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# Lesson 1 MULTIPLICATION PROPERTIES

## LESSON OBJECTIVES

Students will:

- Understand and apply the Commutative Property of Multiplication.
- Understand and apply the Associative Property of Multiplication.

## RELATED AUSTRALIAN CURRICULUM CONTENT DESCRIPTIONS

See page 26 to cross-reference this lesson with aligned Australian Curriculum content descriptions.

## PREREQUISITES

Students should be able to:

- Use arrays to model multiplication.
- Multiply 1-digit numbers.

## RELATED STAMS® PLUS LESSONS

- **Book C – Lesson 3**  
*Multiplication concepts* uses arrays to show multiplication.
- **Book C – Lesson 4**  
*Fact strategies* introduces strategies to learn the 2s, 4s and 5s facts.
- **Book C – Lesson 5**  
*More fact strategies* introduces strategies to learn the 3s, 6s, 7s and 9s facts.

## VOCABULARY

PAGE 4

- **multiplication:** an operation used to find the total number of items in equal-sized groups
- **equal groups:** groups that have the same amount
- **array:** a set of objects or symbols arranged in rows of equal size
- **Commutative Property of Multiplication:** a rule that states you can multiply factors in any order; the product is the same

- **factors:** the numbers you multiply to get a product
- **product:** the result of multiplying numbers together

PAGE 6

- **Associative Property of Multiplication:** a rule that states you can change the grouping of 3 or more factors; the product is the same

## MATHS BACKGROUND

The fact that multiplication is related to repeated addition makes it easy to understand that addition and multiplication share similar properties. Like the Commutative Property of Addition, the Commutative Property of Multiplication is an ordering property. Students learn that changing the order of factors does not change the product:  $2 \times 3 = 6$  and  $3 \times 2 = 6$ . Like the Associative Property of Addition, the Associative Property of Multiplication is a grouping property. Students learn that grouping factors differently does not change the product:  $2 \times (3 \times 5) = 30$  and  $(2 \times 3) \times 5 = 30$ .

The properties can help students manipulate an expression into one they can calculate easily. For example, students may find it difficult to calculate  $45 \times 2$ , but they can easily calculate the expression  $5 \times 9 \times 2$  by using the Commutative and Associative Properties of Multiplication.

$$5 \times 9 \times 2 = (5 \times 2) \times 9 = 10 \times 9 = 90$$



### Interactive Whiteboard

Visualise multiplication properties

Go to the *IWB lessons* to bring parts one and two to life. Use features such as sliding screens with additional practice to deepen students' understanding of the Commutative and Associative Properties of Multiplication.



### Download

<http://iwb.camsandstams.com.au>


## Modelled Instruction

**Lesson 1 MULTIPLICATION PROPERTIES**  
**PART ONE: Learn about the Commutative Property**


**How does changing the order of factors affect the product?**

**Explore**

You can add numbers in any order and get the same sum.



$4 + 5 = 9$




$5 + 4 = 9$

What happens if you change the order of numbers that you are multiplying?


**Think**

**Multiplication** is used to join **equal groups**. An **array** shows equal groups.

$3 \times 4$



$4 \times 3$




How many rows are there?  
 There are 3 rows of 4.  
 There are 12 rectangles in all.


There are 4 rows of 3.  
 There are 12 rectangles in all.

**Connect**

The **Commutative Property of Multiplication** states that you can multiply **factors** in any order. The **product** is the same.



3 rows of 4 = 12  
 $3 \times 4 = 12$



4 rows of 3 = 12  
 $4 \times 3 = 12$

**Let's Talk**

Is  $3 \times 4 = 6 \times 2$  an example of the Commutative Property of Multiplication? Why or why not? What do you know about the numbers on both sides of the equals sign?

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## Guided Instruction

Multiplication properties


**Think It Through**

**Fill in the blanks. Solve the problem.**

Winston has 3 bags of marbles. Each bag has 6 marbles.  
 Padma has 6 bags of marbles. Each bag has 3 marbles.  
 How many marbles does each person have?


■ Draw arrays to model the problem.

**Winston's marbles**




How many rows are there? 3  
 How many items in each row? 6

**Padma's marbles**



How many rows are there? 6  
 How many items in each row? 3

The numbers you multiply are the **factors**.  
 $3 \times 2 = 6$   
 The total is the **product**.



■ Multiply to find the total number of marbles for each person.

Winston:  $3 \times 6 = 18$   
 Padma:  $6 \times 3 = 18$

■ Winston has 18 marbles and Padma has 18 marbles.  
 Which multiplication property tells why this is so?  
Commutative Property

**Solution:** Winston and Padma each have 18 marbles.

**Your Turn** **Now, use what you know to solve this problem.**

1. Which is an example of the Commutative Property of Multiplication?  
 A  $4 \times 2 = 8 \times 1$   
 B  $2 \times 4 = 4 \times 2$   
 C  $2 \times 4 = 4 + 4$   
 D  $2 + 2 = 2 \times 2$

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### AT A GLANCE

Students activate their background knowledge about adding numbers in any order and then learn about the Commutative Property of Multiplication.

### STEP BY STEP

#### PAGE 4

- Introduce the **Question** at the top of the page.
- Have students study the models shown in **Explore** and connect each one to its number sentence.
- Read **Think** with students. Emphasise that both arrays have the same number of items. Pause so students can say aloud the shaded numbers.
- Discuss **Connect** with students. Help students grasp that the order of the factors does not affect the product. Tell students that the Commutative Property is also known as the Order Property.

**Tip:** Write other basic multiplication facts on the board. Have students change the order of the factors and write the product to demonstrate the Commutative Property of Multiplication.

- Organise students in pairs or groups for **Let's Talk** and monitor their discussions.
- Be sure students understand that the equation is not an example of the Commutative Property because the factors in each expression are different.

#### PAGE 5

- Read the **Think It Through** problem with students.
- Guide students as they solve the problem. Help them determine that they can use the Commutative Property of Multiplication because the factors are the same.

**EAL/D Support:** The word *product* also means “something that is made”. Clarify that in maths the product is the result when numbers are multiplied.

- Monitor students as they complete **Your Turn**. Then discuss the correct answer.

**Error Alert:** Students who chose A may not understand that each pair of factors must be the same, only the order can change.



### ADDITIONAL ACTIVITY

See **Hands-on Activity** (page 38).

## Modelled Instruction

**PART TWO: Learn about the Associative Property**

**How does the grouping of factors affect the product?**

**Explore**

You can group numbers differently and get the same sum.

$(4 + 5) + 3 = 12$

$4 + (5 + 3) = 12$

What happens if you group numbers you are multiplying differently?

**Think**

When multiplying three or more **factors**, you can use brackets to group two factors. Multiply the factors inside the brackets first.

$2 \times (3 \times 4)$

What is  $3 \times 4$ ? 12

What is 2 groups of  $3 \times 4$ ? 24

$(2 \times 3) \times 4$

What is  $2 \times 3$ ? 6

What is 4 groups of  $2 \times 3$ ? 24

The **Associative Property of Multiplication** states that you can group factors in different ways. The product is the same.

$2 \times (3 \times 4)$	$(2 \times 3) \times 4$
$2 \times 12 = 24$	$6 \times 4 = 24$

**Let's Talk**

How does the Associative Property make it easier to find  $(8 \times 4) \times 2$ ? Try to solve this problem. Then regroup the factors and solve again. What do you discover?

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## Guided Instruction

Multiplication properties

**Think It Through**

**Fill in the blanks. Solve the problem.**

Use the Associative Property to show that both sets of arrays have the same number of objects.

A

B

■ Array A shows  $2 \times (6 \times 3)$ .

What is  $6 \times 3$ ? 18

What is 2 groups of  $6 \times 3$ ?

$2 \times (6 \times 3)$

$2 \times (18) = 36$

■ Array B shows  $(2 \times 6) \times 3$ .

What is  $2 \times 6$ ? 12

What is 3 groups of  $2 \times 6$ ?

$(2 \times 6) \times 3$

$(12) \times 3 = 36$

**Solution:** Both arrays have 36 objects.

Brackets ( ) show what to do first.

$2 \times (6 \times 3)$

Multiply  $6 \times 3$  first.

**Your Turn** **Now, use what you know to solve this problem.**

2. Use the Associative Property of Multiplication to find the missing number.

$(3 \times 3) \times 7 = 3 \times (3 \times 7)$

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### AT A GLANCE

Students activate their prior knowledge about grouping addends differently and then learn the Associative Property of Multiplication.

### STEP BY STEP

#### PAGE 6

- Introduce the **Question** at the top of the page.
- Read **Explore** with students. Reinforce that numbers can be grouped differently and the sum is the same.

**EAL/D Support:** The word *group* is used as a verb and a noun. Demonstrate each by placing tiles in a stack. Identify the action as *grouping the tiles* and the stack as *a group of tiles*.

- Read **Think** with students.
- Tell students to study the multiplication sentences in **Connect**. Emphasise that the Associative Property is useful if you are multiplying three or more numbers.

**Tip:** Elicit from students that the Associative Property is also known as the Grouping Property.

- Organise students in pairs or groups for **Let's Talk** and monitor their discussions.
- Be sure students grasp that regrouping the factors allows them to use a fact they know to more easily find the product:  $8 \times (4 \times 2) = 8 \times 8 = 64$ .

#### PAGE 7

- Read the **Think It Through** problem with students.
- Guide students as they solve the problem. Pause for students to fill in missing information. Then discuss each response.
- Point out that although  $(6 \times 3)$  comes second in the expression, the brackets indicate that you should multiply 6 times 3 first. Then multiply by 2.
- Monitor students as they complete **Your Turn**. Then discuss the correct answer.

**Error Alert:** Students who wrote the incorrect factor may not understand that they cannot change the factors, only the grouping.



### ADDITIONAL ACTIVITY

See **Reteaching Activity** (page 38).

### Modelled Practice

**PART THREE: Choose the right answer**

Solve the problem. Then read why each answer is correct or not correct.

**Solve**

Mrs Torres and Mr Jackson both have flower gardens. They planted the same number of seeds in their gardens. Mrs Torres planted 5 rows of seeds with 8 seeds each. Mr Jackson planted 8 rows of seeds.

How many seeds did Mr Jackson plant in each row?

Ⓐ 40 seeds      Ⓒ 8 seeds  
Ⓑ 13 seeds      Ⓓ 5 seeds

**Check**

Check to see if you chose the correct answer.

Mrs Torres planted 5 rows of 8 seeds.  $5 \times 8 = 40$  seeds  
Mr Jackson also planted 40 seeds.  
Mr Jackson planted 8 rows of seeds.  $8 \times \square = 40$   
Use the Commutative Property.  $8 \times 5 = 5 \times 8$   
Mr Jackson planted 8 rows with 5 seeds in each row.  
So, the correct answer is Ⓑ.

Why are the other answer choices not correct?

Ⓐ 40 seeds	This is the product of $5 \times 8$ . This is the total number of seeds each person planted.
Ⓑ 13 seeds	This is the sum of 8 and 5.
Ⓒ 8 seeds	This is the number of seeds Mrs Torres planted in each row. Mrs Torres and Mr Jackson planted the same total number of seeds, but not the same number in each row.

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### Guided Practice

Multiplication properties

**Your Turn** Solve each problem. Use the hints to avoid mistakes.

• Make sure the numbers on both sides of the equals sign are the same.  
• Ask yourself whether the order or grouping of the factors is changing.  
• Use  $\times$  to multiply factors and  $()$  to group factors.

3. What number is missing from this equation?  
 $4 \times 6 = 6 \times \square$

Ⓐ 2  
Ⓑ 4  
Ⓒ 10  
Ⓓ 24

4. Elijah bought 2 packs of juice boxes. Each pack had 6 boxes of 3 flavours.  
 $2 \times (6 \times 3)$

What is another way to find the total number of juice boxes?  
Ⓐ  $(2 \times 6) + 3$   
Ⓑ  $2 + (6 + 3)$   
Ⓒ  $2 \times (6 + 3)$   
Ⓓ  $(2 \times 6) \times 3$

5. Which is an example of the Associative Property of Multiplication?  
Ⓐ  $5 \times 7 = 7 \times 5$   
Ⓑ  $3 \times 5 = 5 + 5 + 5$   
Ⓒ  $2 \times (5 \times 7) = (2 \times 5) \times 7$   
Ⓓ  $2 \times (3 \times 5) = 2 \times (5 \times 3)$

6. Ronnie and Lee both collect football cards. Ronnie arranges her cards in 7 rows with 9 cards in each row. Lee has the same number of cards as Ronnie. He wants to put 7 cards in each row. How many rows will Lee make?  
Ⓐ 7  
Ⓑ 9  
Ⓒ 16  
Ⓓ 63

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### AT A GLANCE

Students reinforce their understanding of multiplication properties through solving a multiple-choice problem and analysing correct and incorrect answer choices.

### STEP BY STEP

#### PAGE 8

- Tell students that this page models finding the correct answer to a multiple-choice problem.
- Have students read the problem in **Solve** and choose the best answer. Remind students to check their maths.
- Examine **Check** with students. Discuss the correct and incorrect choices.

#### PAGE 9

- Monitor students as they complete **Your Turn**.
- Organise students in pairs or small groups and have them discuss why each answer choice is correct or not and what errors may have been made.
- Review the answers with the class.



### ADDITIONAL ACTIVITY

See **Vocabulary Activity** (page 38).

### Answer Analysis

3. Ⓐ Subtracted 4 from 6.  
 ●  $4 \times 6 = 24$  and  $6 \times 4 = 24$ .  
 Ⓒ Added 6 and 4.  
 Ⓓ Chose the product of 6 and 4.
4. Ⓐ Changed the second operation to addition.  
 Ⓑ Did not change grouping, and changed the multiplication to addition.  
 Ⓒ Did not change grouping, and changed the second operation to addition.  
 ●  $2 \times (6 \times 3) = 36$  and  $(2 \times 6) \times 3 = 36$ .
5. Ⓐ Chose example of the Commutative Property.  
 Ⓑ Chose multiplication shown as repeated addition.  
 ●  $2 \times (5 \times 7) = 70$  and  $(2 \times 5) \times 7 = 70$ .  
 Ⓓ Chose example of the Commutative Property.
6. Ⓐ Chose number of cards in each of Lee's rows.  
 ●  $7 \times 9 = 63$  and  $9 \times 7 = 63$ , so Lee will make 9 rows with 7 cards in each row.  
 Ⓒ Added 9 and 7.  
 Ⓓ Chose total number of cards each person has.



## Modelled Practice

**PART FOUR: Write the best answer**

Study the model. It is a good example of a written answer.

**Student model**

Keisha and Jamar both read the same number of books. Each week for 5 weeks, Keisha read 3 books. Jamar read 5 books each week.

How many weeks did Jamar spend reading his books? Use pictures, words or numbers to show your work.

Keisha's books

Weeks

Jamar's books

Weeks

$5 \times 3 = 15$   
 $5 \times 3 = 3 \times 5$

**Solution:** 3 weeks

Explain how you got your answer.

I drew arrays to model the problem. Each week for 5 weeks  
Keisha read 3 books. I multiplied to find her total,  $5 \times 3 = 15$ .  
Jamar also read 15 books, but he read 5 books each week.  
I asked myself what number times 5 equals 15. I know that  
 $3 \times 5 = 5 \times 3$ , so Jamar spent 3 weeks reading his books.

**Show**

The student shows each step.

**Explain**

The student correctly answers the question asked.

The student gives important details about how to find the answer.

The student uses the maths words *multiply* and *total*.

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## Guided Practice

Multiplication properties

**Your Turn** Solve each problem. Use what you learned from the model.

**CHECKLIST**

Did you ...

show each step?

answer the question asked?

give important details?

use maths words?

7. The PE teacher wants to buy the same number of basketballs as soccer balls. There are 4 balls in each box of soccer balls. The teacher buys 6 boxes. If there are 6 balls in each box of basketballs, how many boxes will the teacher buy?

Use pictures, words or numbers to show your work.

Soccer balls

Boxes

$6 \times 4 = 24$   
 $6 \times 4 = 4 \times 6$

Basketballs

Boxes

$6 + 6 = 12$   
 $6 + 6 + 6 = 18$   
 $6 + 6 + 6 + 6 = 24$   
 $4 \times 6 = 24$

**Solution:** 4 boxes of basketballs

Explain how you got your answer.

I drew arrays to model the problem. The teacher bought 6 boxes of 4 soccer balls. I multiplied to find the total,  $6 \times 4 = 24$ . The teacher will buy the same number of basketballs. There are 6 basketballs in a box. I asked myself what number times 6 equals 24. I know that  $6 \times 4 = 4 \times 6$ , so the teacher will buy 4 boxes of basketballs.

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### AT A GLANCE

Students study a model answer to an extended-response problem.

### STEP BY STEP

#### PAGE 10

- Tell students that this page models building the solution to a problem one step at a time and writing to explain the solution.
- Have students read the problem in **Show**. Discuss how the arrays and multiplication sentences lead to the solution.

**Tip:** Remind students that multiplication is used to find the total of equal groups, which in this example is the number of weeks.

- Read **Explain** with students. Have students circle the maths words in the explanation.
- Direct students' attention to the notes in the right margin. Tell students that this model would receive a high score for the reasons described in these notes.

#### PAGE 11

- Monitor students as they complete **Your Turn**.
- Encourage students to follow the **Checklist** to write the best answer.
- Have students discuss their work with a partner. Then discuss the correct answer as a class.

### Answer and Explanation

7. See the sample answer. This answer shows all of the steps taken to solve the problem, including writing number sentences. The solution answers the question. The explanation provides important details about how the problem was solved and uses the maths words *multiply* and *total*.



#### ADDITIONAL ACTIVITY

See **Real-World Connection** (page 38).



#### ADDITIONAL ACTIVITY

See **School-Home Connection** (page 38).



## Independent Practice

PART FIVE: Prepare for a test

**As you solve multiplication problems, you may want to:**

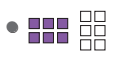

- draw pictures or an array to model the problem.
- keep the Commutative Property in mind. It states that changing the order of factors does not change the product.
- keep the Associative Property in mind. It states that changing the grouping of factors does not change the product.



**Solve each problem.**

8. If  $6 \times 8 = 48$ , then  $8 \times 6 = \square$ .

Ⓐ 14  
Ⓑ 24  
Ⓒ 48  
Ⓓ 84

9. Which picture shows the Commutative Property of Multiplication?

Ⓐ  Ⓒ 

Ⓑ  Ⓓ 

10. Which number is missing?

$(9 \times 2) \times 5 = 9 \times (2 \times \square)$

Ⓐ 5  
Ⓑ 9  
Ⓒ 10  
Ⓓ 18

11. Lance has 4 photo albums. Each album has 6 pages with 2 photos on each page. Jorge has 2 photo albums. Each album has 6 pages with 4 photos on each page. Which statement is true?

Ⓐ Lance has more photos than Jorge.  
Ⓑ Jorge has more photos than Lance.  
Ⓒ Lance and Jorge have the same number of photos.  
Ⓓ More information is needed to find how many photos Lance and Jorge have.

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## Independent Practice

Multiplication properties

12. Which is an example of the Commutative Property of Multiplication?

Ⓐ  $2 + 9 = 9 + 2$   
Ⓑ  $2 \times 9 = 9 \times 2$   
Ⓒ  $2 + (3 + 3) = (2 + 3) + 3$   
Ⓓ  $2 \times (3 \times 3) = (2 \times 3) \times 3$

13. Luke knows that 6 rows of 7 chairs is 42 chairs. Which property can Luke use to find the number of chairs in 7 rows if there are 6 chairs in each row?

Ⓐ Associative Property of Addition  
Ⓑ Associative Property of Multiplication  
Ⓒ Commutative Property of Addition  
Ⓓ Commutative Property of Multiplication

14. Show two different ways to group the factors  $6 \times 3 \times 3$ . Then find the product.

$(6 \times 3) \times 3$   
\_\_\_\_\_

$6 \times (3 \times 3)$   
\_\_\_\_\_

$6 \times (3 \times 3) = 6 \times 9 = 54$   
\_\_\_\_\_

15. Ms Charni wants to buy the same number of hamburgers as rolls. Ms Charni buys 5 bags of rolls. Each bag has 6 rolls. There are 5 hamburgers in a pack. How many packs should Ms Charni buy? Use pictures, words or numbers to show your work.

**Rolls:**  $5 \times 6 = 30$   
**Hamburgers:**  $? \times 5 = 30$   
 $5 \times 6 = 6 \times 5$

**Solution:** 6 packs of hamburgers

Explain how you found your answer.  
I drew arrays to model the problem. I multiplied 5 by 6 to find there are 30 rolls.  
Ms Charni also wants 30 hamburgers. There are 5 hamburgers in a pack. So I asked myself what number times 5 equals 30. I know that  $5 \times 6 = 6 \times 5$ , so Ms Charni will buy 6 packs of hamburgers.

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### AT A GLANCE

Students practise using the Commutative and Associative Properties of Multiplication to solve problems that might appear on a mathematics test.

### STEP BY STEP

#### PAGES 12–13

- Tell students that they will practise solving multiplication problems that involve the Commutative and Associative Properties of Multiplication.
- Point out the tips at the top of page 12. Explain to students that these tips will help them answer the problems correctly.
- You may wish to have students review the hints for avoiding mistakes on page 9 as well.
- Tell students to complete problems 8–15 on pages 12 and 13. Encourage students to check their answers.
- Discuss the correct responses as a class.

### Answers and Explanations

8. Ⓒ Based on the Commutative Property of Multiplication,  $6 \times 8 = 48$ , so  $8 \times 6 = 48$ .
9. Ⓐ The Commutative Property of Multiplication states that when the order of the factors changes, the product stays the same. This pair of arrays shows that 2 rows of 3 is the same as 3 rows of 2, or  $2 \times 3 = 3 \times 2$ .
10. Ⓐ Based on the Associative Property of Multiplication,  $(9 \times 2) \times 5 = 9 \times (2 \times 5)$ .
11. Ⓒ Lance has  $4 \times (6 \times 2)$  photos. Jorge has  $2 \times (6 \times 4)$  photos. The factors are the same, just grouped differently, so the products are the same.
12. Ⓑ Based on the Commutative Property of Multiplication,  $2 \times 9 = 18$  and  $9 \times 2 = 18$ , so  $2 \times 9 = 9 \times 2$ .
13. Ⓓ 6 rows with 7 chairs is  $6 \times 7 = 42$  chairs. 7 rows with 6 chairs is  $7 \times 6$ . Based on the Commutative Property of Multiplication,  $6 \times 7 = 42$ , so  $7 \times 6 = 42$ .

*(continued on page 37)*

(continued from page 36)

**14.**  $6 \times 3 \times 3$  can be grouped as  $(6 \times 3) \times 3$  and  $6 \times (3 \times 3)$ .  $6 \times (3 \times 3)$  is easier to solve because you can use a basic fact,  $3 \times 3 = 9$ , to more easily find the product.  $6 \times 9 = 54$ .

**15.** See the sample answer. This answer shows all of the steps the student took to solve the problem, including number sentences and arrays that show the student’s thinking. The solution answers the question. The explanation provides important details about how the student solved the problem and uses the maths words *multiply* and *equals*.



**ASSESSMENT AND REMEDIATION**

- Ask students to give an example of the Commutative Property of Multiplication. (*Sample answer:  $9 \times 4 = 4 \times 9$* )
- For students who are still struggling, use the chart below to guide remediation.
- After providing remediation, check students’ understanding. Ask students to explain their thinking while finding the missing number in the equation  $7 \times 5 = ? \times 7$ . (5)
- If a student is still having difficulty, use *STAMS® Plus Book C*, Lesson 3, pages 24–33.

If the error is . . .	Students may . . .	To remediate . . .
two equal expressions with the order of the factors the same	not understand that the Commutative Property states that the order of the factors changes.	Remind students that the Commutative Property is also called the Order Property because of its emphasis on the order of the factors. On an index card, have students write “Commutative Property (Order Property)” and an example, such as $3 \times 4 = 4 \times 3$ . Allow students to refer to the card as they work.
two equal multiplication expressions with different factors	not understand that the factors must be the same.	Provide several examples of the Commutative Property of Multiplication. Underline the factors on both sides of the equal sign. Point out that the factors are the same but in a different order.
an example of the Associative Property of Multiplication	have confused the properties of multiplication.	Review the Commutative and the Associative Properties of Multiplication. Make flash cards with examples of each property. Have students practise stating the correct property for each example.



**ADDITIONAL ACTIVITY**

For students who have mastered the skills in this lesson, see **Challenge Activity** (page 38).

## ADDITIONAL ACTIVITIES



### Hands-on Activity

Use grid paper to model the Commutative Property of Multiplication.

**Materials:** grid paper with large squares, red and blue crayons

Distribute paper and crayons to each student. Tell students to colour 3 rows of 6 squares red and 6 rows of 3 squares blue. Ask students, “What is the multiplication sentence for the red array?” ( $3 \times 6$ ) “What is the product of  $3 \times 6$ ?” (18) Repeat for the blue array. Write  $3 \times 6 = 18$  and  $6 \times 3 = 18$  on the board. Ask students to compare the two equations. Discuss how the factors are the same but in a different order. Give the definition of the Commutative Property of Multiplication.



### Reteaching Activity

Act out the Associative Property of Multiplication.

**Materials:** index cards, crayons

Distribute an index card and crayon to each student. Divide the class into three groups. Tell students in each group to write a number from 1–5 on their index card. Then select and tell one volunteer from each group to stand and show their number. Avoid choosing volunteers who have the same number. Place two of the students in a group and ask them to find the product of their numbers. Then have them multiply their product by the third student’s number. Record the final product on the board. Regroup the students and repeat the activity. Discuss how the product stays the same when the factors are grouped differently. Repeat using different factors.



### Vocabulary Activity

Play “Bingo” to reinforce terms.

**Materials:** blank sheets of paper, counters

Have each student create a grid by folding a sheet of paper in thirds horizontally and then in thirds vertically. Display the vocabulary words, along with the word *order*. Then tell students to write BINGO

in the centre box and the vocabulary words in the other boxes. Read a definition and have students cover the corresponding word on their grid with a counter. The winner for each round is the first student to cover 3 spaces vertically, horizontally or diagonally.



### Real-World Connection

Identify everyday uses of the multiplication properties.

Discuss how the multiplication properties can help students solve maths problems mentally. Give real-world examples, such as the cost of 6 items at \$4 each is the same as the cost of 4 items at \$6 each. Have students share other examples.



### School-Home Connection

Inform families about multiplication properties.

Give each student a copy of the School-Home Connection activity sheet for Lesson 1 (page 159) to share with the family. The activity included in the letter has the family build arrays with coins to show the Commutative and Associative Properties of Multiplication.



### Challenge Activity

Write and solve multiplication problems with 3 factors.

**Materials:** 3 number cubes per student pair, paper, pencils

Have students take turns rolling 3 number cubes. One student will write and solve a multiplication problem using the 3 numbers that are rolled as factors. Remind students to insert brackets to group two of the factors. Also tell students to group the factors in a way that helps them quickly find the product. The partner will then check the student’s work. If the answer is correct, the student gets 1 point.