** (page 7) A game is provided to reinforce chapter concepts and may be used at appropriate times throughout the chapter.

Resources for Computational Lessons

**Reteach** Each lesson has an associated Reteach worksheet. In general, the Reteach worksheet focuses on the same lesson content but uses a different approach, learning style, or modality than that used in the Student Edition. The Reteach worksheet closes with computational practice of the concept.

**Skills Practice** The Skills Practice worksheet for each lesson focuses on the computational aspect of the lesson. The Skills Practice worksheet may be helpful in providing additional practice of the skill taught in the lesson.

**Homework Practice** The Homework Practice worksheet provides an opportunity for additional computational practice. The Homework Practice worksheet includes word problems that address the skill taught in the lesson.

**Problem-Solving Practice** The Problem-Solving Practice worksheet presents additional reinforcement in solving word problems that apply both the concepts of the lesson and some review concepts.

**Enrich** The Enrich worksheet presents activities that extend the concepts of the lesson. Some Enrich materials are designed to widen students’ perspectives on the mathematics they are learning. These worksheets are written for use with all levels of students.

Resources for Problem-Solving Strategy and Problem-Solving Investigation Lessons

In recognition of the importance of problem-solving strategies, worksheets for problem-solving lessons follow a slightly different format. For problem-solving lessons, a two-page Reteach worksheet offers a complete model for choosing a problem-solving strategy. For each Problem-Solving Strategy lesson, Reteach and Homework Practice worksheets offer reinforcement of the strategy taught in the Student Edition lesson. In contrast, the Problem-Solving
Use this graphic organizer to take notes on **Chapter 4: Multiplication Concepts and Facts.** Fill in the missing information.

<table>
<thead>
<tr>
<th>Property</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
</table>
| Commutative Property   |            | $2 \times \square = 12$  
                          |            | $6 \times \square = 12$  |
| Zero Property          |            | $3 \times \square = 0$   |
| Identity Property      |            | $1 \times \square = 5$   |
Student-Built Glossary

This is an alphabetical list of new vocabulary terms you will learn in **Chapter 4: Multiplication Concepts and Facts**. As you study the chapter, complete each term’s definition or description. Remember to add the page number where you found the term. Add this page to your math study notebook to review vocabulary at the end of the chapter.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Found on Page</th>
<th>Definition/Description/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>array</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commutative Property of Multiplication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity Property of Multiplication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>multiply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>product</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero Property of Multiplication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Family,

Today my class started Chapter 4: Multiplication Concepts and Facts. I will be exploring the meaning of multiplication, using models to multiply, and using multiplication properties and rules. I will also learn how to multiply by the numbers 2, 4, 5, 10, 0, and 1. Here are my vocabulary words and an activity we can do together.

Love, _________________

Key Vocabulary

factor A number that divides into a whole number evenly. Also a number that is multiplied by another number.

product The answer to a multiplication problem.

array Objects or symbols displayed in rows of the same length and columns of the same length.

Commutative Property of Multiplication The property that states that the order in which two numbers are multiplied does not change the product.

Zero Property of Multiplication The property that states any number multiplied by zero is zero.

Identity Property of Multiplication If you multiply a number by 1, the product is the same as the given number.

Activity

Place two cups together on the table. Place another set of two cups next to the first two. Finally, place one last set of two cups next to those. On the table you should have three pairs of cups. Count the cups to see how many you have in three sets of two. Now rearrange the cups into two groups, with three cups in each group. Count the cups again to see how many you have in two sets of three. Ask: What was your answer each time? Ask: What property of multiplication does this demonstrate?

Books to Read

Anno’s Mysterious Multiplying Jar by Mitsumasa Anno

The Rajah’s Rice by David Barry

The King’s Chessboard by David Birch
Estimada familia:

Hoy mi clase comenzó el Capítulo 4: Conceptos y hechos de la multiplicación. Exploraré el significado de multiplicación usando modelos para multiplicar y las propiedades y reglas de la multiplicación. Además exploraré cómo multiplicar por los números 2, 4, 5, 10, 0 y 1. A continuación, están mis palabras de vocabulario y una actividad que podemos hacer juntos.

Vocabulario clave

factor Número que divide exactamente a otro número entero. También es un número multiplicado por otro número.

producto Respuesta a un problema de multiplicación.

arreglo Objetos o símbolos representados en filas de la misma longitud y columnas de la misma longitud.

Propiedad conmutativa de la multiplicación
Propiedad que establece que el orden en el cual se multiplican dos o más números no altera el producto.

Propiedad del producto nulo de la multiplicación
Propiedad que establece que cualquier número multiplicado por cero es igual a cero.

Propiedad de identidad de la multiplicación Si se multiplica un número por 1, el producto es igual al número dado.

Cariños, ______________________

Libros recomendados:
Anno’s Mysterious Multiplying Jar de Mitsumasa Anno
The Rajah’s Rice de David Barry
The King’s Chessboard de David Birch

Actividad

## Anticipation Guide

**Multiplication Concepts and Facts**

### Before you begin Chapter 4

- Read each statement.
- Decide whether you agree (A) or disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (not sure).

<table>
<thead>
<tr>
<th>STEP 1 A, D, or NS</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A, D, or NS</td>
<td>7 + 7 + 7 + 7 + 7 = 35</td>
<td></td>
</tr>
<tr>
<td>2. A</td>
<td>When you multiply, you divide the same number multiple times.</td>
<td></td>
</tr>
<tr>
<td>3. D</td>
<td>An array can help you to find the answer to a multiplication problem.</td>
<td></td>
</tr>
<tr>
<td>4. A</td>
<td>4 (\times) 3 is greater than 6 (\times) 2.</td>
<td></td>
</tr>
<tr>
<td>5. D</td>
<td>To find a 4 multiplication fact, you can double a 2 multiplication fact.</td>
<td></td>
</tr>
<tr>
<td>6. A</td>
<td>Six $10-bills are $60.</td>
<td></td>
</tr>
<tr>
<td>7. D</td>
<td>Any number multiplied by 10 is equal to that number with two zeros after it.</td>
<td></td>
</tr>
<tr>
<td>8. A</td>
<td>The Zero Property of Multiplication says that when you multiply a number by zero, the product is zero.</td>
<td></td>
</tr>
<tr>
<td>9. A</td>
<td>The Identity Property of Multiplication says that when you multiply any number by 2 the product is that number.</td>
<td></td>
</tr>
<tr>
<td>10. A</td>
<td>0 (\times) 0 = 0</td>
<td></td>
</tr>
</tbody>
</table>

### After you complete Chapter 4

- Reread each statement and complete the last column by entering an A (agree) or a D (disagree).
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a separate sheet of paper to explain why you disagree. Use examples, if possible.
You will need:
number cube
index card
paper and markers

Make a number cube with the pattern above.

Copy the pattern onto an index card and write the numbers 0, 1, 2, 4, 5, and 10, with one number in each square.

Cut out the pattern and then glue the cube together.

1. Have player 1 roll the cube twice and use the numbers as factors.
2. Multiply the factors and write a multiplication sentence.
3. Have player 2 check the multiplication sentence. If it is correct, player 1 gets 2 points. If it is incorrect, player 2 gets 3 points.
4. Take turns repeating the activity.
5. Play the game for 4 rounds. The player with the most points at the end wins the game.
When there is an equal number in each group, you can find the total by using repeated addition or multiplication.

- Add: $3 + 3 + 3 + 3 = 12$

Find each total. Write an addition and a multiplication sentence.

1. $6 + 6 + 6 = ______$
   - 3 groups of 6 = ______
   - $3 \times 6 = ______$

2. ______ groups of ______ = ______
   - ______ $\times 2 = ______$

3. ______ groups of ______ = ______
   - ______ $\times ______ = ______$

4. ______ groups of ______ = ______
   - ______ $\times ______ = ______$
Write an addition and a multiplication sentence for each model.

1. 

2. 

Multiply. Use repeated addition.

3. 4 × 6 = _____ 4. 2 × 9 = _____ 5. 3 × 7 = _____

6. 6 × 4 = _____ 7. 8 × 3 = _____ 8. 5 × 5 = _____

9. 2 × 8 = _____ 10. 6 × 2 = _____ 11. 3 × 9 = _____

Solve.

12. If Jason can collect 5 cans in one week, how many cans can he collect in 7 weeks?

13. Omar collected 8 cans of food on Monday, 8 cans of food on Tuesday, and 8 cans of food on Thursday. How many cans did he collect in all?
Write an addition and a multiplication sentence for each model.

1. 

2. 

Multiply. Use repeated addition.

3. \(8 \times 3 = \underline{\quad}\)

4. \(4 \times 6 = \underline{\quad}\)

5. \(8 \times 4 = \underline{\quad}\)

6. \(3 \times 9 = \underline{\quad}\)

7. \(7 \times 6 = \underline{\quad}\)

8. \(9 \times 10 = \underline{\quad}\)

Spiral Review

Write an expression to describe each problem.
Then solve. (Lesson 3–9)

9. Jennifer needs 4 blue strings and 18 pink strings to make friendship bracelets. How many strings does she need?

10. Allison made 21 mini pizzas for the party. Angela made 33 mini pizzas. How many more pizzas did Angela make?
Problem-Solving Practice

Multiplication as Repeated Addition

Write an addition and a multiplication sentence. Then solve.

1. There are 3 people sitting at each of 4 tables. How many people are there in all?

2. Alisa needs to put 2 forks at each of 8 table settings. How many forks in all does she need?

3. Renee jogs 5 miles a day, 4 days each week. How many miles does she jog each week?

4. Henry lives 3 miles away from the mall. Henry can run a mile in 6 minutes. If he can keep up this speed, how long will it take him to run to the mall?

5. It takes Sam 5 minutes to wash a window. Sam has 9 windows in his house to wash. How many minutes will it take him to finish?

6. Heather spent $4 for a salad and $2 for a drink. She bought the same lunch for 3 of her friends. She paid with three $10-bills. How much change did she get back?
These frogs like to sit in groups. Complete each addition sentence to see how many frogs are in each group. Match the number of frogs from the addition sentence to the groups of frogs. Then write a multiplication sentence that gives the same answer as the addition sentence.

1. $2 + 2 + 2 + 2 = \underline{\hspace{2cm}}$

2. $4 + 4 + 4 = \underline{\hspace{2cm}}$

3. $6 + 6 + 6 = \underline{\hspace{2cm}}$

4. Show how you would draw five groups of four frogs. Then write a multiplication and an addition sentence that explain the drawing.

$\underline{\hspace{2cm}}$
Find $2 \times 3$ and $3 \times 2$.

**Using Models**
Make 2 rows of 3 counters to show $2 \times 3$.

```
  O O O
  O O O
```

Make 3 rows of 2 counters to show $3 \times 2$.

```
  O O
  O O
  O O
```

**Using Paper and Pencil**

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number in each row</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

Draw lines to match the multiplication sentence with an array. Then use the Commutative Property to write a different multiplication sentence.

1. $5 \times 3 = 15$
2. $3 \times 6 = 18$
3. $5 \times 4 = 20$
Write the multiplication sentence for each array. Then multiply.

1. [Array 1]
2. [Array 2]
3. [Array 3]

Use the Commutative Property of Multiplication to find the missing number.

4. $2 \times 3 = 6$
   \[\square \times 2 = 6\]

5. $5 \times 0 = 0$
   \[\square \times 5 = 0\]

6. $8 \times 6 = 48$
   \[6 \times \square = 48\]

7. $7 \times 4 = 28$
   \[\square \times 7 = 28\]

8. $2 \times 5 = 10$
   \[5 \times \square = 10\]

9. $5 \times 9 = 45$
   \[9 \times \square = 45\]

10. $8 \times 3 = 24$
    \[3 \times \square = 24\]

11. $9 \times 4 = 36$
    \[\square \times 9 = 36\]

12. $1 \times 8 = 8$
    \[8 \times \square = 8\]

13. $7 \times 8 = 56$
    \[\square \times 7 = 56\]

14. $6 \times 7 = 42$
    \[\square \times 6 = 42\]

15. $9 \times 6 = 54$
    \[6 \times \square = 54\]
Write a multiplication sentence for each array. Then multiply.

1. \[
\begin{align*}
\triangle \triangle \triangle \\
\triangle \triangle \triangle 
\end{align*}
\]

2. \[
\begin{align*}
\quad \quad \quad \quad \quad \quad \quad \\
\quad \quad \quad \quad \quad \quad \quad \\
\quad \quad \quad \quad \quad \quad \quad 
\end{align*}
\]

3. \[
\begin{align*}
\bullet \bullet \bullet \\
\bullet \bullet \bullet 
\end{align*}
\]

4. \[
\begin{align*}
\quad \quad \quad \quad \quad \quad \quad \\
\quad \quad \quad \quad \quad \quad \quad \\
\quad \quad \quad \quad \quad \quad \quad 
\end{align*}
\]

Use the Commutative Property of Multiplication to find the missing number.

5. \[3 \times 6 = 18 \quad \square \times 3 = 18\]

6. \[7 \times 4 = 28 \quad 4 \times \square = 28\]

7. \[8 \times 6 = 48 \quad 6 \times 8 = \square\]

8. \[5 \times 2 = 10 \quad \square \times 5 = 10\]

Spiral Review

Write an addition and a multiplication sentence. Then solve. (Lesson 4–1)

9. \[
\begin{align*}
\bullet \bullet \bullet \\
\bullet \bullet \bullet 
\end{align*}
\]
1. Mr. Turner has 4 students in each of 5 math groups. Draw an array of circles to show how many students there are in all.
   _____ students

2. Four students have 3 pencils each. Draw an array of circles to show how many pencils there are in all.
   _____ pencils

3. The top shelf in the bakery has 5 muffins on each of 6 plates. The bottom shelf has 6 muffins on each plate. Both shelves have the same number of muffins. How many plates are on the bottom shelf?
   _____ plates
   How many muffins are on each shelf?
   _____ muffins

4. Each baker uses the same number of cherries. Tanya puts 3 cherries on each of 6 pies. Russell puts cherries on 3 pies. If Russell puts the same number of cherries on each pie, how many cherries does he need?
   _____ cherries
   How many cherries did each baker use?
   _____ cherries

5. Leroy and Vern each have the same number of video games. Leroy puts an equal number of games in each of 7 boxes. Vern has only 3 boxes. He puts 7 games in each box. How many video games do Leroy and Vern have altogether?
   _____ video games

6. Ray makes an array that has 4 rows of 4 counters. He wants to make two more arrays using the same number of counters. He wants more than one counter in each row. What two arrays can he make?
Enrich

Colorful Arrays

- Choose 4 colors to make arrays.
- Use 2 colors in each array.

Complete the multiplication sentence under each array. Color an array to match the sentence. (Hint: The first digit tells how many rows in the array. The second digit tells how many in each row.)

Then use the Commutative Property of Multiplication to write a different multiplication sentence using the same factors. Write that sentence underneath the first set of sentences. The products should be the same.

For example, $3 \times 2 = 6$ and $2 \times 3 = 6$. So, $3 \times 2 = 2 \times 3$.

1.  
   \[2 \times 7 = \underline{\phantom{0}}\]

2.  
   \[4 \times 5 = \underline{\phantom{0}}\]

\[\underline{\phantom{0}} \quad \underline{\phantom{0}}\]
You can skip count on the number line to help you multiply two numbers.

Find 6 × 2. Think: 6 groups of 2 or 6 jumps of 2 spaces

Find 3 × 2. Think: 3 groups of 2 or 3 jumps of 2 spaces

Multiply. You may want to use a number line.

1. 4 × 2 = _____
2. 7 × 2 = _____
3. 2 × 9 = _____
4. 5 × 2 = _____
5. 2 × 6 = _____
6. 2 × 3 = _____
7. 2 × 2 = _____
8. 2 × 4 = _____
9. 9 × 2 = _____
10. 1 × 2 = _____
11. 8 × 2 = _____
12. 6 × 2 = _____
13. 2 × 7 = _____
14. 3 × 2 = _____
15. 2 × 5 = _____
16. 2 × 8 = _____
Skills Practice

Multiply by 2

Multiply. Draw a picture or use an array.

1. \[ 7 \times 2 = \] 2
2. \[ 9 \times 2 = \] 2
3. \[ 4 \times 2 = \] 2
4. \[ 2 \times 7 = \] 7
5. \[ 5 \times 2 = \] 2
6. \[ 6 \times 2 = \] 2

7. \[ 2 \times 9 = \] 2
8. \[ 2 \times 9 = \] 2
9. \[ 2 \times 2 = \] 2
10. \[ 8 \times 2 = \] 2
11. \[ 2 \times 6 = \] 2
12. \[ 2 \times 4 = \] 4

13. \[ 3 \times 2 = \] 6
14. \[ 2 \times 3 = \] 6
15. \[ 5 \times 2 = \] 10
16. \[ 2 \times 5 = \] 10
17. \[ 9 \times 2 = \] 18
18. \[ 2 \times 9 = \] 18
19. \[ 2 \times 8 = \] 20
20. \[ 2 \times 7 = \] 14
21. \[ 2 \times 4 = \] 8
22. \[ 6 \times 2 = \] 12
23. \[ 7 \times 2 = \] 14
24. \[ 8 \times 2 = \] 16
25. \[ 2 \times 2 = \] 4
26. \[ 2 \times 5 = \] 10
27. \[ 4 \times 2 = \] 8
28. \[ 7 \times 2 = \] 14
29. \[ 8 \times 2 = \] 16
30. \[ 1 \times 2 = \] 2

Write a multiplication sentence for each situation. Then solve.

31. The dancers in a ballet class rehearse for 3 hours each day. For how many hours will they rehearse from Tuesday through Saturday?

32. The beginner ballet class meets for 6 weeks Tuesday through Saturday. For how many days does the ballet class meet?
Multiply.

1. \[
\begin{array}{ccc}
\bigcirc \\
\bigcirc \\
\bigcirc \\
\bigcirc \\
\bigcirc \\
\bigcirc \\
\end{array}
\]

2. \[
\begin{array}{ccc}
\triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle
\end{array}
\]

Multiply. Draw a picture or use an array.

3. \[
\frac{5}{2}
\]

4. \[
\frac{2}{3}
\]

5. \[
\frac{4}{2}
\]

6. \[
\frac{7}{2}
\]

7. \[
\frac{2}{9}
\]

8. \[
2 \times 8
\]

9. \[
2 \times 2
\]

10. \[
6 \times 2
\]

Write a multiplication sentence for each situation. Then solve.

11. There are 4 boys. How many total arms do they have?

12. John is jumping on a pogo stick. He is counting by twos. If he counted to 24, how many jumps has he made?

Spiral Review

Use the Commutative Property of Multiplication to find each missing number. (Lesson 4–2)

13. \[4 \times 7 = 28\]  \[7 \times \square = 28\]

14. \[6 \times 2 = 12\]  \[\square \times 6 = 12\]

15. \[5 \times 3 = 15\]  \[\square \times 5 = 15\]
Write a multiplication sentence for each situation. Then solve.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> There are 2 daisies in each vase. There are 8 vases. How many daisies are there in all?</td>
<td><strong>2.</strong> Maria plants 2 tomato seeds in each flower pot. If there are 6 flower pots, how many tomato seeds did Maria plant?</td>
</tr>
<tr>
<td>$2 \times 8$</td>
<td>$2 \times 6$</td>
</tr>
<tr>
<td>_____ daisies</td>
<td>_____ tomato seeds</td>
</tr>
<tr>
<td><strong>3.</strong> There are 7 people in the Smith family. They all keep their gloves in one box in the closet. Each person has 2 pairs of gloves. How many pairs of gloves are in the box?</td>
<td><strong>4.</strong> Dad paid the cashier two $5-bills. How much money did he pay?</td>
</tr>
<tr>
<td>$7 \times 2$</td>
<td>$2 \times 5$</td>
</tr>
<tr>
<td>_____ pairs of gloves</td>
<td>_____</td>
</tr>
<tr>
<td><strong>5.</strong> Letti is coloring 9 flowers on two pages. How many flowers will Letti color?</td>
<td><strong>6.</strong> There are 4 children in a line. How many legs are there in all?</td>
</tr>
<tr>
<td>$9 \times 2$</td>
<td>$4 \times 2$</td>
</tr>
<tr>
<td>_____ flowers</td>
<td>_____ legs</td>
</tr>
</tbody>
</table>
Each shape stands for a number. See if you can figure out what the numbers are.

What digit does each symbol represent?

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

________________________________

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Reteach

Multiply by 4

Find $4 \times 5$.

Using Models

![Using Models Diagram]

Using Pencil and Paper

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number in each row</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

Use the picture to find the product.

1. $4 \times 6 = $ ______
2. $4 \times 5 = $ ______
3. $4 \times 9 = $ ______

Multiply.

4. $4 \times 7 = $ ______
5. $4 \times 4 = $ ______
6. $4 \times 3 = $ ______
7. $3 \times 4 = $ ______
8. $4 \times 2 = $ ______
9. $4 \times 1 = $ ______
10. $4 \times 6 = $ ______
11. $9 \times 4 = $ ______
12. $4 \times 8 = $ ______
13. $7 \times 4 = $ ______
14. $4 \times 9 = $ ______
15. $2 \times 4 = $ ______
16. $5 \times 4 = $ ______
17. $6 \times 4 = $ ______
18. $1 \times 4 = $ ______
19. $4 \times 5 = $ ______
20. $2 \times 4 = $ ______
21. $4 \times 4 = $ ______
Multiply. Draw a picture or use an array.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>×4</td>
<td>×4</td>
<td>×2</td>
<td>×4</td>
<td>×9</td>
<td>×6</td>
</tr>
</tbody>
</table>

Multiply.

7. $4 \times 2 = \underline{8}$
8. $4 \times 6 = \underline{24}$
9. $4 \times 4 = \underline{16}$
10. $8 \times 4 = \underline{32}$
11. $5 \times 4 = \underline{20}$
12. $7 \times 4 = \underline{28}$
13. $2 \times 4 = \underline{8}$
14. $6 \times 4 = \underline{24}$
15. $4 \times 5 = \underline{20}$
16. $4 \times 7 = \underline{28}$
17. $9 \times 4 = \underline{36}$
18. $4 \times 8 = \underline{32}$
19. $4 \times 1 = \underline{4}$
20. $4 \times 3 = \underline{12}$
21. $1 \times 4 = \underline{4}$
22. $4 \times 9 = \underline{36}$
23. $3 \times 4 = \underline{12}$
24. $4 \times 7 = \underline{28}$

Write a multiplication sentence for each situation. Then solve.

25. There are 4 rows of 9 chairs in the room. How many chairs are in the room?

26. There are 4 rows of 7 students in a class photograph. How many students are in the photograph?
Multiply by 4

Multiply.

1. \[4 \times 2\]
2. \[6 \times 4\]
3. \[3 \times 4\]
4. \[4 \times 7\]
5. \[8 \times 4\]
6. \[4 \times 5\]
7. \[4 \times 9\]
8. \[7 \times 4\]
9. \[4 \times 8\]
10. \[9 \times 4\]

11. \[2 \times 4\]
12. \[4 \times 4\]
13. \[6 \times 4\]
14. \[4 \times 3\]
15. \[4 \times 10\]
16. \[4 \times 1\]

Write a multiplication sentence for each situation. Then solve.

17. There are 5 cars. How many total wheels do they have?

18. There are 4 snakes and each snake has two eyes. What is the total number of eyes?

19. A toy comes with 6 parts in each box. If you have 4 boxes of toys, how many parts are there altogether?

---

Spiral Review

Multiply. Draw a picture or use an array. (Lesson 4–3)

20. \[9 \times 2 = \_\_\_\_\_\_\_\_\_\_\_] 
21. \[2 \times 4 = \_\_\_\_\_\_\_\_\_\_\_] 
22. \[2 \times 10 = \_\_\_\_\_\_\_\_\_\_\_]
Write a multiplication sentence for each situation. Then solve.

1. The straight part of Eli’s train track has 4 tracks. Each track has 7 train cars. How many train cars are on the straight part of the train track?
   
   ______ train cars

2. Melissa owns 4 sets of trains. Each set has 6 train cars. How many train cars does Melissa have in all?
   
   ______ cars

3. There are 4 posters on each bulletin board. There are 3 bulletin boards. How many posters are there in all?
   
   ______

4. There are 4 groups of students in charge of decorating the hallway bulletin boards. Each group decorates 8 different boards around the school. How many bulletin boards are there in all?
   
   ______ bulletin boards

5. Paula can make 4 beaded bracelets in an hour. In one week Paula made bracelets for 6 hours. How many bracelets did she make?
   
   ______ bracelets

6. Every bracelet has 4 blue beads. If Jackie makes 5 bracelets, how many blue beads will she use?
   
   ______ blue beads
Read the questions about the animals. Write a true multiplication sentence for each question.

1. How many wings on 4 birds?
   ____________ wings

2. How many trunks on 4 elephants?
   ____________ trunks

3. How many legs on 4 snakes?
   ____________ legs

4. How many legs on 4 grasshoppers?
   ____________ legs

5. How many legs on 9 zebras?
   ____________ legs

6. How many arms on 4 octopuses?
   ____________ arms

7. How many legs on 4 cheetahs?
   ____________ legs

8. How many legs on 3 elephants?
   ____________ legs

CHALLENGE

9. How many legs are on 2 zebras and 3 elephants?
   ____________

10. How many legs are on 2 grasshoppers and 2 octopuses?
   ____________
Math class starts at 10:00 A.M. and lasts for 55 minutes. Art class starts 5 minutes after math class ends. Art class ends at 11:45 A.M. How long is art class?

| Step 1 Understand | **Make sure you understand the problem.**
| What do you need to find? How long is art class? |
| **Step 2 Plan** | **Make a plan**
| Find out when art class begins and ends. |
| Find the necessary information. |
| Math starts at 10:00. |
| It lasts for 55 minutes. |
| Art starts 5 minutes later. |
| Art class ends at 11:45. |

| **Step 2 Solve** | **Carry out your plan.**
| Find when math class ends. 10:00 → 55 minutes later → 10:55 |
| Art starts 5 minutes later. 10:55 → 5 minutes later → 11:00 |
| How long is art class? 11:00 → 11:45 = 45 minutes |
| Art class is 45 minutes long. |

| **Step 4 Check** | **Check your answer.**
| Make sure you used the correct information. |
Solve. If there is missing information, tell what facts you need to solve the problem.

1. Kirk practices the trumpet for 30 minutes on Tuesday, 45 minutes longer than that on Wednesday, and 30 minutes on Thursday. How much time does Kirk practice his trumpet in all?

2. Meg does spelling homework for 60 minutes and reading homework for 30 minutes. Her science homework takes 10 minutes longer than her reading homework. How long does she spend on her homework?

3. Samantha ate 4 servings of fruit every day for 7 days. Sometimes she ate strawberries, sometimes she ate peaches, and sometimes she drank orange juice. How many servings of fruit did Samantha eat?

4. Marcy is 3 inches taller than her sister. Her sister is 8 years old. How much taller is Marcy than her sister?

5. Elena has $20 to spend at the fair. She already knows that she wants to buy an item that costs $10. She also has to spend $4 total on travel to and from the fair. How much money will she have left to spend after she pays for these things?
Solve. If there is missing information, tell what facts you need to solve the problems. If there is extra information, write it on the line provided.

1. Annie walks 3 minutes to her bus stop every morning and 3 minutes from the bus stop to her home after school. Her bus has 17 stops. How many minutes does Annie walk to and from the bus stop throughout five days?

2. There are 2,593 library books on the library shelves. About 1,000 of them are fiction. If 308 books are checked out, how many library books will be left?

3. Brandy sold 395 candles for a fund-raiser. How many more candles does Brandy need to meet her goal?

4. A movie theater has 200 seats. A movie is showing at 6:00. Suppose 133 people buy tickets. How many seats will be empty?
Solve. If there is missing information, tell what facts you need to solve the problem. If there is extra information, write it on the line provided.

1. Ronnie is making banana bread for a fundraiser. He needs to make 9 loaves of bread. Each loaf needs 5 bananas. Each loaf will sell for $2.00. How many bananas will he need to purchase?

1. Ace wants to buy packs of pencils. Each pack costs $2. How much change will he get back from 2 $5-bills?

2. Erin bought a 4-pack of books for $6.95. Jackie bought the same 4-pack of books for $9.95. Sue spent $12.95 for the books she bought. How much more money did Sue spend on her books than what Erin and Jackie each spent?

3. Naya has twelve jacks. She gives away 6 to Jane and 3 to Heather. Hannah does not have any jacks. How many jacks does Naya have left?

4. Juan bought 2 tires for his bike. His bike cost $65. How much did he spend on the 2 tires?

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Solve. If there is missing information, tell what facts you need to solve the problem. If there is extra information, write it on the line provided.

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5. Juan bought 2 tires for his bike. His bike cost $65. How much did he spend on the 2 tires?

Multiply. (Lesson 4–4)

6. 2 × 4 = ______
7. 6 × 4 = ______
8. 8 × 4 = ______
9. 4 × 5 = ______
Use multiplication facts and strategies to help you find factors and answer the riddles.

1. My factors are between 0 and 7. If you multiply my three factors they have a product equal to 22 + 6. What are my factors?

2. I am a 2-digit number. If you subtract my second digit from my first digit, the difference is 6. The product of my digits is 0. What number am I?

3. When you add two of me together, I equal 8. I have a product of 16 when you multiply me times myself. What number am I?

4. I am a 3-digit number. The sum of my digits is 10. The product of my digits is 0. My first digit is the same as my last digit. What number am I?

5. Write your own multiplication riddle. Then explain a strategy someone could use to solve it.
You can skip count on the number line to multiply by 5.

**Find 4 × 5.** Think: 4 groups of 5 or 4 jumps of 5

\[ 4 \times 5 = 20 \]

\[ \begin{array}{cccccccccccccc}
0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 \\
\end{array} \]

**Find 3 × 5.** Think: 3 groups of 5 or 3 jumps of 5

\[ 3 \times 5 = 15 \]

\[ \begin{array}{cccccccccccccc}
0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 \\
\end{array} \]

**Multiply. You may want to use a number line.**

1. \( 2 \times 5 = \) ______
2. \( 4 \times 5 = \) ______
3. \( 7 \times 5 = \) ______

4. \( 5 \times 5 = \) ______
5. \( 5 \times 9 = \) ______
6. \( 1 \times 5 = \) ______

7. \( 6 \times 5 = \) ______
8. \( 5 \times 2 = \) ______
9. \( 5 \times 8 = \) ______

10. \( 5 \times 6 = \) ______
11. \( 3 \times 5 = \) ______
12. \( 5 \times 1 = \) ______

13. \( 5 \times 7 = \) ______
14. \( 4 \times 5 = \) ______
15. \( 6 \times 5 = \) ______

16. \( 5 \times 3 = \) ______
17. \( 8 \times 5 = \) ______
18. \( 5 \times 8 = \) ______

19. \( 9 \times 5 = \) ______
20. \( 5 \times 7 = \) ______
21. \( 5 \times 9 = \) ______

22. \( 5 \times 4 = \) ______
23. \( 3 \times 5 = \) ______
24. \( 5 \times 5 = \) ______
Multiply. Draw a picture or use an array.

1. \(5 \times 2\)  
2. \(5 \times 9\)  
3. \(10 \times 5\)  
4. \(5 \times 5\)  
5. \(8 \times 5\)  

6. \(3 \times 5\)  
7. \(5 \times 8\)  
8. \(5 \times 6\)  
9. \(7 \times 5\)  
10. \(9 \times 5\)  

11. \(5 \times 7\)  
12. \(4 \times 5\)  
13. \(2 \times 5\)  

14. If there are 10 students and each student pays $5 to a fundraiser, how much total money will they donate?

15. For a craft, each student will need 5 eggs. If there are 9 students, how many eggs will be needed?

16. For each game that Carla wins at the fair, she gets 5 tickets. Suppose Carla has 10 tickets and wins 4 more games. How many tickets will Carla have in all?

ALGEBRA Find each missing number.

17. \(5 \times \_\_\_\_\_ = 55\)  
18. \(\_\_\_\_\_ \times 5 = 30\)  
19. \(5 \times \_\_\_\_\_ = 25\)
Multiply. Draw a picture or use an array.

1. \[5 \times 2\]  
2. \[5 \times 9\]  
3. \[5 \times 4\]  
4. \[5 \times 7\]  
5. \[8 \times 5\]

6. \[7 \times 5\]  
7. \[5 \times 8\]  
8. \[5 \times 1\]  
9. \[5 \times 6\]  
10. \[9 \times 5\]

11. \[6 \times 5\]  
12. \[3 \times 5\]  
13. \[5 \times 5\]

14. Katie paid for her new bike with six $5-bills. Her change was $4. How much did the bike cost? _______

15. Sean has 4 nickels. How many walnuts can he buy if they are 5 cents each? _______

16. Each pair of tennis shoes costs $25.00. If Andrea has four $5-bills, does she have enough to buy 1 pair? _______

17. Emma has 39 books. Her bookshelf has 5 shelves. Each shelf can hold 7 books. Is there enough room for Emma’s books? Explain.

Solve. If there is missing information, tell what facts you need to solve the problem. If there is extra information, write it on the line provided. (Lesson 4–5)

18. A group of children is going to the movies. The price of admission is $4.95 each. If there are 6 children and 2 adults, and 4 seats in each car, how many cars will they take?

19. If Grant wants to adopt a cat and he brings four $10-bills, will he have enough money?

______________________________
Problem-Solving Practice

Multiply by 5

Write a multiplication sentence for each situation. Then solve.

1. There are 2 flowers in each vase. There are 5 vases. How many flowers are there in all?

2. Maria plants 5 seeds in each pot. If there are 6 pots, how many seeds did Maria plant?

3. There are 4 people in the Jones family. They all keep their shoes in one closet. Each person has 5 pairs of shoes. How many pairs of shoes are in the closet?

4. Mom bought five soccer balls. She paid with eight $5-bills. She did not get any change back. How much did the balls cost?

5. Trish is coloring 7 flowers on a page. Each flower has 5 petals. How many petals must she color to finish?

6. Mrs. Ortiz bought 8 coloring books as party favors. The books are $5 each. She paid with two $20-bills. Will Mrs. Ortiz get any change back?
Enrich

The Picnic

Five friends are planning a picnic. You are one of the friends. Each person will bring one, two, or three items to the picnic. The friends will bring enough for five people. Answer the questions to see what each person will bring and how much. Write a number sentence to show how you got your answers.

1. Zoe will bring the chips. She will bring 10 chips for each person. How many chips will Zoe bring?

2. Phil will bring sandwiches. Each sandwich will have 2 slices of bread, 3 pieces of lunchmeat and 1 slice of cheese. How many slices of bread does Phil need to make the sandwiches?

3. Ali will bring snacks of carrot sticks, celery sticks, and apple slices. He will bring 5 apple slices, 6 celery sticks, and 9 carrot sticks for each person. How many apple slices does Ali need to bring?

4. Shana will bring milk. She will bring 8 ounces for each person. How many ounces of milk does she need to bring?

5. You will bring yogurt. The yogurt is served in 6-ounce cups. How many ounces of yogurt do you need to bring?
You can use models to help you multiply by tens.

<table>
<thead>
<tr>
<th></th>
<th>1 × 10 = 10</th>
<th>2 × 10 = 20</th>
<th>3 × 10 = 30</th>
<th>4 × 10 = 40</th>
<th>5 × 10 = 50</th>
<th>6 × 10 = 60</th>
<th>7 × 10 = 70</th>
<th>8 × 10 = 80</th>
<th>9 × 10 = 90</th>
<th>10 × 10 = 100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1" alt="model1" /></td>
<td><img src="image2" alt="model2" /></td>
<td><img src="image3" alt="model3" /></td>
<td><img src="image4" alt="model4" /></td>
<td><img src="image5" alt="model5" /></td>
<td><img src="image6" alt="model6" /></td>
<td><img src="image7" alt="model7" /></td>
<td><img src="image8" alt="model8" /></td>
<td><img src="image9" alt="model9" /></td>
<td><img src="image10" alt="model10" /></td>
</tr>
</tbody>
</table>

**Multiply.**

1. \[10 \times 2 = \square\]
2. \[10 \times 7 = \square\]
3. \[10 \times 8 = \square\]
4. \[10 \times 4 = \square\]
5. \[10 \times 9 = \square\]
6. \[10 \times 3 = \square\]
7. \[10 \times 1 = \square\]
8. \[10 \times 7 = \square\]
9. \[10 \times 10 = \square\]
10. \[10 \times 6 = \square\]
11. \[10 \times 5 = \square\]
Multiply.

1. $10 \times 3$
2. $10 \times 6$
3. $5 \times 10$
4. $10 \times 8$
5. $10 \times 1$

6. $10 \times 4$
7. $2 \times 10$
8. $10 \times 5$
9. $10 \times 7$
10. $10 \times 9$

11. $10 \times 2 = ____$
12. $10 \times 6 = ____$
13. $8 \times 10 = ____$
14. $10 \times 10 = ____$
15. $4 \times 10 = ____$
16. $10 \times 7 = ____$
17. $5 \times 10 = ____$
18. $3 \times 10 = ____$
19. $9 \times 10 = ____$

Solve.

For Exercises 20–22, use data from the pictograph.

20. How many votes did Yellowstone National Park get?

21. How many votes did the Everglades get?

22. How many people voted in the survey?

<table>
<thead>
<tr>
<th>Favorite National Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowstone</td>
</tr>
<tr>
<td>Grand Canyon</td>
</tr>
<tr>
<td>Everglades</td>
</tr>
</tbody>
</table>

Key: Each stands for 10 votes.
Multiply.

1. \(10 \times 2\)  
2. \(10 \times 9\)  
3. \(10 \times 4\)  
4. \(10 \times 8\)  
5. \(10 \times 5\)  
6. \(10 \times 3\)  
7. \(7 \times 10\)  
8. \(10 \times 1\)  
9. \(4 \times 10\)  
10. \(10 \times 6\)

11. \(8 \times 10\)  
12. \(10 \times 7\)  
13. \(9 \times 10\)  
14. \(10 \times 10\)  
15. \(5 \times 10\)  
16. \(6 \times 10\)  
17. There are 10 cats and 5 dogs. How many total legs are there?
18. A farmer has 10 cows. How many eyes and ears do the cows have?

Spiral Review

Multiply. (Lesson 4–6)

19. \(5 \times 4 = \)  
20. \(7 \times 5 = \)  
21. \(5 \times 5 = \)  
22. \(5 \times 6 = \)  
23. \(8 \times 5 = \)  
24. \(5 \times 3 = \)  
25. \(9 \times 5 = \)  
26. \(6 \times 5 = \)  
27. \(5 \times 8 = \)  
28. \(5 \times 7 = \)  
29. \(2 \times 5 = \)  
30. \(5 \times 9 = \)
Write a multiplication sentence for each situation. Then solve.

1. In a game, Carlos ran with the football three times. Each time, he ran 10 yards. How many yards did he run?

   \[3 \times 10 = 30\] yards

2. The Appletown Zoo has 10 monkeys. Each monkey gets one banana a day. How many bananas do the monkeys eat each day?

   \[10 \times 1 = 10\] bananas

3. Hal shoes horses on a farm. Today he put horseshoes on all the hooves of 10 horses. How many horseshoes did he put on?

   \[10 \times 1 = 10\] horseshoes

4. Nine women have an appointment at the nail salon. Kiki will polish all of their fingernails. How many fingernails will Kiki polish today?

   \[9 \times 1 = 9\] fingernails

5. Ellen drives a van for the animal shelter. The van holds 10 animals. This week she made 6 trips to the shelter. The van was full each trip. How many animals did she drive?

   \[10 \times 6 = 60\] animals

6. A children’s TV show is on 10 days each month. On every show, Burton the Clown plays 3 songs. In the last month, he sang six of all the songs that were played. How many times did he \textit{not} sing last month?

   \[10 \times 3 \times 6 = 180\] times
Write a multiplication sentence for each trivia question. Then solve.

1. What is ten times the number of days in the week?

2. Ten times what number gives you the number of seconds in a minute or minutes in an hour?

3. What number times ten gives you the number of days in September, April, June, or November?

4. Two multiplied by what number tells how many cents are in two dimes?

5. Ten times what number gives you the number of cents in a half-dollar?

6. What number multiplied times itself gives the number of cents in one dollar?

7. What number multiplied by 10 gives the number years in a decade?

8. What number multiplied by ten gives you an answer that is twenty more than sixty?

9. Look back at your multiplication sentences. Two sentences are missing for all of the numbers 1–10 multiplied by ten. What are they?

10. What do you notice about the ones place when you multiply a number by 10?
George picked 24 ears of corn for a crab feast dinner. Penny pulled 39 crabs out of the trap to cook. There will be 16 family members having dinner. How many ears of corn are left if each family member eats one ear?

Step 1
Understand

Be sure you understand the problem.
What do you know
- George picked _____ ears of corn.
- There are _____ people eating ears of corn.
- Penny pulled _____ crabs out to cook.
- You need to find out how many _____.

Step 2
Plan
- Act it out
- Draw a picture
- Look for a pattern

Make a plan
Choose a strategy.

You can draw a picture. Decide what facts you know. Plan what you will do and in what order. Use your plan to solve the problem. Then check your solution to make sure it makes sense.
### Step 3: Solve

**Carry out your plan.**

**Plan 1** Cross off the extra information you do not need from the problem.

You know that you need to find out how many ears of corn are left.

You do not need to know how many crabs Penny is going to cook.

\[ \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \times \time...
Skills Practice

Problem-Solving Investigation

Use any strategy shown below to solve. Tell what strategy you used.

PROBLEM-SOLVING STRATEGIES

• Act it out
• Draw a picture
• Look for a pattern

1. If there are 9 alligators and 2 chickens, how many legs are there altogether?

2. Steve bought 4 shirts. Each shirt cost $10. How much change would he receive from $40?

3. Elephants at the zoo each eat 5 bales of hay every day. If there are 3 elephants, how many bales of hay will they eat a day?

4. Christine collects dolls. She has 59 plastic dolls, 48 rubber bugs, 17 pairs of shoes, and 13 cloth dolls. How many total dolls does she have?

5. Annie made lemon squares. She cut each pan into 5 rows with 5 pieces. If she made two pans and ate five squares, how many squares are left?
Use any strategy shown below to solve. Tell what strategy you used.

PROBLEM-SOLVING STRATEGIES
• Act it out
• Draw a picture
• Look for a pattern

1. Four children and 1 adult are going to a movie. The price of a ticket is $10.00 for an adult and $6.00 for a child. How much will they pay for their tickets?

2. In a pile of laundry there are 14 pairs of socks, 10 shorts, and 12 shirts. How many pieces of clothing are there altogether?

3. Janice saw 8 dogs, 4 cats, and 19 frogs for sale in the pet store. If the store sells 2 dogs and 1 cat each week, how many dogs and cats will there be at the end of the month?

4. Each dog owner paid $50 for a training class. If there are 3 classes in all, how much did each owner pay?

Spiral Review
Multiply. (Lesson 4–7)

5. 10 × 4 = _____  
6. 8 × 10 = _____  
7. 10 × 7 = _____  
8. 9 × 10 = _____  
9. 10 × 6 = _____  
10. 5 × 10 = _____
Suppose you are the leader of a drill team. There are 20 members on the team. As the team marches in the parade, the members move in different numbers of equal rows or groups. Show four ways to arrange the 20 members to make arrays, equal rows, or groups. Do not use groups of 1 or 20. Write an addition sentence and a multiplication sentence for each arrangement.

1. Addition Sentence _____________________________
   Multiplication Sentence _____________________________

2. Addition Sentence _____________________________
   Multiplication Sentence _____________________________

3. Addition Sentence _____________________________
   Multiplication Sentence _____________________________

4. Addition Sentence _____________________________
   Multiplication Sentence _____________________________

5. How are the arrays for $4 \times 5$ and $5 \times 4$ alike? How are the arrays different?
### Multiply by 0 and 1

#### Using Models
- 1 group of 4 stars = 4 stars
  \[1 \times 4 = 4\]
- 4 groups of 1 star = 4 stars
  \[4 \times 1 = 4\]
- 0 groups of 4 stars = 0 stars
  \[0 \times 4 = 0\]
- 4 groups of 0 stars = 0 stars
  \[4 \times 0 = 0\]

#### Using Pencil and Paper

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1 \times 0]</td>
<td>______</td>
</tr>
<tr>
<td>[5 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 8]</td>
<td>______</td>
</tr>
<tr>
<td>[0 \times 3]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 7]</td>
<td>______</td>
</tr>
<tr>
<td>[0 \times 5]</td>
<td>______</td>
</tr>
<tr>
<td>[4 \times 0]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 4]</td>
<td>______</td>
</tr>
<tr>
<td>[9 \times 0]</td>
<td>______</td>
</tr>
<tr>
<td>[6 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[2 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[0 \times 9]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 6]</td>
<td>______</td>
</tr>
<tr>
<td>[2 \times 0]</td>
<td>______</td>
</tr>
<tr>
<td>[9 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[0 \times 6]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 2]</td>
<td>______</td>
</tr>
<tr>
<td>[5 \times 0]</td>
<td>______</td>
</tr>
<tr>
<td>[7 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[0 \times 8]</td>
<td>______</td>
</tr>
<tr>
<td>[3 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[1 \times 9]</td>
<td>______</td>
</tr>
<tr>
<td>[0 \times 4]</td>
<td>______</td>
</tr>
<tr>
<td>[7 \times 0]</td>
<td>______</td>
</tr>
<tr>
<td>[8 \times 1]</td>
<td>______</td>
</tr>
<tr>
<td>[8 \times 0]</td>
<td>______</td>
</tr>
</tbody>
</table>
Multiply.

1. \( \frac{5}{1} \times 1 = ____ \\
2. \( \frac{3}{0} \times 0 = ____ \\
3. \( \frac{8}{1} \times 1 = ____ \\
4. \( \frac{1}{7} \times 7 = ____ \\
5. \( \frac{0}{1} \times 1 = ____ \\
6. \( \frac{1}{8} \times 8 = ____ \\

7. \( 0 \times 5 = ____ \\
8. \( 9 \times 0 = ____ \\
9. \( 0 \times 4 = ____ \\
10. \( 1 \times 4 = ____ \\
11. \( 1 \times 2 = ____ \\
12. \( 9 \times 1 = ____ \\
13. \( 1 \times 6 = ____ \\
14. \( 7 \times 1 = ____ \\
15. \( 1 \times 3 = ____ \\
16. \( 6 \times 0 = ____ \\
17. \( 0 \times 2 = ____ \\
18. \( 5 \times 1 = ____ \\

ALGEBRA  Find each missing number.

19. \( 6 \times ____ = 6 \\
20. ____ \times 9 = 0 \\
21. 1 \times ____ = 1 \\
22. ____ \times 7 = 0 \\
23. 5 \times ____ = 5 \\
24. ____ \times 4 = 0 \\
25. 8 \times ____ = 8 \\
26. ____ \times 3 = 0 \\
27. 2 \times ____ = 0 \\

Write a multiplication sentence for each situation.

28. There is 1 row of 7 chairs in the back of the classroom. How many chairs are there?

29. There are 6 chairs around the table but no one is sitting in them. How many people are sitting in the chairs?
Multiply.

1. 10 \times 0
2. 5 \times 1
3. 0 \times 3
4. 4 \times 1
5. 1 \times 8
6. 1 \times 6

7. 2 \times 1
8. 8 \times 0
9. 9 \times 1
10. 1 \times 5
11. 7 \times 1
12. 0 \times 9

Write a multiplication sentence for each situation.

13. Jimmy collects stamps. If he gets 1 stamp a day for 12 days, how many stamps will he add to the collection?

14. Louis has 5 boxes. Each box contains 1 marble. How many marbles does he have?

15. Joan has 9 goldfish. How many total legs are there?

16. Each shirt has 1 pocket. How many total pockets do 11 shirts have?

Solve. (Lesson 4–8)

17. Jane collected 4 bugs every day for 10 days. How many bugs does she have?

18. Alfonso picked 8 oranges and twice as many apples. How many apples did he pick?
Solve.

1. Laura went to the library. She saw 1 student at each of the 6 tables. How many students did she see altogether?

2. There are 10 cats. Each cat has 1 stripe on its tail. How many stripes are there in all?

3. There are 8 whales. How many legs are there?

4. There are 2 alligators. How many wings do they have?

5. One cat and 4 dogs live in the same house. How many total noses are there?

6. A boy has 2 jars. Each jar has 1 penny. How many pennies does he have?

7. One muffin has 12 chocolate chips in it. How many total chips are there?
Enrich

Multiply by 0 and 1

Solve the problems in the picture below. If the answer is a number, color that part gray. If the answer is zero, leave that part white.

1. Tell what you see when you look at the picture.

2. What do you notice about the answer in a problem where a number is multiplied by zero?

3. What do you notice about the answer of any number that is multiplied by one?
### Individual Progress Checklist

<table>
<thead>
<tr>
<th>B</th>
<th>D</th>
<th>M</th>
<th>Goal</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>explore the meaning of multiplication</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>use models to multiply</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>multiply by 2, 4, 5, 10, 0, and 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>use multiplication properties and rules</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>identify extra or missing information</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Find each sum.
1. \(3 + 3 + 3 + 3\)
2. \(6 + 6 + 6\)
3. \(4 + 4 + 4 + 4\)
4. \(2 + 2 + 2\)

Complete the pattern.
5. 3, 6, \(\square\), 12, \(\square\)
6. 4, \(\square\), 12, 16, \(\square\)
7. \(\square\), \(\square\), 6, 8, 10, 12
8. 10, 20, \(\square\), 40, \(\square\)

Write an addition sentence for each picture.
9. [Diagram]

10. [Diagram]

Solve.
11. Todd has 4 cups. In each cup he has 5 marbles. How many marbles does he have in all?
Write an addition and a multiplication sentence for each of the following.

1. 5 groups of 7

2. 9 groups of 2

Use the Commutative Property of Multiplication to find each missing number.

3. \(3 \times 6 = 18\) \(6 \times \square = 18\)

4. \(8 \times 3 = 24\) \(3 \times 8 = \square\)

Multiply.

5. \(6 \times 2 = \)

6. \(5 \times 2 = \)

7. \(4 \times 3 = \)

8. \(5 \times 4 = \)

9. \(3 \times 5 = \)

10. \(2 \times 10 = \)

11. \(10 \times 4 = \)

12. \(7 \times 0 = \)

13. \(5 \times 1 = \)

Solve.

14. Paul is collecting insects on a hike. He has 3 jars, and places 5 insects in each jar. Write an addition and a multiplication sentence to express how many bugs he collects. How many bugs does Paul have in all?
Write an addition and a multiplication sentence for each model.

1. 6 groups of 7
2. 5 groups of 8

Multiply. Draw a picture or use an array.

3. $2 \times 4$
4. $5 \times 2$
5. $8 \times 2$
6. $2 \times 7$

7. Ellen bought 2 boxes of markers. Each box has 6 markers. What is the total number of markers?

Write a multiplication sentence for the array. Then multiply.

8. 

Use the Commutative Property of Multiplication to find each missing number.

9. $6 \times 3 = 18$
   $3 \times \square = 18$

10. $2 \times 8 = 16$
    $\square \times 2 = 16$
Multiply.

1. $4 \times 2$
2. $6 \times 5$
3. $6 \times 4$
4. $5 \times 7$
5. $4 \times 4$

If there is missing information, tell what facts you need to solve the problem. If there is extra information, write it on the line provided. Then solve if possible.

6. Ellen bought 4 boxes of pens. Each box has 10 pens and costs $2.50. What is the total number of pens Ellen bought?

7. A roller coaster holds 20 people. If there are 5 groups of 5 people each, how many people will not be able to ride on the roller coaster?

8. A farmer is selling peaches. Each basket of peaches costs $2.95 and holds 6 peaches. If you purchase two baskets of peaches, how much change will you receive?

9. Write a multiplication sentence that shows that 6 nickels equals 30 cents.

10. Write a multiplication sentence that shows that 8 nickels equals 40 cents.

Find each missing number.

11. $3 \times \square = 15$
12. $\square \times 4 = 32$

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Multiply.
1. $10 \times 3$
2. $6 \times 0$
3. $1 \times 5$
4. $10 \times 7$
5. $4 \times 1$

Write a multiplication sentence for each situation. Then solve.
6. Each sticker has one spot. If you have 8 stickers, how many total spots are there?
7. How much is 5 dimes?
8. How many pouches do 3 monkeys have?
9. Buying milk with lunch costs 5 cents a day. How much will you pay for milk over 10 days?
10. Emma earns $4 a week in allowance. How much does she earn in 7 weeks?

Find each missing number.
11. $3 \times \square = 3$
12. $\square \times 4 = 0$
Write true or false on the line to identify whether each statement is true or false.

1. The Commutative Property of Multiplication states that the order in which numbers are multiplied does change the product.  **1. _____**
2. To find a 4s fact, you can double a 2s fact.  **2. _____**

Choose the best answer.

3. Find the multiplication sentence that shows 3 dimes equals 30 cents.
   A. $5 \times 6 = 30$
   B. $2 \times 15 = 30$
   C. $3 \times 10 = 30$
   D. $3 \times 8 = 24$  **3. _____**

4. Find the array that shows 4 pairs of shoes.
   F. 4 groups of 3
   G. 4 groups of 2
   H. 2 groups of 5
   J. 2 groups of 1  **4. _____**

5. Which situation shows a total of 9?
   A. 1 nose on 4 cats
   B. 2 ears on 6 elephants
   C. 2 eyes on 4 dogs
   D. 3 fish with 3 fins each  **5. _____**

Multiply.

6. $2 \times 6$  **6. _____**
7. $4 \times 8$  **7. _____**
8. $2 \times 3$  **8. _____**
9. $9 \times 4$  **9. _____**

Write a multiplication sentence for the situation. Then solve.

10. There are four cats. How many ears do they have?  **10. _____**
Vocabulary Test

Match each word to its definition. Write the letter on the line provided.

1. multiply  A. the answer to a multiplication problem
2. factor  B. the property that states that the order in which two numbers are multiplied does not change the product
3. product  C. a number that is multiplied by another number
4. array  D. the operation of repeated addition
5. Commutative Property of Multiplication  E. If you multiply a number by 1, the product is the same as that number.
6. Zero Property of Multiplication  F. the property that states any number multiplied by zero is zero
7. Identity Property of Multiplication  G. objects or symbols displayed in rows of the same length and columns of the same length

Complete each sentence by writing the correct word or words in the blank.

8. When you are completing a multiplication problem, the answer is known as the ______.

9. $6 \times 4 = 24$  $4 \times 6 = 24$. This is an example of the ______ Property of Multiplication.

10. $9 \times 1 = 9$. This is an example of the ______ Property of Multiplication.
Arrange a selection of small objects (paperclips, pencils, erasers) into groups. There should be 5 groups, each containing 4 objects.

Read each question aloud to the student. Then write the student’s answers on the lines below the question.

1. How many groups do we have? How many objects are in each group?

2. How many objects do we have in all?

3. How many objects would we have if there were another group of 4 objects?

4. Tell how you got your answer.

5. If I arrange these objects into 4 groups each containing 5 objects, would I still have the same total amount?

6. Tell how you got your answer.
7. If I have 4 bowls, and each one holds 4 apples, how many apples do I have in all?

8. Tell how you got your answer.

9. What is the answer to $5 + 5 + 5$?

10. What is the answer to $5 \times 3$?

11. Tell how you got your answer.

12. What is the answer to $4 \times 1$?

13. What is the answer to $4 \times 0$?

14. Tell how you got your answer.
# Chapter Project Rubric

<table>
<thead>
<tr>
<th>Score</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 3     | Student successfully completed the chapter project.  
       | Student demonstrated appropriate use of chapter information in completing the chapter project. |
| 2     | Student completed the chapter project with partial success.  
       | Student partially demonstrated appropriate use of chapter information in completing the chapter project. |
| 1     | Student did not complete the chapter project or completed it with little success.  
       | Student demonstrated very little appropriate use of chapter information in completing the chapter project. |
| 0     | Student did not complete the chapter project.  
       | Student demonstrated inappropriate use of chapter information in completing the chapter project. |
## Foldables Rubric

### Multiplications Concept and Facts

#### Three-Pocket Book Foldables

<table>
<thead>
<tr>
<th>Score</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| 3     | Student properly assembled Foldables graphic organizer according to instructions.  
        Student recorded information related to the chapter in the manner directed by the Foldables graphic organizer.  
        Student used the Foldables graphic organizer as a study guide and organizational tool. |
| 2     | Student exhibited partial understanding of proper Foldables graphic organizer assembly.  
        Student recorded most, but not all information related to the chapter in the manner directed by the Foldables graphic organizer.  
        Student demonstrated partial use of the Foldables graphic organizer as a study guide and organizational tool. |
| 1     | Student showed little understanding of proper Foldables graphic organizer assembly.  
        Student recorded only some information related to the chapter in the manner directed by the Foldables graphic organizer.  
        Student demonstrated little use of the Foldables graphic organizer as a study guide and organizational tool. |
| 0     | Student did not assemble Foldables graphic organizer according to instructions.  
        Student recorded little or no information related to the chapter in the manner directed by the Foldables graphic organizer.  
        Student did not use the Foldables graphic organizer as a study guide and organizational tool. |
Read each question carefully. Write your answer on the line provided.

1. \[ \frac{4}{2} \]
   - A. 6
   - B. 8
   - C. 10
   - D. 12
   - 1. _____

2. \[ \frac{8}{4} \]
   - F. 4
   - G. 12
   - H. 16
   - J. 32
   - 2. _____

3. \[ \frac{1}{9} \]
   - A. 1
   - B. 8
   - C. 9
   - D. 10
   - 3. _____

4. \[ \frac{5}{5} \]
   - F. 0
   - G. 10
   - H. 15
   - J. 25
   - 4. _____

5. \[ \frac{6}{0} \]
   - A. 0
   - B. 1
   - C. 6
   - D. 12
   - 5. _____

6. \[ \frac{10}{4} \]
   - F. 10
   - G. 30
   - H. 40
   - J. 400
   - 6. _____

7. \[ \frac{5}{10} \]
   - A. 10
   - B. 15
   - C. 50
   - D. 55
   - 7. _____
Chapter Test, Form 1  (continued)

8. \[0 \times 4\]  
   
   F. 0  
   G. 1  
   H. 4  
   J. 5  
   8. ____

9. \[3 \times 5 = \]  
   
   A. 8  
   B. 12  
   C. 15  
   D. 18  
   9. ____

10. \[6 \times 2 = \]  
    
    F. 2  
    G. 8  
    H. 12  
    J. 14  
    10. ____

11. Which property of multiplication is used for \(9 \times 1 = 9\)?  
   A. Associative Property  
   B. Identity Property  
   C. Commutative Property  
   D. Zero Property  
   11. ____

12. Which property of multiplication is used for \(5 \times 0 = 0\)?  
   F. Associative Property  
   G. Identity Property  
   H. Commutative Property  
   J. Zero Property  
   12. ____

13. Jose, Courtney, and Gabriella each have 4 stickers. If Courtney loses 1 of her stickers, how many stickers will Jose, Courtney, and Gabriella have altogether?  
   A. 4  
   B. 11  
   C. 12  
   D. 13  
   13. ____

Solve.

14. 10 students are lined up in the hallway. Each student has 1 backpack. How many backpacks are there in all?  
   F. 1  
   G. 10  
   H. 11  
   J. 20  
   14. ____

15. A group of 5 fish has how many legs?  
   A. 0  
   B. 1  
   C. 5  
   D. 10  
   15. ____
Chapter Test, Form 2A

Read each question carefully. Write your answer on the line provided.

1. \[ \frac{3}{2} \times 2 \]
   - A. 5
   - B. 6
   - C. 8
   - D. 9
   1. _____

2. \[ \frac{9}{4} \times 4 \]
   - F. 5
   - G. 13
   - H. 34
   - J. 36
   2. _____

3. \[ \frac{1}{8} \times 8 \]
   - A. 1
   - B. 8
   - C. 9
   - D. 18
   3. _____

4. \[ \frac{5}{4} \times 4 \]
   - F. 1
   - G. 9
   - H. 15
   - J. 20
   4. _____

5. \[ \frac{0}{7} \times 7 \]
   - A. 0
   - B. 1
   - C. 7
   - D. 14
   5. _____

6. \[ \frac{10}{2} \times 2 \]
   - F. 10
   - G. 12
   - H. 15
   - J. 20
   6. _____

7. \[ \frac{8}{10} \times 10 \]
   - A. 10
   - B. 18
   - C. 80
   - D. 100
   7. _____
8. $2 \times 7 = \square$
   - F. 5
   - G. 9
   - H. 12
   - J. 14
   - 8. _____

9. Which property of multiplication is used for $8 \times 0$?
   - A. Associative Property
   - B. Identity Property
   - C. Commutative Property
   - D. Zero Property
   - 9. _____

10. $5 \times 7 = \square$
    - F. 12
    - G. 15
    - H. 35
    - J. 40
    - 10. _____

11. Which property of multiplication is used for $5 \times 4 = 4 \times 5$?
    - A. Associative Property
    - B. Identity Property
    - C. Commutative Property
    - D. Zero Property
    - 11. _____

12. Which property of multiplication is used for $7 \times 1 = 7$?
    - F. Associative Property
    - G. Identity Property
    - H. Commutative Property
    - J. Zero Property
    - 12. _____

Solve.

13. There are 5 clowns at the circus. Each clown has 1 red nose. How many total red noses do the clowns have?
   - A. 1
   - B. 5
   - C. 10
   - D. 15
   - 13. _____

14. How many legs do 10 fish have altogether?
    - F. 0
    - G. 5
    - H. 10
    - J. 11
    - 14. _____

15. Michael, William, Elizabeth, and Ramon each put both of their hands into a group before their soccer game. If William takes one of his hands out of the group, how many hands will be left in the group of hands?
    - A. 7
    - B. 8
    - C. 12
    - D. 13
    - 15. _____
Read each question carefully. Write your answer on the line provided.

1. $3 \times 2$
   - A. 5
   - B. 6
   - C. 8
   1. _____

2. $9 \times 4$
   - F. 5
   - G. 13
   - H. 36
   2. _____

3. $1 \times 8$
   - A. 1
   - B. 8
   - C. 9
   3. _____

4. $4 \times 4$
   - F. 1
   - G. 9
   - H. 16
   4. _____

5. $0 \times 7$
   - A. 0
   - B. 7
   - C. 14
   5. _____

6. $10 \times 2$
   - F. 12
   - G. 15
   - H. 20
   6. _____

7. $7 \times 3$
   - A. 21
   - B. 24
   - C. 37
   7. _____

8. $5 \times 0$
   - F. 0
   - G. 5
   - H. 10
   8. _____
9. \(2 \times 6\)
   A. 8   B. 12   C. 14
9. ______

10. \(2 \times 7 = \square\)
    F. 5   G. 9   H. 14
10. ______

11. What multiplication property is used for \(8 \times 0\)?
    A. Identity Property
    B. Commutative Property
    C. Zero Property
11. ______

12. What multiplication property is used for \(5 \times 4 = 4 \times 5\)?
    F. Identity Property
    G. Commutative Property
    H. Zero Property
12. ______

13. What multiplication property is used for \(7 \times 1 = 7\)?
    A. Identity Property
    B. Commutative Property
    C. Zero Property
13. ______

Solve.

14. There are 5 clowns. Each clown has 1 nose. How many noses do the clowns have in all?
    F. 1   G. 5   H. 10
14. ______

15. How many legs do 10 fish have in all?
    A. 0   B. 5   C. 10
15. ______
Read each question carefully. Write your answer on the line provided.

**Multiply.**

1. \[9 \times 1\]  
2. \[9 \times 2\]  
3. \[1 \times 5\]  
4. \[5 \times 2\]  
5. \[8 \times 0\]  
6. \[9 \times 4\]  
7. \[2 \times 10\]  
8. \[6 \times 2\]  

9. Which property of multiplication is used?  
   \[4 \times 0 = 0\]
10. $4 \times 4 =$

11. Which property of multiplication is used?
   $8 \times 1 = 8$

12. Which property of multiplication is used?
   $3 \times 4 = 4 \times 3$

Solve.

13. There are 4 lions at the circus. Each lion has 1 furry tail. How many furry tails do the lions have in all?

14. How many legs do 10 fish have altogether?

15. Brandon, Carlos, Daniel, and Emily each put both of their hands into a group before their soccer game. If Brandon takes one of his hands out of the group, how many hands will be left in the group of hands?
Read each question carefully. Write your answer on the line provided.

Multiply.

1. \[ 9 \times 1 \]

2. \[ 8 \times 2 \]

3. \[ 1 \times 10 \]

4. \[ 5 \times 2 \]

5. \[ 7 \times 0 \]

6. \[ 9 \times 4 \]

7. \[ 3 \times 10 \]

8. \[ 9 \times 2 \]

9. What multiplication property is used?
   \[ 5 \times 0 = 0 \]

9. ____________________________
10. \[ \begin{array}{c}
4 \\
\times 4
\end{array} \]

11. \[ \begin{array}{c}
7 \\
\times 2
\end{array} \]

12. \[ \begin{array}{c}
4 \\
\times 2
\end{array} \]

13. What multiplication property is used?

\[ 7 \times 1 = 7 \]

14. What multiplication property is used?

\[ 3 \times 4 = 4 \times 3 \]

**Solve.**

15. There are 4 lions. Each lion has 1 tail. How many tails do the lions have altogether?

16. How many legs do 10 fish have altogether?

17. Paul, Ricky, and Don each put 2 hands into a group. If Ricky takes 1 of his hands out of the group, how many hands will be left in the group of hands?
Read each question carefully. Write your answer on the line provided.

Find each product.

1. $9 \times 10$

2. $8 \times 2$

3. $1 \times 10$

4. $5 \times 2$

5. $7 \times 0$

6. $9 \times 4$

7. $3 \times 10$

8. $3 \times 5$

9. $7 \times 4$

10. $0 \times 6$

11. $9 \times 2$

Grade 3
12. Which property of multiplication is used in the following equation?

\[ 5 \times 0 = 0 \]

13. \[ 4 \]
\[ \times 4 \]

14. \[ 7 \]
\[ \times 2 \]

15. \[ 4 \]
\[ \times 2 \]

16. Which property of multiplication is used in the following equation?

\[ 7 \times 1 = 7 \]

17. Which property of multiplication is used in the following equation?

\[ 3 \times 4 = 4 \times 3 \]

**Solve.**

18. There are 20 lions at the circus. Each lion has 1 furry tail. How many furry tails do the lions have altogether?

19. How many legs do 4 fish have altogether?

20. Madison, Ryan, Holly, and Alex each put both of their hands into a group before their soccer game. If Ryan and Alex each take one hand out of the group, how many hands will be left in the group?
Chapter Extended-Response Test

Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solution in more than one way or investigate beyond the requirements of the problem. Record your answer on another piece of paper.

1. Explain in your own words the meaning of multiplication.
   a. How can multiplication be seen as repeated addition?
   b. What is an example of multiplication as repeated addition?

2. What is an array and how can it be used to help with multiplication?
   a. Draw an array for \(4 \times 5\).
   b. Draw an array for \(3 \times 9\).

3. Write two multiplication sentences that demonstrate the Commutative Property of Multiplication.

4. Describe the Zero Property of Multiplication and the Identity Property of Multiplication. Provide an example of each.
Student Recording Sheet

Use this recording sheet with pages 196–197 of the Student Edition.

Read each question. Then fill in the correct answer.

1. A B C D

2. F G H J

3. A B C D

4. F G H J

5. A B C D

6. F G H J

7. A B C D

8. F G H J

9. A B C D

10. F G H J
Test Example

Emily needs 4 nails for each shelf in the bookcase she is building. There are 5 shelves in the bookcase. How many nails will Emily need to complete the bookcase.

A. 9  B. 18  C. 15  D. 20

Read the Question

You need to find out how many nails Emily needs.

Solve the Question

Emily needs 20 nails to build the bookcase.
Therefore, the answer is D.

Read each question carefully. Write your answer on the line provided.

1. Hector bought 3 packs of gum. Each pack has 5 pieces. How many pieces of gum does Hector have?
   A. 12  B. 15  C. 10  D. 8
   1. _____

2. Which number sentence is modeled by the figure?
   F. $7 + 7 + 7$  H. $7 \times 5 = 35$
   G. $7 \times 2 = 14$  J. $7 \times 3 = 21$
   2. _____
3. Which is the same as $10 \times 6$?
   
   A. $6 \times 10$  
   B. $6 - 10$  
   C. $10 + 6$  
   D. $6 + 10$  
   3. _____

4. What number would make the number sentence true?
   
   $2 \times \square = 10$
   
   F. 10  
   G. 4  
   H. 5  
   J. 6  
   4. _____

5. Jacob runs 3 miles a day. He runs 3 days a week. How many miles does Jacob run each week?
   
   A. 7  
   B. 6  
   C. 9  
   D. 3  
   5. _____

6. The product of 7 and another factor is 7. What is the missing factor?
   
   F. 1  
   G. 49  
   H. 0  
   J. 2  
   6. _____

7. The school spirit store ordered 77 T-shirts. The store sold 62 T-shirts. How many T-shirts did they have left?
   
   A. 12  
   B. 15  
   C. 5  
   D. 3  
   7. _____

8. How is four thousand, five hundred twenty-two written in standard form?
   
   F. 4,022  
   G. 4,525  
   H. 4,255  
   J. 4,522  
   8. _____

9. Which set of numbers is in order from greatest to least?
   
   A. 923, 392, 450, 290  
   B. 392, 290, 923, 450  
   C. 923, 450, 392, 290  
   D. 290, 392, 450, 923  
   9. _____

10. For the class picnic, Jose packed 20 cherry ice pops, 14 grape ice pops, and 12 orange ice pops. There are 60 students going to the picnic. How many more ice pops should Jose pack?
    
    F. 17  
    G. 11  
    H. 59  
    J. 14  
    10. _____
11. Write a multiplication problem for 7 groups of 5.

12. How would you write an addition sentence for $4 \times 3$?

13. Write a multiplication sentence that equals 21.

14. Write a multiplication sentence for $2 + 2 + 2 + 2 + 2$.

15. Write a multiplication sentence to show how many dimes are in a dollar.


17. Sue buys a carton of milk for $1.05, a salad for $2.15, and a slice of pizza for $2.21. How much does she pay?

18. Each aquarium has 7 fish. There are 5 aquariums. How many fish are there in all?
Use this graphic organizer to take notes on Chapter 4: Multiplication Concepts and Facts. Fill in the missing information.

<table>
<thead>
<tr>
<th>Property</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
</table>
| Commutative Property | The order in which numbers are multiplied does not change the product. | $2 \times 6 = 12$
|                 |                                                  | $6 \times 2 = 12$ |
| Zero Property   | When you multiply a number by 0, the product is zero. | $3 \times 0 = 0$ |
| Identity Property | When any number is multiplied by 1, the product is that number. | $1 \times 5 = 5$ |

**Anticipation Guide**

Multiplication Concepts and Facts

**Before you begin Chapter 4**

- Read each statement.
- Decide whether you agree (A) or disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (not sure).

<table>
<thead>
<tr>
<th>Statement</th>
<th>A, D, or NS</th>
<th>A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7 + 7 + 7 + 7 = 35$</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>When you multiply, you divide the same number multiple times.</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>An array can help you to find the answer to a multiplication problem.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>$4 \times 3$ is greater than $6 \times 2$.</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>To find a 4 multiplication fact, you can double a 2 multiplication fact.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Six $10$-bills are $60$.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Any number multiplied by 10 is equal to that number with two zeros after it.</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>The Zero Property of Multiplication says that when you multiply a number by zero, the product is zero.</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>The Identity Property of Multiplication says that when you multiply any number by 2 the product is that number.</td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>$0 \times 0 = 0$</td>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>

**After you complete Chapter 4**

- Reread each statement and complete the last column by entering an A (agree) or a D (disagree).
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a separate sheet of paper to explain why you disagree. Use examples, if possible.
**Reteach**

**Multiplication as Repeated Addition**

When there is an equal number in each group, you can find the total by using repeated addition or multiplication.

Multiply: 4 groups of 3 = 12

4 \times 3 = 12

Add: \( 3 + 3 + 3 + 3 = 12 \)

Find each total. Write an addition and a multiplication sentence.

1. \( \star \star \star \star + \star \star \star \star = 18 \)
   
   3 groups of 6 = 18
   
   \( 3 \times 6 = 18 \)

2. \( \star \star \star \star + \star \star \star \star + \star \star \star \star + \star \star \star \star + \star \star \star \star = 22 \)
   
   7 groups of 2 = 14
   
   \( 7 \times 2 = 14 \)

3. \( \star \star \star \star + \star \star \star \star + \star \star \star \star + \star \star \star \star = 15 \)
   
   3 groups of 5 = 15
   
   \( 3 \times 5 = 15 \)

4. \( \star \star \star \star + \star \star \star \star + \star \star \star \star = 12 \)
   
   3 groups of 4 = 12
   
   \( 3 \times 4 = 12 \)

**Skills Practice**

**Multiplication as Repeated Addition**

Write an addition and a multiplication sentence for each model.

1. \( \star \star \star \star + \star \star \star \star + \star \star \star \star + \star \star \star \star = 18 \)
   
   \( 6 + 6 + 6 = 18 \)
   
   \( 3 \times 6 = 18 \)

2. \( \star \star \star \star + \star \star \star \star + \star \star \star \star + \star \star \star \star + \star \star \star \star = 20 \)
   
   \( 5 + 5 + 5 + 5 = 20 \)
   
   \( 4 \times 5 = 20 \)

Multiply. Use repeated addition.

3. \( 4 \times 6 = 24 \)

4. \( 2 \times 9 = 18 \)

5. \( 3 \times 7 = 21 \)

6. \( 6 \times 4 = 24 \)

7. \( 8 \times 3 = 24 \)

8. \( 5 \times 5 = 25 \)

9. \( 2 \times 8 = 16 \)

10. \( 6 \times 2 = 12 \)

11. \( 3 \times 9 = 27 \)

Solve.

12. If Jason can collect 5 cans in one week, how many cans can he collect in 7 weeks?
   
   \( 35 \text{ cans} \)

13. Omar collected 8 cans of food on Monday, 8 cans of food on Tuesday, and 8 cans of food on Thursday. How many cans of food did he collect in all?
   
   \( 24 \text{ cans} \)
Homework Practice
Multiplication as Repeated Addition

Write an addition and a multiplication sentence for each model.

1.  
   \[4 + 4 + 4 = 12\]
   \[3 \times 4 = 12\]

2.  
   \[4 + 4 + 4 + 4 = 20\]
   \[5 \times 4 = 20\]

Multiply. Use repeated addition.

3. \[8 \times 3 = 24\]
4. \[4 \times 6 = 24\]
5. \[8 \times 4 = 32\]
6. \[3 \times 9 = 27\]
7. \[7 \times 6 = 42\]
8. \[9 \times 10 = 90\]

Problem-Solving Practice
Multiplication as Repeated Addition

Write an addition and a multiplication sentence. Then solve.

1. There are 3 people sitting at each of 4 tables. How many people are there in all?
   \[3 + 3 + 3 + 3 = 12\]
   \[4 \times 3 = 12 \text{ people in all}\]

2. Alisa needs to put 2 forks at each of 8 table settings. How many forks in all does she need?
   \[2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16\]
   \[8 \times 2 = 16 \text{ forks in all}\]

3. Renee jogs 5 miles a day, 4 days each week. How many miles does she jog each week?
   \[20\] miles
   \[5 + 5 + 5 + 5 = 20\]
   \[5 \times 4 = 20\]

4. Henry lives 3 miles away from the mall. Henry can run a mile in 6 minutes. If he can keep up this speed, how long will it take him to run to the mall?
   \[18\] minutes
   \[6 + 6 + 6 = 18\]
   \[6 \times 3 = 18\]

5. It takes Sam 5 minutes to wash a window. Sam has 9 windows in his house to wash. How many minutes will it take him to finish?
   \[45\] minutes
   \[5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 45\]
   \[5 \times 9 = 45\]

6. Heather spent $4 for a salad and $2 for a drink. She bought the same lunch for 3 of her friends. She paid with three $10-bills. How much change did she get back?
   \[6 + 6 + 6 + 6 = 24; 10 + 10 + 10 = 30; 30 - 24 = 6\]
   \[6 \times 4 = 24; 3 \times 10 = 30; 30 - 24 = 6\]

Spiral Review

Write an expression to describe each problem. Then solve. (Lesson 3–9)

9. Jennifer needs 4 blue strings and 18 pink strings to make friendship bracelets. How many strings does she need?
   \[4 + 18; 4 + 18 = 22 \text{ strings}\]

10. Allison made 21 mini pizzas for the party. Angela made 33 mini pizzas. How many more pizzas did Angela make?
    \[33 - 21 = 12 \text{ more pizzas}\]
4–1 Answers (Lessons 4–1 and 4–2)

**Enrich**

**Groups of Frogs**

These frogs like to sit in groups. Complete each addition sentence to see how many frogs are in each group. Match the number of frogs from the addition sentence to the groups of frogs. Then write a multiplication sentence that gives the same answer as the addition sentence.

1. 2 + 2 + 2 + 2 = 8
   
   line drawn to 8 frogs in four groups of 2; 4 × 2 = 8

2. 4 + 4 + 4 = 12
   
   line drawn to 12 frogs in 3 groups of 4; 3 × 4 = 12

3. 6 + 6 + 6 = 18
   
   line drawn to 18 frogs in 3 groups of 6; 3 × 6 = 18

4. Show how you would draw five groups of four frogs. Then write a multiplication and an addition sentence that explain the drawing.
   
   drawing should represent five groups of four frogs;
   
   4 + 4 + 4 + 4 + 4 = 20;
   
   5 × 4 = 20

**Reteach**

**Arrays and Multiplication**

Find 2 × 3 and 3 × 2.

**Using Models**

Make 2 rows of 3 counters to show 2 × 3.

- Number of rows: 2
- Number in each row: 3
- Product: 6

Make 3 rows of 2 counters to show 3 × 2.

- Number of rows: 3
- Number in each row: 2
- Product: 6

**Using Paper and Pencil**

- Number of rows
- Number in each row
- Product

**Draw lines to match the multiplication sentence with an array. Then use the Commutative Property to write a different multiplication sentence.**

1. 5 × 3 = 15
2. 3 × 6 = 18
3. 5 × 4 = 20

- 4 × 5 = 20
- 6 × 3 = 18
- 3 × 5 = 15
Write the multiplication sentence for each array. Then multiply.

1. \(4 \times 3 = 12\)
2. \(5 \times 2 = 10\)
3. \(3 \times 5 = 15\)

Use the Commutative Property of Multiplication to find the missing number.

4. \(2 \times 3 = 6\) \(3 \times 2 = 6\)
5. \(5 \times 0 = 0\) \(0 \times 5 = 0\)
6. \(8 \times 6 = 48\) \(6 \times 8 = 48\)
7. \(7 \times 4 = 28\) \(4 \times 7 = 28\)
8. \(2 \times 5 = 10\) \(5 \times 2 = 10\)
9. \(5 \times 9 = 45\) \(9 \times 5 = 45\)
10. \(8 \times 3 = 24\) \(3 \times 8 = 24\)
11. \(9 \times 4 = 36\) \(4 \times 9 = 36\)
12. \(1 \times 8 = 8\) \(8 \times 1 = 8\)
13. \(7 \times 8 = 56\) \(8 \times 7 = 56\)
14. \(6 \times 7 = 42\) \(7 \times 6 = 42\)
15. \(9 \times 6 = 54\) \(6 \times 9 = 54\)

Use the Commutative Property of Multiplication to find the missing number.

4. \(3 \times 9 = 27\)

Spiral Review

Write an addition and a multiplication sentence. Then solve. (Lesson 4–1)

9. \(3 + 3 = 6; 2 \times 3 = 6\)
Problem-Solving Practice

Arrays and Multiplication

Solve.

1. Mr. Turner has 4 students in each of 5 math groups. Draw an array of circles to show how many students there are in all.

   Students should draw 5 rows of circles with 4 circles in each row.

2. Four students have 3 pencils each. Draw an array of circles to show how many pencils there are in all.

   Students should draw 4 rows of circles with 3 circles in each row.

3. The top shelf in the bakery has 5 muffins on each of 6 plates. The bottom shelf has 6 muffins on each plate. Both shelves have the same number of muffins. How many plates are on the bottom shelf?

   Students should draw 5 rows of circles with 4 circles in each row.

   How many muffins are on each shelf?

4. Each baker uses the same number of cherries. Tanya puts 3 cherries on each of 6 pies. Russell puts cherries on 3 pies. If Russell puts the same number of cherries on each pie, how many cherries does he need?

   Students should draw 4 rows of circles with 3 circles in each row.

   How many cherries did each baker use?

5. Leroy and Vern each have the same number of video games. Leroy puts an equal number of games in each of 7 boxes. Vern has only 3 boxes. He puts 7 games in each box. How many video games do Leroy and Vern have altogether?

6. Ray makes an array that has 4 rows of 4 counters. He wants to make two more arrays using the same number of counters. He wants more than one counter in each row. What two arrays can he make?

   Sample answer: 2 rows of 8 counters or 8 rows of 2 counters

Enrich

Colorful Arrays

- Choose 4 colors to make arrays.
- Use 2 colors in each array.

Complete the multiplication sentence under each array. Color an array to match the sentence. (Hint: The first digit tells how many rows in the array. The second digit tells how many in each row.)

Then use the Commutative Property of Multiplication to write a different multiplication sentence using the same factors. Write that sentence underneath the first set of sentences. The products should be the same.

For example, 3 × 2 = 6 and 2 × 3 = 6. So, 3 × 2 = 2 × 3.

Check student’s arrays.
Reteach
Multiply by 2

You can skip count on the number line to help you multiply two numbers.

Find $6 \times 2$. Think: 6 groups of 2 or 6 jumps of 2 spaces

\[6 \times 2 = 12\]

Find $3 \times 2$. Think: 3 groups of 2 or 3 jumps of 2 spaces

\[3 \times 2 = 6\]

Multiply. You may want to use a number line.

1. $4 \times 2 = 8$
2. $7 \times 2 = 14$
3. $2 \times 9 = 18$
4. $5 \times 2 = 10$
5. $2 \times 6 = 12$
6. $2 \times 3 = 6$
7. $2 \times 2 = 4$
8. $2 \times 4 = 8$
9. $9 \times 2 = 18$
10. $1 \times 2 = 2$
11. $8 \times 2 = 16$
12. $6 \times 2 = 12$
13. $2 \times 7 = 14$
14. $3 \times 2 = 6$
15. $2 \times 5 = 10$
16. $2 \times 8 = 16$

Skills Practice
Multiply by 2

Multiply. Draw a picture or use an array.

1. $7 \times 2 = 14$
2. $9 \times 2 = 18$
3. $2 \times 7 = 14$
4. $2 \times 2 = 8$
5. $5 \times 2 = 10$
6. $6 \times 2 = 12$
7. $2 \times 1 = 2$
8. $2 \times 9 = 18$
9. $2 \times 2 = 4$
10. $2 \times 6 = 12$
11. $2 \times 4 = 8$
12. $2 \times 2 = 4$
13. $2 \times 3 = 6$
14. $2 \times 4 = 8$
15. $5 \times 2 = 10$
16. $2 \times 2 = 4$
17. $9 \times 2 = 18$
18. $2 \times 9 = 18$
19. $2 \times 8 = 16$
20. $2 \times 7 = 14$
21. $2 \times 4 = 8$
22. $6 \times 2 = 12$
23. $7 \times 2 = 14$
24. $8 \times 2 = 16$
25. $2 \times 2 = 4$
26. $2 \times 5 = 10$
27. $4 \times 2 = 8$
28. $7 \times 2 = 14$
29. $8 \times 2 = 16$
30. $1 \times 2 = 2$

Write a multiplication sentence for each situation. Then solve.

31. The dancers in a ballet class rehearse for 3 hours each day. For how many hours will they rehearse from Tuesday through Saturday?

\[5 \times 3 = 15\text{ hours}\]

32. The beginner ballet class meets for 6 weeks Tuesday through Saturday. For how many days does the ballet class meet?

\[6 \times 5 = 30\text{ days}\]
Multiply.

1. \(5 \times 2 = 10\)

2. \(2 \times 8 = 16\)

Multiply. Draw a picture or use an array.

3. \(5 \times 2 = 10\)

4. \(2 \times 3 = 6\)

5. \(4 \times 2 = 8\)

6. \(7 \times 2 = 14\)

7. \(7 \times 9 = 63\)

8. \(2 \times 8 = 16\)

9. \(2 \times 2 = 4\)

10. \(6 \times 2 = 12\)

Write a multiplication sentence for each situation. Then solve.

11. There are 4 boys. How many total arms do they have?

\[4 \times 2 = 8; 8 \text{ arms}\]

12. John is jumping on a pogo stick. He is counting by twos. If he counted to 24, how many jumps has he made?

\[12 \text{ jumps}\]

Spiral Review

Use the Commutative Property of Multiplication to find each missing number. (Lesson 4–2)

13. \(4 \times 7 = 28\)

14. \(6 \times 2 = 12\)

15. \(5 \times 3 = 15\)

16. \(7 \times \square = 28\)

17. \(2 \times 6 = 12\)

18. \(3 \times 5 = 15\)

Answers (Lesson 4–3)
**Enrich**

*Symbols Puzzler*

Each shape stands for a number. See if you can figure out what the numbers are.

- **Heart** = 2
- **Triangle** = 3
- **Diamond** = 4
- **5-pointed star** = 5
- **Hexagon** = 6
- **Happy face** = 7
- **Sun with rays** = 8

What digit does each symbol represent?

- **Heart** × **Heart** = 12
- **Heart** × **Star** = 10
- **Heart** × **Diamond** = 14
- **Hexagon** × 2 =

**Reteach**

*Multiply by 4*

Find 4 × 5.

Using Models

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number in each row</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

Using Pencil and Paper

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number in each row</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

Use the picture to find the product.

1. 4 × 6 = __________
2. 4 × 5 = __________
3. 4 × 9 = __________
4. 4 × 7 = __________
5. 4 × 4 = __________
6. 4 × 3 = __________
7. 3 × 4 = __________
8. 4 × 2 = __________
9. 4 × 1 = __________
10. 4 × 6 = __________
11. 9 × 4 = __________
12. 4 × 8 = __________
13. 7 × 4 = __________
14. 4 × 9 = __________
15. 2 × 4 = __________
16. 5 × 4 = __________
17. 6 × 4 = __________
18. 1 × 4 = __________
19. 4 × 5 = __________
20. 2 × 4 = __________
21. 4 × 4 = __________
Multiply.

1. \(4 \times 2 = 8\)
2. \(4 \times 6 = 24\)
3. \(4 \times 9 = 36\)
4. \(4 \times 3 = 12\)
5. \(4 \times 7 = 28\)

Write a multiplication sentence for each situation. Then solve.

17. There are 5 cars. How many total wheels do they have?
   \(5 \times 4 = 20\) wheels

18. There are 4 snakes and each snake has two eyes. What is the total number of eyes?
   \(4 \times 2 = 8\) eyes

19. A toy comes with 6 parts in each box. If you have 4 boxes of toys, how many parts are there altogether?
   \(4 \times 6 = 24\) parts
Problem-Solving Practice

Multiply by 4

Write a multiplication sentence for each situation. Then solve.

1. The straight part of Eli's train track has 4 tracks. Each track has 7 train cars. How many train cars are on the straight part of the train track?
   \[4 \times 7 = 28\]
   \[28\] train cars

2. Melissa owns 4 sets of trains. Each set has 6 train cars. How many train cars does Melissa have in all?
   \[4 \times 6 = 24\]
   \[24\] cars

3. There are 4 posters on each bulletin board. There are 3 bulletin boards. How many posters are there in all?
   \[3 \times 4 = 12\]
   \[12\] posters

4. There are 4 groups of students in charge of decorating the hallway bulletin boards. Each group decorates 8 different boards around the school. How many bulletin boards are there in all?
   \[4 \times 8 = 32\]
   \[32\] bulletin boards

5. Paula can make 4 beaded bracelets in an hour. In one week Paula made bracelets for 6 hours. How many bracelets did she make?
   \[6 \times 4 = 24\]
   \[24\] bracelets

6. Every bracelet has 4 blue beads. If Jackie makes 5 bracelets, how many blue beads will she use?
   \[4 \times 5 = 20\]
   \[20\] blue beads

Enrich

How Many in Zooland?

Read the questions about the animals. Write a true multiplication sentence for each question.

1. How many wings on 4 birds?
   \[4 \times 2 = 8\] wings

2. How many trunks on 4 elephants?
   \[4 \times 1 = 4\] trunks

3. How many legs on 4 snakes?
   \[4 \times 0 = 0\] legs

4. How many legs on 4 grasshoppers?
   \[4 \times 6 = 24\] legs

5. How many legs on 9 zebras?
   \[9 \times 4 = 36\] legs

6. How many arms on 4 octopuses?
   \[4 \times 8 = 32\] arms

7. How many legs on 4 cheetahs?
   \[4 \times 4 = 16\] legs

8. How many legs on 3 elephants?
   \[3 \times 4 = 12\] legs

CHALLENGE

9. How many legs are on 2 zebras and 3 elephants?
   \[4 \times 5 = 20\] or \[2 \times 4 = 8\]; \[3 \times 4 = 12\]; \[8 + 12 = 20\]

10. How many legs are on 2 grasshoppers and 2 octopuses?
    \[2 \times 6 = 12\]; \[2 \times 8 = 16\]; \[12 + 16 = 28\] legs
## Reteach

### Problem-Solving Strategy

**Extra or Missing Information**

Math class starts at 10:00 A.M. and lasts for 55 minutes. Art class starts 5 minutes after math class ends. Art class ends at 11:45 A.M. How long is art class?

<table>
<thead>
<tr>
<th>Step 1 Understand</th>
<th>Make sure you understand the problem. What do you need to find? How long is art class?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2 Plan</td>
<td>Make a plan</td>
</tr>
<tr>
<td></td>
<td>Find out when art class begins and ends.</td>
</tr>
<tr>
<td></td>
<td>Find the necessary information.</td>
</tr>
<tr>
<td></td>
<td>Math starts at 10:00.</td>
</tr>
<tr>
<td></td>
<td>It lasts for 55 minutes.</td>
</tr>
<tr>
<td></td>
<td>Art starts 5 minutes later.</td>
</tr>
<tr>
<td></td>
<td>Art class ends at 11:45.</td>
</tr>
</tbody>
</table>

| Step 2 Solve      | Carry out your plan.                                                                  |
|                   | Find when math class ends. 10:00 → 55 minutes later → 10:55                           |
|                   | Art starts 5 minutes later. 10:55 → 5 minutes later → 11:00                           |
|                   | How long is art class? 11:00 → 11:45 = 45 minutes                                      |
|                   | Art class is 45 minutes long.                                                         |

| Step 4 Check      | Check your answer.                                                                    |
|                   | Make sure you used the correct information.                                           |

### Solve. If there is missing information, tell what facts you need to solve the problem.

1. Kirk practices the trumpet for 30 minutes on Tuesday, 45 minutes longer than that on Wednesday, and 30 minutes on Thursday. How much time does Kirk practice his trumpet in all?

**135 minutes**

2. Meg does spelling homework for 60 minutes and reading homework for 30 minutes. Her science homework takes 10 minutes longer than her reading homework. How long does she spend on her homework?

**130 minutes**

3. Samantha ate 4 servings of fruit every day for 7 days. Sometimes she ate strawberries, sometimes she ate peaches, and sometimes she drank orange juice. How many servings of fruit did Samantha eat?

**28 servings**

4. Marcy is 3 inches taller than her sister. Her sister is 8 years old. How much taller is Marcy than her sister?

**The missing information is the height of Marcy’s sister.**

5. Elena has $20 to spend at the fair. She already knows that she wants to buy an item that costs $10. She also has to spend $4 total on travel to and from the fair. How much money will she have left to spend after she pays for these things?

**$6**
Solve. If there is missing information, tell what facts you need to solve the problem. If there is extra information, write it on the line provided.

1. Ronnie is making banana bread for a fundraiser. He needs to make 9 loaves of bread. Each loaf needs 5 bananas. Each loaf will sell for $2.00. How many bananas will he need to purchase?

2. Ace wants to buy packs of pencils. Each pack costs $2. How much change will he get back from 2 $5-bills?

3. Brandy sold 395 candles for a fundraiser. How many more candles does Brandy need to meet her goal?

4. A movie theater has 200 seats. A movie is showing at 6:00. Suppose 133 people buy tickets. How many seats will be empty?

5. Juan bought 2 tires for his bike. His bike cost $65. How much did he spend on the 2 tires?

6. Naya has twelve jacks. She gives away 6 to Jane and 3 to Heather. Hannah does not have any jacks. How many jacks does Naya have left?

7. 6 bananas; extra information: Each loaf will sell for $2.00

8. 8 bananas; extra information: Each loaf will sell for $2.00

9. 4 bananas; extra information: Each loaf will sell for $2.00

1. Annie walks 3 minutes to her bus stop every morning and 3 minutes from the bus stop to her home after school. Her bus has 17 stops. How many minutes does Annie walk to and from the bus stop throughout five days?

2. There are 2,593 library books on the library shelves. About 1,000 of them are fiction. If 308 books are checked out, how many library books will be left?

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7. 6 × 4 = 24

8. 8 × 4 = 32

9. 4 × 5 = 20

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**Enrich**

**Multiplication Riddles**

Use multiplication facts and strategies to help you find factors and answer the riddles.

1. My factors are between 0 and 7. If you multiply my three factors they have a product equal to 22 + 6. What are my factors?
   
   7, 4, 1

2. I am a 2-digit number. If you subtract my second digit from my first digit, the difference is 6. The product of my digits is 0. What number am I?

   60

3. When you add two of me together, I equal 8. I have a product of 16 when you multiply me times myself. What number am I?

   4

4. I am a 3-digit number. The sum of my digits is 10. The product of my digits is 0. My first digit is the same as my last digit. What number am I?

   505

5. Write your own multiplication riddle. Then explain a strategy someone could use to solve it.

   **Answers will vary depending on the riddle; accept reasonable/logical answers.**
Multiply. Draw a picture or use an array.

1. \(5 \times 2 = 10\)  
2. \(5 \times 9 = 45\)  
3. \(10 \times 5 = 50\)  
4. \(5 \times 5 = 25\)  
5. \(8 \times 5 = 40\)  
6. \(3 \times 5 = 15\)  
7. \(7 \times 5 = 35\)  
8. \(5 \times 6 = 30\)  
9. \(7 \times 5 = 35\)  
10. \(9 \times 5 = 45\)  
11. \(5 \times 7 = 35\)  
12. \(4 \times 5 = 20\)  
13. \(2 \times 5 = 10\)

14. Katie paid for her new bike with six $5-bills. Her change was $4. How much did the bike cost? $26

15. Sean has 4 nickels. How many walnuts can he buy if they are 5 cents each? 4 walnuts

16. Each pair of tennis shoes costs $25.00. If Andrea has four $5-bills, does she have enough to buy 1 pair? \(\text{no}\)

17. Emma has 39 books. Her bookshelf has 5 shelves. Each shelf can hold 7 books. Is there enough room for Emma's books? Explain. \(\text{no; } 5 \times 7 = 35. \text{ The bookshelf will only hold } 35 \text{ books, and Emma has 39 books. } 39 > 35\)

ALGEBRA Find each missing number.

17. \(5 \times 11 = 55\)  
18. \(6 \times 5 = 30\)  
19. \(5 \times 5 = 25\)

Solve. If there is missing information, tell what facts you need to solve the problem. If there is extra information, write it on the line provided. (Lesson 4–5)

18. A group of children is going to the movies. The price of admission is $4.95 each. If there are 6 children and 2 adults, and 4 seats in each car, how many cars will they take? \(2 \text{ cars; price of admission}\)

19. If Grant wants to adopt a cat and he brings four $10-bills, will he have enough money? \(\text{We need to know the cost of adopting a cat.}\)
4–6

Problem-Solving Practice

Multiply by 5

Write a multiplication sentence for each situation. Then solve.

1. There are 2 flowers in each vase. There are 5 vases. How many flowers are there in all?
   \[5 \times 2 = 10\]
   10 flowers

2. Maria plants 5 seeds in each pot. If there are 6 pots, how many seeds did Maria plant?
   \[5 \times 6 = 30\]
   30 seeds

3. There are 4 people in the Jones family. They all keep their shoes in one closet. Each person has 5 pairs of shoes. How many pairs of shoes are in the closet?
   \[4 \times 5 = 20\]
   20 pairs of shoes

4. Mom bought five soccer balls. She paid with eight $5-bills. She did not get any change back. How much did the balls cost?
   \[8 \times 5 = 40\]
   $40

5. Trish is coloring 7 flowers on a page. Each flower has 5 petals. How many petals must she color to finish?
   \[7 \times 5 = 35\]
   35 petals

6. Mrs. Ortiz bought 8 coloring books as party favors. The books are $5 each. She paid with two $20-bills. Will Mrs. Ortiz get any change back?
   \[8 \times 5 = 40\]
   \[20 + 20 = 40\]
   \[80 - 40 = 0\]
   40; 40 - 40 = 0

4–6

Enrich

The Picnic

Five friends are planning a picnic. You are one of the friends. Each person will bring one, two, or three items to the picnic. The friends will bring enough for five people. Answer the questions to see what each person will bring and how much. Write a number sentence to show how you got your answers.

1. Zoe will bring the chips. She will bring 10 chips for each person. How many chips will Zoe bring?
   \[5 \times 10 = 50\]
   50 chips

2. Phil will bring sandwiches. Each sandwich will have 2 slices of bread, 3 pieces of lunchmeat and 1 slice of cheese. How many slices of bread does Phil need to make the sandwiches?
   \[5 \times 2 = 10\]
   10 slices

3. Ali will bring snacks of carrot sticks, celery sticks, and apple slices. He will bring 5 apple slices, 6 celery sticks, and 9 carrot sticks for each person. How many apple slices does Ali need to bring?
   \[5 \times 5 = 25\]
   25 apple slices

4. Shana will bring milk. She will bring 8 ounces for each person. How many ounces of milk does she need to bring?
   \[5 \times 8 = 40\]
   40 ounces

5. You will bring yogurt. The yogurt is served in 6-ounce cups. How many ounces of yogurt do you need to bring?
   \[5 \times 6 = 30\]
   30 ounces
Multiply.

1. \( 10 \times 3 \)
2. \( 10 \times 6 \)
3. \( 6 \times 10 \)
4. \( 4 \times 10 \)
5. \( 5 \times 10 \)
6. \( 10 \times 3 \)
7. \( 2 \times 10 \)
8. \( 10 \times 5 \)
9. \( 8 \times 10 \)
10. \( 10 \times 9 \)

Solve.

For Exercises 20–22, use data from the pictograph.

<table>
<thead>
<tr>
<th>Favorite National Park</th>
<th>Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowstone</td>
<td>60</td>
</tr>
<tr>
<td>Grand Canyon</td>
<td>70</td>
</tr>
<tr>
<td>Everglades</td>
<td>30</td>
</tr>
</tbody>
</table>

Key: Each \( \times 10 \) stands for 10 votes.

20. How many votes did Yellowstone National Park get?
21. How many votes did the Everglades get?
22. How many people voted in the survey?

\[ 60 \times 10 + 70 = 160 \]

Reteach

Multiply by 10

You can use models to help you multiply by tens.

<table>
<thead>
<tr>
<th>Multiply by 10</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 \times 10 = 10</td>
<td></td>
</tr>
<tr>
<td>2 \times 10 = 20</td>
<td></td>
</tr>
<tr>
<td>3 \times 10 = 30</td>
<td></td>
</tr>
<tr>
<td>4 \times 10 = 40</td>
<td></td>
</tr>
<tr>
<td>5 \times 10 = 50</td>
<td></td>
</tr>
<tr>
<td>6 \times 10 = 60</td>
<td></td>
</tr>
<tr>
<td>7 \times 10 = 70</td>
<td></td>
</tr>
<tr>
<td>8 \times 10 = 80</td>
<td></td>
</tr>
<tr>
<td>9 \times 10 = 90</td>
<td></td>
</tr>
<tr>
<td>10 \times 10 = 100</td>
<td></td>
</tr>
</tbody>
</table>

Multiply:

1. \( 10 \times 2 \)
2. \( 10 \times 7 \)
3. \( 10 \times 3 \)
4. \( 10 \times 8 \)
5. \( 10 \times 5 \)
6. \( 10 \times 1 \)
7. \( 10 \times 10 \)
8. \( 10 \times 6 \)
9. \( 10 \times 9 \)
Multiply by 10

1. \[30 \times 2 = 60\]
2. \[90 \times 9 = 810\]
3. \[40 \times 4 = 160\]
4. \[80 \times 8 = 640\]
5. \[50 \times 5 = 250\]

6. \[30 \times 3 = 90\]
7. \[70 \times 7 = 490\]
8. \[40 \times 10 = 400\]
9. \[10 \times 4 = 40\]
10. \[60 \times 6 = 360\]

11. \[8 \times 10 = 80\]
12. \[10 \times 7 = 70\]
13. \[9 \times 10 = 90\]
14. \[10 \times 10 = 100\]
15. \[5 \times 10 = 50\]
16. \[6 \times 10 = 60\]

17. There are 10 cats and 5 dogs. How many total legs are there? **60 legs**

18. A farmer has 10 cows. How many eyes and ears do the cows have? **40 ears and eyes**

Write a multiplication sentence for each situation. Then solve.

1. In a game, Carlos ran with the football three times. Each time, he ran 10 yards. How many yards did he run? \[3 \times 10 = 30\] yards

2. The Appletown Zoo has 10 monkeys. Each monkey gets one banana a day. How many bananas do the monkeys eat each day? \[10 \times 10 = 100\] bananas

3. Hall shoes horses on a farm. Today he put horseshoes on all the hooves of 10 horses. How many horseshoes did he put on? \[10 \times 6 = 60\] horseshoes

4. Nine women have an appointment at the nail salon. Kiki will polish all of their fingernails. How many fingernails will Kiki polish today? \[9 \times 10 = 90\] fingernails

5. Ellen drives a van for the animal shelter. The van holds 10 animals. This week she made 6 trips to the shelter. The van was full each trip. How many animals did she drive? \[6 \times 10 = 60\] animals

6. A children’s TV show is on 10 days each month. On every show, Burton the Clown plays 3 songs. In the last month, he sang six of all the songs that were played. How many times did he not sing last month? \[10 \times 3 - 6 = 24\] times
**Answers (Lessons 4–7 and 4–8)**

**Problem-Solving Investigation**

George picked 24 ears of corn for a crab feast dinner. Penny pulled 39 crabs out of the trap to cook. There will be 16 family members having dinner. How many ears of corn are left if each family member eats one ear?

**Step 1**

**Understand**

Be sure you understand the problem.

What do you know

- George picked _____ ears of corn.
- Penny pulled _____ crabs out to cook.
- There are _____ people eating ears of corn.
- You need to find out how many _____.

**Step 2**

**Plan**

Choose a strategy.

- Act it out
- Draw a picture
- Look for a pattern

Make a plan

You can draw a picture. Decide what facts you know. Plan what you will do and in what order. Use your plan to solve the problem. Then check your solution to make sure it makes sense.

---

**Trivia Tens**

Write a multiplication sentence for each trivia question. Then solve.

1. What is ten times the number of days in the week?
   
   10 \times 7 = 70

2. Ten times what number gives you the number of seconds in a minute or minutes in an hour?
   
   10 \times 6 = 60

3. What number times ten gives you the number of days in September, April, June, or November?
   
   3 \times 10 = 30

4. Two multiplied by what number tells how many cents are in two dimes?
   
   2 \times 10 = 20

5. Ten times what number gives you the number of cents in a half-dollar?
   
   10 \times 5 = 50

6. What number multiplied times itself gives the number of cents in one dollar?
   
   10 \times 10 = 100

7. What number multiplied by 10 gives you the number years in a decade?
   
   1 \times 10 = 10

8. What number multiplied by ten gives you an answer that is twenty more than sixty?
   
   8 \times 10 = 80

9. Look back at your multiplication sentences. Two sentences are missing for all of the numbers 1–10 multiplied by ten. What are they?
   
   4 \times 10 = 40 and
   
   9 \times 10 = 90

---

**The product always has a zero in the ones place.**
**Problem-Solving Investigation**

**Step 3**

**Solve**

**Carry out your plan.**

**Plan 1** Cross off the extra information you do not need from the problem.
- You know that you need to find out how many ears of corn are left.
- You do not need to know how many crabs Penny is going to cook.

**Plan 2** Find the exact answer. Write a subtraction sentence.

$24 - 16 = \underline{\text{______}}$

**Step 4**

**Check**

**Is the solution reasonable?**

Reread the problem.

How can you check your answer?________

---

**Use any strategy shown below to solve. Tell what strategy you used.**

**PROBLEM-SOLVING STRATEGIES**

- Act it out
- Draw a picture
- Look for a pattern

1. Patrick bought 5 books. Each book costs $7. How much change will he have left from a $50-bill?

   **$15; act it out**

2. Dave caught 7 fish. One fish broke the line and got away. Three fish were too small and he released them. How many fish did he bring home?

   **3 fish; draw a picture**

3. If there are 9 alligators and 2 chickens, how many legs are there altogether?

   **40 legs; look for a pattern**


   **0 dollars; act it out**

5. Elephants at the zoo each eat 5 bales of hay every day. If there are 3 elephants, how many bales of hay will they eat a day?

   **15 bales of hay; look for a pattern**

6. Christine collects dolls. She has 59 plastic dolls, 48 rubber bugs, 17 pairs of shoes, and 13 cloth dolls. How many total dolls does she have?

   **72 dolls; draw a picture**

7. Annie made lemon squares. She cut each pan into 5 rows with 5 pieces. If she made two pans and ate five squares, how many squares are left?

   **45 squares; look for a pattern**
Use any strategy shown below to solve. Tell what strategy you used.

**Problem-Solving Strategies**
- Act it out
- Draw a picture
- Look for a pattern

**Possible strategies given.**

1. Four children and 1 adult are going to a movie. The price of a ticket is $10.00 for an adult and $6.00 for a child. How much will they pay for their tickets?
   - **$34; act it out**

2. In a pile of laundry there are 14 pairs of socks, 10 shorts, and 12 shirts. How many pieces of clothing are there altogether?
   - **50 pieces; draw a picture**

3. Janice saw 8 dogs, 4 cats, and 19 frogs for sale in the pet store. If the store sells 2 dogs and 1 cat each week, how many dogs and cats will there be at the end of the month?
   - **$150; look for a pattern**

**Spiral Review**

Multiply. (Lesson 4–7)

1. 10 × 4 = 40
2. 8 × 10 = 80
3. 9 × 10 = 90
4. 10 × 7 = 70
5. 10 × 6 = 60
6. 5 × 10 = 50

**Check students’ work.**

**Enrich**

**Drill Team**

Suppose you are the leader of a drill team. There are 20 members on the team. As the team marches in the parade, the members move in different numbers of equal rows or groups. Show four ways to arrange the 20 members to make arrays, equal rows, or groups. Do not use groups of 1 or 20. Write an addition sentence and a multiplication sentence for each arrangement.

1. Addition Sentence __________________________
   Multiplication Sentence __________________________
2. Addition Sentence __________________________
   Multiplication Sentence __________________________
3. Addition Sentence __________________________
   Multiplication Sentence __________________________
4. Addition Sentence __________________________
   Multiplication Sentence __________________________

**Check students’ work.**

5. How are the arrays for 4 × 5 and 5 × 4 alike? How are the arrays different?
Multiply.

Using Models

Using Pencil and Paper

Identity Property of Multiplication

The product of a nonzero number and 1 is the number itself.

Zero Property of Multiplication

The product of a number and 0 is 0.

Multiply.

1. \(1 \times 0 = \) 0
2. \(5 \times 1 = 5\)
3. \(1 \times 8 = 8\)
4. \(0 \times 3 = 0\)
5. \(1 \times 7 = 7\)
6. \(0 \times 5 = 0\)
7. \(4 \times 0 = 0\)
8. \(1 \times 4 = 4\)
9. \(9 \times 0 = 0\)
10. \(6 \times 1 = 6\)
11. \(2 \times 1 = 2\)
12. \(0 \times 9 = 0\)
13. \(1 \times 6 = 6\)
14. \(2 \times 0 = 0\)
15. \(9 \times 1 = 9\)
16. \(0 \times 6 = 0\)
17. \(1 \times 2 = 2\)
18. \(5 \times 0 = 0\)
19. \(7 \times 1 = 7\)
20. \(0 \times 8 = 0\)
21. \(3 \times 1 = 3\)
22. \(1 \times 1 = 1\)
23. \(1 \times 9 = 9\)
24. \(0 \times 4 = 0\)
25. \(7 \times 0 = 0\)
26. \(8 \times 1 = 8\)
27. \(8 \times 0 = 0\)

ALGEBRA Find each missing number.

19. \(6 \times \_ = 6\)
20. \(\_ \times 9 = 0\)
21. \(1 \times \_ = 1\)
22. \(\_ \times 7 = 0\)
23. \(5 \times \_ = 5\)
24. \(\_ \times 4 = 0\)
25. \(8 \times \_ = 8\)
26. \(\_ \times 3 = 0\)
27. \(2 \times \_ = 0\)

Write a multiplication sentence for each situation.

28. There is 1 row of 7 chairs in the back of the classroom. How many chairs are there?

\(1 \times 7 = 7\)

29. There are 6 chairs around the table but no one is sitting in them. How many people are sitting in the chairs?

\(6 \times 0 = 0\)
Multiply.

1. 10 \times 0 = 0
2. 5 \times 1 = 5
3. 0 \times 3 = 0
4. 4 \times 1 = 4
5. 1 \times 8 = 8
6. 1 \times 6 = 6
7. 2 \times 9 = 18
8. 8 \times 1 = 8
9. 9 \times 0 = 0
10. 1 \times 5 = 5
11. 7 \times 1 = 7
12. 0 \times 9 = 0

Write a multiplication sentence for each situation.

13. Jimmy collects stamps. If he gets 1 stamp a day for 12 days, how many stamps will he add to the collection?
   \[1 \times 12 = 12 \text{ stamps}\]

14. Louis has 5 boxes. Each box contains 1 marble. How many marbles does he have?
   \[5 \times 1 = 5 \text{ marbles}\]

15. Joan has 9 goldfish. How many total legs are there?
   \[9 \times 0 = 0 \text{ legs}\]

16. Each shirt has 1 pocket. How many total pockets do 11 shirts have?
   \[11 \times 1 = 11 \text{ pockets}\]

Solve. (Lesson 4–8)

17. Jane collected 4 bugs every day for 10 days. How many bugs does she have?
   \[40 \text{ bugs}\]

18. Alfonso picked 8 oranges and twice as many apples. How many apples did he pick?
   \[16 \text{ apples}\]

19. One muffin has 12 chocolate chips in it. How many total chips are there?
   \[12 \text{ chips}\]
Enrich

Multiply by 0 and 1

Solve the problems in the picture below. If the answer is a number, color that part gray. If the answer is zero, leave that part white.

5 × 1 = 5
1 × 9 = 9
4 × 1 = 4
1 × 1 = 1
3 × 1 = 3
1 × 8 = 8
7 × 1 = 7
6 × 1 = 6
0 × 1 = 0
2 × 0 = 0
0 × 3 = 0
8 × 0 = 0
0 × 5 = 0
4 × 0 = 0
9 × 6 = 0

1. Tell what you see when you look at the picture. Possible answers may include faces looking at each other or a vase.

2. What do you notice about the answer in a problem where a number is multiplied by zero? The answer is always zero.

3. What do you notice about the answer of any number that is multiplied by one? The answer is always the number.

Vocabulary Test

Match each word to its definition. Write the letter on the line provided.

1. multiply A. the answer to a multiplication problem
2. factor B. the property that states that the order in which two numbers are multiplied does not change the product
3. product C. a number that is multiplied by another number
4. array D. the operation of repeated addition
5. Commutative Property of Multiplication E. if you multiply a number by 1, the product is the same as that number.
6. Zero Property of Multiplication F. the property that states any number multiplied by zero is zero
7. Identity Property of Multiplication G. objects or symbols displayed in rows of the same length and columns of the same length

Complete each sentence by writing the correct word or words in the blank.

8. When you are completing a multiplication problem, the answer is known as the ______.
9. 6 × 4 = 24. 4 × 6 = 24. This is an example of the ______ Property of Multiplication.
10. 9 × 1 = 9. This is an example of the ______ Property of Multiplication.
Arranged a selection of small objects (paperclips, pencils, erasers) into groups. There should be 5 groups, each containing 4 objects.

Read each question aloud to the student. Then write the student's answers on the lines below the question.

7. If I have 4 bowls, and each one holds 4 apples, how many apples do I have in all?  
   **16 apples**

8. Tell how you got your answer.  
   **Answers may vary.**

9. What is the answer to 5 + 5 + 5?  
   **15**

10. What is the answer to 5 × 3?  
    **15**

11. Tell how you got your answer.  
    **Answers may vary.**

12. What is the answer to 4 × 1?  
    **4**

13. What is the answer to 4 × 0?  
    **0**

14. Tell how you got your answer.  
    **Answers may vary.**
### Chapter 4 Assessment Answer Key

#### Diagnostic Assessment

**Page 54**

| 1. | 12 |
| 2. | 18 |
| 3. | 16 |
| 4. | 6 |
| 5. | 9, 15 |
| 6. | 8, 20 |
| 7. | 2, 4 |
| 8. | 30, 50 |

#### Chapter Pretest

**Page 55**

| 1. \(7 + 7 + 7 + 7\) + 7 + 7 = 35 |
| 2. \(2 + 2 + 2 + 2 + 2\) + 2 + 2 = 18 |
| 3. 3 |
| 4. 24 |
| 5. 12 |
| 6. 10 |
| 7. 12 |
| 8. 20 |
| 9. 15 |
| 10. 20 |
| 11. 40 |
| 12. 0 |
| 13. 5 |

#### Quiz 1 (4–1 through 4–3)

**Page 56**

| 1. \(7 + 7 + 7 + 7\) + 7 + 7 = 42 |
| 2. \(8 + 8 + 8 + 8 + 8\) + 8 + 8 = 40 |
| 3. 8 |
| 4. 10 |
| 5. 16 |
| 6. 14 |
| 7. 12 |
| 8. \(5 \times 6 = 30\) |
| 9. 6 |
| 10. 8 |

9. \(4 + 4 + 4 = 12\)

10. \(5 + 5 = 10\)

11. 20 marbles
## Chapter 4 Assessment Answer Key

### Quiz 2 (4–4 through 4–6)  
Page 57

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>1.</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>30</td>
</tr>
<tr>
<td>3.</td>
<td>24</td>
</tr>
<tr>
<td>4.</td>
<td>35</td>
</tr>
<tr>
<td>5.</td>
<td>16</td>
</tr>
</tbody>
</table>

6. 40; costs $2.50

7. 5 people  
The missing information is how much money you paid the farmer.

8. 6 × 5 = 30

9. 8 × 5 = 40

10. 8 × 5 = 40

### Quiz 3 (4–7 through 4–9)  
Page 58

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>30</td>
</tr>
<tr>
<td>2.</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>70</td>
</tr>
<tr>
<td>5.</td>
<td>4</td>
</tr>
</tbody>
</table>

6. 8 × 1 = 8

7. 5 × 10 = 50

8. 3 × 0 = 0

9. 10 × 5¢ = 50¢

10. $4 × 7 = $28

### Mid-Chapter Review  
Page 59

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>false</td>
</tr>
<tr>
<td>2.</td>
<td>true</td>
</tr>
<tr>
<td>3.</td>
<td>C</td>
</tr>
<tr>
<td>4.</td>
<td>G</td>
</tr>
<tr>
<td>5.</td>
<td>D</td>
</tr>
</tbody>
</table>

6. 12

7. 32

8. 6

9. 36

10. 4 × 2 = 8 ears
Chapter 4 Assessment Answer Key

Chapter Test, Form 1
Page 65

1. B
2. J
3. C
4. J
5. A
6. H
7. C
8. F

Chapter Test, Form 2A
Page 67

1. B
2. J
3. B
4. J
5. A
6. J
7. C
8. F

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Chapter 4 Assessment Answer Key

Chapter Test, Form 2A
Page 68

8. J
9. D
10. H
11. C
12. G
13. B
14. F
15. A

Chapter Test, Form 2B
Page 69

9. B
1. B
2. H
3. B
4. H
5. A
6. H
7. A
8. F

Page 70

9. B
10. H
11. C
12. G
13. A
14. G
15. A

(continued on the next page)
### Chapter 4 Assessment Answer Key

<table>
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<th>Chapter Test, Form 2D</th>
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<tbody>
<tr>
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<tr>
<td><strong>1.</strong> 9</td>
<td><strong>1.</strong> 9</td>
</tr>
<tr>
<td><strong>2.</strong> 18</td>
<td><strong>2.</strong> 16</td>
</tr>
<tr>
<td><strong>Identity Property</strong></td>
<td><strong>Identity Property</strong></td>
</tr>
<tr>
<td><strong>3.</strong> 5</td>
<td><strong>3.</strong> 10</td>
</tr>
<tr>
<td><strong>Commutative Property</strong></td>
<td><strong>Commutative Property</strong></td>
</tr>
<tr>
<td><strong>4.</strong> 10</td>
<td><strong>4.</strong> 10</td>
</tr>
<tr>
<td><strong>5.</strong> 0</td>
<td><strong>5.</strong> 0</td>
</tr>
<tr>
<td><strong>4 tails</strong></td>
<td><strong>4 tails</strong></td>
</tr>
<tr>
<td><strong>14.</strong> 0 wheels</td>
<td><strong>0 wheels</strong></td>
</tr>
<tr>
<td><strong>6.</strong> 36</td>
<td><strong>6.</strong> 36</td>
</tr>
<tr>
<td><strong>7.</strong> 20</td>
<td><strong>7.</strong> 30</td>
</tr>
<tr>
<td><strong>8.</strong> 12</td>
<td><strong>8.</strong> 18</td>
</tr>
<tr>
<td><strong>Zero Property</strong></td>
<td><strong>Zero Property</strong></td>
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</table>

(continued on the next page)
**Chapter 4 Assessment Answer Key**

<table>
<thead>
<tr>
<th>Chapter Test, Form 2D</th>
<th>Chapter Test, Form 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page 74</td>
<td>Page 75</td>
</tr>
</tbody>
</table>

10. 16

11. 14

12. 8

13. **Identity Property**

14. **Commutative Property**

15. 4 tails

16. 0 wheels

17. 5 hands

| 1. 90 |
| 2. 16 |
| 3. 10 |
| 4. 10 |
| 5. 0  |
| 6. 36 |
| 7. 30 |
| 8. 15 |
| 9. 28 |
| 10. 0 |
| 11. 18 |

12. **Zero Property**

13. 16

14. 14

15. 8

16. **Identity Property**

17. **Commutative Property**

18. 20 tails

19. 0 wheels

20. 6 hands
### Chapter 4 Assessment Answer Key

**Page 77, Extended-Response Test**

**Scoring Rubric**

<table>
<thead>
<tr>
<th>Level</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4</strong></td>
<td>The student demonstrates a <strong>thorough understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>The student demonstrates an <strong>understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student's response to the task is essentially correct with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding. The response may contain minor errors that reflect inattentive execution of the mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>The student has demonstrated only a <strong>partial understanding</strong> of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student’s work lacks an essential understanding of the underlying mathematical concepts. The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>The student has demonstrated a <strong>very limited understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student’s response to the task is incomplete and exhibits many flaws. Although the student has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete. The response exhibits many errors or may be incomplete.</td>
</tr>
<tr>
<td><strong>0</strong></td>
<td>The student has provided a <strong>completely incorrect</strong> solution or uninterpretable response, or no response at all.</td>
</tr>
</tbody>
</table>
In addition to the scoring rubric found on page A32, the following sample answers may be used as guidance in evaluating open-ended assessment items.

1. Multiplication is when you combine equal groups of numbers to find a total.
   a. Multiplication can be seen as repeated addition because repeated addition is a way of putting equal groups together.
   b. Answers will vary. Example Answer: An example of repeated addition is $4 + 4 + 4 + 4 = 16$. It is the same as $4 \times 4 = 16$.

2. Answers will vary. Example Answer: An array shows rows and columns with an equal number in each. Using an array can help with multiplication because if you want to find what $4 \times 3$ is, you can make an array of 4 rows of 3 and then count.
   a. Answers will vary. Example Answer: 

```
  ♂  ♂  ♂  ♂
  ♂  ♂  ♂  ♂
  ♂  ♂  ♂  ♂
  ♂  ♂  ♂  ♂
```
   
   b. Answers will vary. Example Answer: 

```
  ♂  ♂  ♂  ♂  ♂  ♂  ♂  ♂
  ♂  ♂  ♂  ♂  ♂  ♂  ♂  ♂
  ♂  ♂  ♂  ♂  ♂  ♂  ♂  ♂
  ♂  ♂  ♂  ♂  ♂  ♂  ♂  ♂
```

3. Answers will vary. Example Answer: $4 \times 2 = 8$ and $2 \times 4 = 8$; $7 \times 3 = 21$ and $3 \times 7 = 21$.

4. The Zero Property of Multiplication says that when you multiply a number by 0, the product is zero. Example: $4 \times 0 = 0$. The Identity Property of Multiplication says that when you multiply a number by 1, the product is that number. Example: $4 \times 1 = 1$. 

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3. A

11. \[
\frac{7 \times 5}{3 + 3 + 3} = 12
\]

12. \[
3 + 3 = 12
\]

13. \[
3 \times 7 = 21
\]

4. H

14. \[
2 \times 5
\]

15. \[
10 \times 10\text{¢} = 100\text{¢}
\]

16. \[
765, 675, 657, 576
\]

5. C

6. F

7. B

8. J

9. C

10. J

17. $5.41

18. 35 fish

1. B

2. J