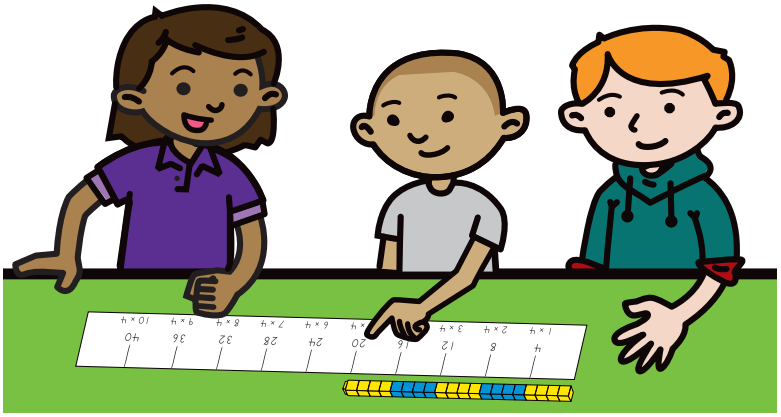
Bridges in Mathematics
Grade 3 Unit 2

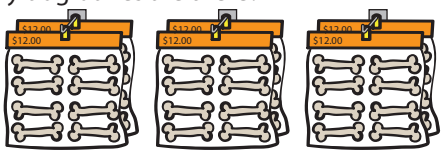
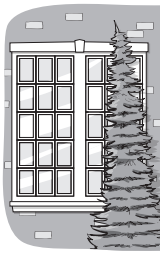
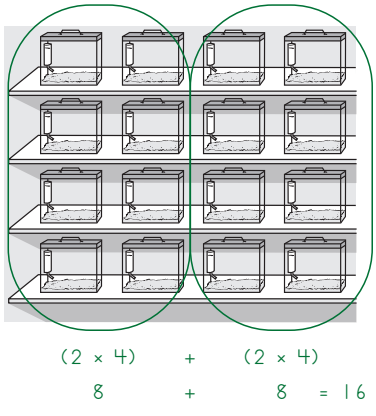
Introduction to Multiplication

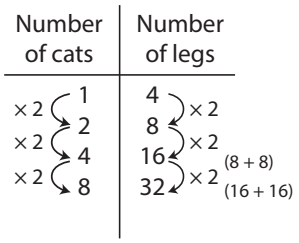


In this unit, your student will:

- Solve word problems involving multiplication
- Represent problems involving multiplication using skip-counting, number lines, arrays, and ratio tables
- Develop efficient strategies for multiplication facts through 10 × 10

Your student will practice these skills by solving problems such as these:

PROBLEM	COMMENTS
How many dog bones are there?  *There are 6 bags in all, and 8 bones in each bag.* *I counted by 8s to find the total number of bones: 8, 16, 24, 32, 40, 48 bones.*	Students solve problems that invite them to use helpful models, like the array or the number line, for multiplication. Early in the unit, students are introduced to items in a pet store. They pose and solve problems about these items, which are displayed in arrays. The array model invites students to skip-count and recognize equal groups.
How many panes are in this window, including the ones hidden behind the tree? 	A little later in the unit, students solve problems in which arrays of objects — like window panes or walls of mailboxes — are partially hidden. This encourages students to visualize how many are hidden and think in terms of multiples. By making it impossible for students to count the objects one by one, such problems require them to find other strategies, including multiplication.
4 × 4 = ____  (2 × 4) + (2 × 4) 8 + 8 = 16	Students develop ways to multiply by each number from 1 to 10. For example, they can multiply any number by 4 by multiplying that number by 2 twice and then adding those products together. Others might multiply the number by 2 and then double the result. The array model provides a visual justification for why such strategies work. Eventually, students will likely recall from memory that 4 × 4 = 16.

PROBLEM	COMMENTS
A cat has 4 legs. How many legs do 8 cats have?  	Students also solve problems with a ratio table. In this problem, there is a constant ratio of 4 legs per cat. The ratio table for this problem shows the number of legs for different numbers of cats. To determine how many legs are on 8 cats, students can simply count by 4 eight times, or double the number of legs from the previous lines. Students may use a variety of strategies to find the products. Students continue to use ratio tables as they multiply greater numbers.

For additional support, you can use the Math Vocabulary Cards app at apps.mathlearningcenter.org.

Frequently Asked Questions About Unit 2

Q: Why does this unit emphasize the array model so much?

A: We do not expect students to use pictures of rectangles to calculate forever. However, pictures illustrate relationships among numbers. They also show why certain properties of operations make sense for multiplication and why certain strategies work. The understandings that these models help to develop are the foundations of students' computational skills.

Q: Why do students solve multiplication problems with different strategies instead of memorizing the facts?

A: Students are expected to recall basic multiplication facts from memory by the end of third grade. Strategies build students' understandings of the properties of multiplication, allow students to quickly compute answers, and permit students to calculate mentally with greater numbers through repetition.

Q: How can I support my student's learning at home?

A: Challenge your student to look for equal groups or arrays, such as 2 hot dogs per person or 7 tiles in each row of floor tiles. Ask them to describe the groups using multiplication.

To further support your student in learning mathematics, you can:

- Visit mathathome.mathlearningcenter.org and work through some or all of the activities in Grade 3: Set 2 together. These activities complement the learning taking place in the classroom during Unit 2 and provide fun ways to engage children in mathematical thinking. This set also includes digital versions of familiar games that your student has learned at school, such as Loops & Groups.
- If your student would enjoy learning about math concepts through literature, consider looking for math-related books at your local library. Encourage them to read to you and point out the mathematical relationships they see. Here are some suggested titles:
  - *The Book of Math* by Anna Weltman, illustrated by Paul Boston
  - *Counting in Dog Years and Other Sassy Math Poems* by Betsy Franco, illustrated by Priscilla Tey