

# Exploring Multiplicative Relationships

Family Guide | Grade 4 | Unit 1

Your student is exploring how multiplication can help to discover, understand, and explain relationships between numbers.

## Key Math Ideas

Your student comes to fourth grade already knowing how to think about multiplication in several ways, like equal groups, arrays (rows and columns), and area models. They also have a basic understanding of remainders.

In this unit, your student will deepen their understanding of multiplication and division. They will explore how numbers relate as factors and multiples and will learn to think about numbers that do not divide evenly as “a multiple plus some extra.” They will also understand what remainders mean in real-world problems. These multiplication and division skills will help your student throughout the year as they develop strategies for multiplying and dividing larger numbers and solving increasingly complex word problems.

### → In the beginning of the unit, your student will learn to

- find factor pairs for a given number, such as finding that the factor pairs for the number 12 are  $1 \times 12$ ,  $2 \times 6$ , and  $3 \times 4$ ;
- identify numbers as prime (a number that has exactly two factors: 1 and itself) or composite (a number that has more than two factors);
- find the area of a rectangle by multiplying its side lengths;
- understand that the area of any rectangle can be found using the general formula for area:  $l \times w = A$ ;
- find the unknown side length of a rectangle when the area and the other side length are shown.

### → In the middle of the unit, your student will learn to

- describe the relationship between factors and multiples;
- create a list of multiples and notice patterns in how multiples relate to even and odd numbers, such as noticing how all multiples of even numbers are even;
- describe a number as a multiple of another number (24 is a multiple of 6) or a multiple plus some extras ( $26 = 4 \times 6 + 2$ ).

### → At the end of the unit, your student will learn to

- identify “some left over” as the remainder, such as writing the quotient of  $26 \div 4$  as  $6 \text{ R } 2$  because there are 2 left over;
- identify whether a number is divisible by another number, such as noticing 16 is divisible by 4 because you can divide it with no remainder;
- solve division word problems with a remainder;
- explain what the remainder means in different contexts, such as in a problem like  $26 \div 4 = 6 \text{ R } 2$ , they might round down to 6, round up to 7, or the answer might be 2, depending on what question is asked.

## Helpful Hint

A prime number has exactly two factors: 1 and itself. Students sometimes think that 1 is a prime number, but it is important to help them understand that 1 is a special case because it is neither prime nor composite.

**1 is neither prime nor composite.**

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

**Is It a Prime Number?**

Pick 5 numbers for your group. Work together to find as many factor pairs as you can for each of your numbers.

7	29	30	27	19	16	9	13	25	23
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Number	Factor Pairs

What conclusion can I make about multiplying odd numbers?

odd	×	odd	=	_____
even	×	odd	=	_____

Is 38 a multiple of 6? Show your thinking.

$6 \times 5 = 30$
$6 \times 6 = 36$
$6 \times 7 = 42$

No, these are the closest multiple of 6.

Solve.

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What is the remainder?

$40 \div 6 =$   R

# Tips for Supporting Your Student at Home

## Questions to Ask Your Student



### → At the beginning of the unit :

- How can you check to see if you found all the factor pairs for a number?
- Is \_\_ prime or composite? How do you know?
- How can you use the sides of a rectangle to find the area?
- How can you use the area to find the length or width of a rectangle?

### → In the middle of the unit :

- How are factors and multiples related?
- Is \_\_ a multiple of \_\_? How do you know?
- Is \_\_ a factor of \_\_? How do you know?
- Will the product be odd or even? How do you know?

### → At the end of the unit :

- Is \_\_ divisible by \_\_? How do you know?
- How can multiplication help to solve a division problem?
- What does the remainder tell us about this problem?

## If...

your student finds it difficult to address the remainder in contextual problems, like "How many cars will be needed to transport 14 people if each car can fit 4 people?" ...

## Try...

asking "How could an equation or drawing help you represent the problem?" Then help them interpret the remainder by asking, "Is 3 cars enough to transport all 14 people? Why or why not? How many cars are needed?"

## Student Strengths Spotlight

### I learn from my mistakes.

Students often make mistakes while solving problems, however, they do learn how to modify their work and reach the correct response.

### I explain how my classmates' reasoning compares to my own.

Students use comparative language to describe how their reasoning is similar or different from their classmates'.

### I notice patterns and try to apply them.

Recognizing patterns and using them to explore new problems supports students to think flexibly and in new ways.

## Try This Together!

- **Understanding Remainders.** Try highlighting situations in real life that have remainders. For example, while shopping, you could ask, "These bags of oranges cost \$6. How many bags of oranges can we buy with \$20?" To answer this question, you would round down to 3 bags because you cannot buy 3 R2 bags. You can also ask, "How much money will we have left over?" In this case, the answer to the question is the remainder, \$2. This will help your student understand how the remainder will be interpreted differently depending on the question being asked.

$$20 \div 6 = 3 \text{ R}2$$

- **Prime or Not.** Make a hopscotch grid on the floor with chalk. Have your student write numbers 1 to 15 (or a range appropriate to their ability as they progress) in each square. As they hop, ask them to explain whether a number is prime or composite. If they answer correctly, they get an extra hop.

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15