InsightMath California

Exploring Multiplication and Division Strategies

Family Guide | Grade 3 | Unit 3

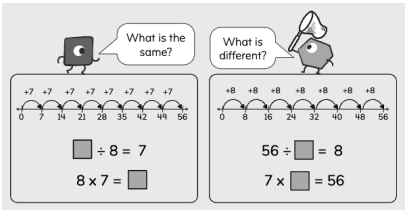
Your student is exploring how relating known facts and using flexible models and strategies can help to multiply and divide efficiently and fluently.

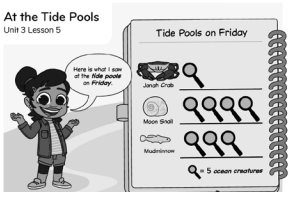
Key Math Ideas

In this unit, your student will expand their understanding of multiplication and division by developing new strategies for working with known facts and using patterns. They will begin by using models as they explore the relationship between multiplication and division, using multiplication to support their division strategies and recognizing how situations can be represented by both a multiplication and division equation. Your student will continue to strengthen their multiplication and division strategies, exploring how to use what they know to find what they do not know. Using flexible models and strategies can help them multiply and divide efficiently and fluently, which not only helps them in their current math work but also prepares them for future work with larger numbers and more complex problem-solving situations.

→ In the first half of the unit, your student will learn to

- create visual models and equations to represent and solve multiplication problems where either the product or one factor is known;
- flexibly interpret the meaning of factors as the number of groups or the number in each group and use that to find a missing factor;
- create visual models and equations to represent and solve division problems;
- explain that the same situation can be represented with multiplication and division equations;
- use information displayed in scaled picture graphs to solve one- and two-step problems involving multiplication.

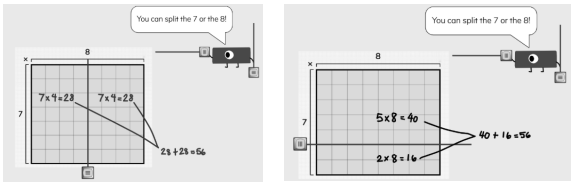




The scaled picture graph uses one magnifying glass to represent 5 ocean animals.

→ In the second half of the unit, your student will learn to

- use known facts and grouping strategies to multiply efficiently;
- compare the efficiency of strategies for solving multiplication and division problems;
- identify patterns on a multiplication table, including patterns within related facts, such as knowing 4 × 3 means they know 3 × 4 and helps them know 8 × 3 because 8 is double 4;
- describe what happens when dividing 0 by a number (other than 0);
- solve word problems involving multiplication and division;
- describe, compare, and contrast multiplication and division strategies.



Two ways of multiplying 8 × 7 using known facts. The model on left breaks apart the factor 8 so students can multiply 7 × 4 to find the product of 7 × 8. The model on the right breaks apart 7 so students can use 8 × 5 and 8 × 2 to find the product of 8 × 7.

Helpful Hint

Sometimes students look for keywords such as “in all” or “how many” in word problems, but these can lead to misconceptions. When supporting your students to solve word problems, avoid asking your student to look for keywords. For example, “how many” can mean “How many total?,” which means students might need to multiply to join equal groups, or “How many does each person get?” which means students might need to divide. Instead, support your student’s understanding of the word problem by asking them to act out or draw the situation, which helps them understand the bigger picture of the problem. The priority is for students to make sense of a problem holistically so they can be flexible mathematical thinkers.

Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ In the first half of the unit:

- How can you use a model, such as a number line, to represent the multiplication or division problem?
- How can you use multiplication to help solve division problems?
- Can the situation be represented by multiplication and division? How do you know?
- How can you use multiplication to solve a problem involving the picture graph?

→ In the second half of the unit:

- How can you use known facts to help you multiply?
- How can you combine equal groups to multiply?
- How can you find the area of a rectangle in parts?
- What patterns can you find in the multiplication table?
- What happens when you divide 0 by another number?

If...	Try...
your student struggles to know how to start to solve a multiplication or division problem . . . Note: this is similar to the suggestions in Unit 1 however as students expand their strategies, the ways to support them grow.	asking your student, "What multiplication facts do you know that can help you find what you do not know?" or "How can you break apart one of the factors to use known multiplication facts?" Prompting students to think about what they know first helps them to find a starting point for the problem.

Student Strengths Spotlight

I keep trying, even when a problem is hard.	When students persevere to solve difficult problems and do not give up, they build confidence.
I notice patterns and try to understand them.	Recognizing patterns and using them to explore new problems supports students to think flexibly and in new ways.
I choose representations to help me solve problems and show my thinking.	Students learn to use appropriate models and equations to represent and communicate their thinking.

Try This Together!

- **Play a Game.** Use playing cards (number cards only with the ace representing 1) to play a multiplication game. Each player takes two cards and multiplies the numbers. Whoever has the greater product keeps all the cards, and whoever has more cards at the end wins. While playing, encourage your student to discuss their strategies and provide them with paper to use as needed to solve. For example, when multiplying 9 × 6 your student may break apart 9 into 4 and 5 and use those facts to solve (4 × 6 = 24 and 5 × 6 = 30 so 9 × 6 = 54 because 24 + 30 = 54).
- **Write Equations.** Ask your student to write addition equations to represent situations with equal and unequal groups. Give them real life situations like, "We have 8 stickers and want to give 4 people the same amount. How many stickers will each person get?" or "There are 9 pickles in the jar and we have 3 jars, how many pickles in all?" Reinforce that multiplication and division apply only when all groups are of equal size and ask them to represent the situation by telling a multiplication or division equation. Support your student to solve using the strategy that is most efficient for them.