Bridges in Mathematics
Grade 5 Unit 4

Multiplying & Dividing Whole Numbers & Decimals

In this unit your child will:

- Use a variety of strategies for multiplying and dividing multi-digit whole numbers
- Practice using the standard algorithm to multiply multi-digit whole numbers
- Begin multiplying and dividing with decimal numbers

Your child will learn and practice these skills by solving problems like those shown below. Keep this sheet for reference when you're helping with homework. Use the free Math Vocabulary Cards app for additional support: mathlearningcenter.org/apps.

PROBLEM	COMMENTS
Write the following number in expanded notation: three hundred six and twenty-five hundredths. 300 + 6 + 0.20 + 0.05	Reviewing the place value concepts associated with decimal numbers helps students compare different numbers and compute with decimal numbers. The words and expression (in expanded form) in this example are two ways of representing the number 306.25 that make the place value of the digits clear.
Solve the problems in the string below. Use the answers from the first few combinations to help solve the rest. 28 × 10 = 280 28 × 5 = 140 28 × 15 = 420 28 × 100 = 2,800 28 × 50 = 1,400 1,456 ÷ 28 = 52	This series of calculations is closely related to the work with ratio tables (see next example) and resembles the problem string exercises that students do frequently in the classroom. The purpose is to use combinations that are easy to solve mentally to help solve problems that aren't so easy at first. In this example, students can halve 28 × 10 (280) to solve 28 × 5 (140) and then add the products to solve 28 × 15 (420). Once they calculate that 28 × 50 = 1,400, they may also see that 1,456 is 2 groups of 28 more than 1,400, so 1,456 ÷ 28 must be 52. These strings build a strong sense of number and mental computation strategies.

Janelle was getting ready for a big party. She bought 13 bottles of juice for $3.25 per bottle. How much did she spend on juice?
bottles | cost
1 | $3.25
10 | $32.50
2 | $6.50
3 | $9.75
13 | $42.25
$32.50 + $9.75
32 + 9 + 0.50 + 0.75
41 + 1.25
$42.25
	When you were a math student, you might have seen a problem like this solved as shown below. Using a ratio table to keep track of partial products (like 10 × $3.25 = $32.50) helps students solve such problems with greater ease, while also building their number sense and ability to use strategies that lead to mental computation.
	   1
	  3.2 5
	  × 1 3
	 1 ¹9 7 5
	× 3 2 5 0
	$ 4 2.2 5

<table>
<tr><th>PROBLEM</th><th>COMMENTS</th></tr>
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<td>
Fill in the blanks to complete the problems.

2
27
× 14
108
× 270
378

Use the standard algorithm to solve the problem.

3
34
× 28
¹272
× 680
952
</td>
<td>Students are expected to be able to use the standard algorithm for multiplication, and toward the end of the unit you'll see homework problems that require it. Some are only partially completed using the algorithm, and then students are asked to finish the work. This prepares students for assessment items shown this way. Other prompts ask students to examine a fictional student's work and identify how and why that student made errors in their use of the algorithm. Those prompts are meant to help students think carefully about how the algorithm works and to help them avoid making common errors when they use the algorithm.</td>
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<td>
Julissa bought her mom some flowers. Each flower cost $0.65, and Julissa spent $11.70 in all. How many flowers did she get for her mom?

20–2
<table>
<tr><td>flowers</td><td>1</td><td>10</td><td>20</td><td>2</td><td>18</td></tr>
<tr><td>cost</td><td>$0.65</td><td>$6.50</td><td>$13.00</td><td>$1.30</td><td>$11.70</td></tr>
</table>
13–1.30

She bought 18 flowers because
$0.65 × 18 = $11.70.
(That also means $11.70 ÷ $0.65 = 18)
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The ratio table can also be used to solve division problems. You might recall solving problems like this one by first converting the divisor (0.65) to a whole number, multiplying the dividend by the corresponding power of 10, and then carrying out the long division algorithm, using a process of informed trial and error to figure out the maximum number of times the divisor goes into each part of the dividend.

0.65)11.70

18
65)1170
− 65
520
−520
0

65 × 7 = 455
65 × 8 = 520

The ratio table gives students a way to keep track of related facts that can help them solve the problem, reinforces the inverse relationship between multiplication and division, and preserves the actual magnitude of the numbers in the problem.
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FREQUENTLY ASKED QUESTIONS ABOUT UNIT 4

Q: I don't remember how to use the multiplication algorithm. The examples in the homework don't really help me, because I can't see where to start or what order to do the steps.

A: The algorithm works every time when carried out correctly, but many people have difficulty remembering how to carry out the steps. Take a look online for videos that will take you through the algorithm step by step. Some are much clearer than others, so watch different videos if the first isn't helpful for you.

Q: This approach to multiplication and division is new to me. Why have kids use so many different strategies when they can use the algorithms instead?

A: An algorithm is a set of steps used to perform a particular calculation with specific kinds of numbers. Algorithms are important because when they are used accurately and with understanding, they are reliable, efficient, and universally applicable. Difficulties arise when students attempt to use an algorithm for multiplying or dividing without having mastered the basic facts, when they don't understand why the algorithm works, when they forget the steps, or when they can carry out the steps yet are unable to use their estimation skills to judge whether their final answer is reasonable. This unit employs the array model and additional strategies to help students build a strong sense of number and an understanding of how different strategies, including the algorithms, work. The goal is to help students develop many effective computational strategies, a strong sense of number, and the ability to use algorithms with understanding and accuracy.