InsightMath California

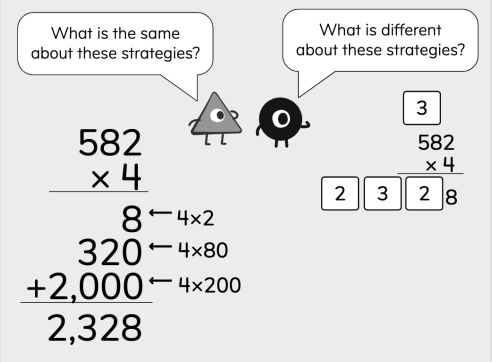
Extending Multiplication to Multi-digit Whole Numbers

Family Guide | Grade 5 | Unit 2

Your student is exploring how multidigit computations can be reduced to repeated processes based on a series of single-digit computations.

Key Math Ideas

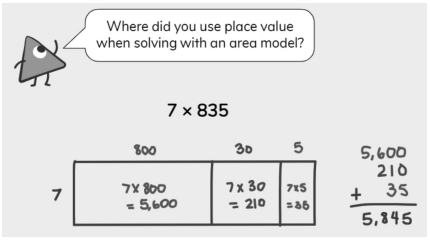
Previously your student learned to use place value strategies to multiply two-digit by two-digit numbers and multiply up one-digit numbers by numbers with up to four digits. In this unit, your student will learn the standard algorithm for multiplying, using their place value understanding to discover why regrouping (carrying) is sometimes necessary. Throughout the unit, students make place value connections between the standard algorithm and multiplying using partial products, where they multiply the value of each digit in the factors (as shown to the right), as well as connections to multiplying with open area models. They work toward multiplying with the standard algorithm accurately and efficiently to solve word problems in real-world contexts



The strategy on the left shows the partial-products algorithm. The strategy on the right shows the standard algorithm for multiplication.

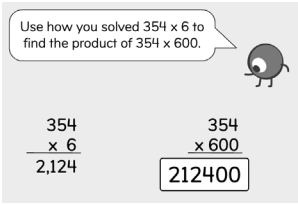
→ In the beginning of the unit, your student will learn to

- recognize place value patterns to identify, read, write, and say numbers up to trillions;
- describe patterns in the zeros of a product when multiplying multiples of 10, 100, and 1,000;
- use high and low estimates to determine if a product is reasonable;
- use area models to represent partial products when multiplying numbers;
- use the partial-products algorithm to record multiplication steps.



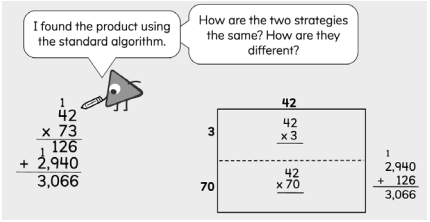
→ In the middle of the unit, your student will learn to

- use place value to describe the relationship between partial products and the standard algorithm when multiplying a one-digit number by a multidigit number;
- multiply multidigit numbers by one-digit numbers using the standard algorithm;
- use place value to explain the steps of the standard algorithm when multiplying with a one-digit factor.



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

- multiply multidigit numbers using the standard algorithm;
- use place value to explain the steps of the standard algorithm when multiplying with multidigit numbers;
- use the standard algorithm for multiplication to solve word problems.



Helpful Hint

Although your student is learning the standard algorithm for multiplication in this unit, they also have other strategies they know to solve problems involving multiplying whole numbers. Encourage them to use the strategy that is most efficient for them depending on the problem. Sometimes that may be the standard algorithm and sometimes that might be the partial-products algorithm. At times, your student might prefer to break apart larger numbers and use an open area model to represent partial products when multiplying. When using standard algorithm, support your student to explain using place value language to avoid it becoming just "steps to multiply" instead of a procedure they understand how to use.

Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ In the beginning of the unit:

- How can you describe patterns in the number of zeros when you multiply by powers of ten?
- What strategy can you use to multiply whole numbers?
- What is your estimate of what the product of these numbers might be?

→ In the middle of the unit:

- Why can you keep the partial products on one line when we multiply?
- How can you use the standard algorithm to multiply?
- What are steps of the standard algorithm with a one-digit factor? How can you use place value to help you explain?

→ By the end of the unit:

- How can you use the standard algorithm to multiply by two-digit numbers?
- What are steps of the standard algorithm with two-digit factors? How can you use place value to help you explain?
- How can multiplication strategies help you solve real world problems?

If...		Try...
your student misinterprets the meaning the amount they regrouped and adds it to the number in that place, such as in wwthe problem to the right where the 3 they carried over was added to the 3 in the tens place before multiplying the tens place . . .	3 47 x 5 355	having them solve with a different strategy, such as finding the partial products by multiplying the value of each digit. Support them to recognize their mistake and try again!

Student Strengths Spotlight

I value mistakes.	Students investigate mistakes in order to better understand how to multiply using the standard algorithm. They recognize that these mistakes add value to their learning process.
I make a plan to solve a problem and adapt my plan if I need to.	Before solving problems, students take time to make a plan and then are able to change the plan if needed a solution is not found.
I determine what tools and strategies might help me solve this problem.	Students make connections between strategies, and then choose strategies that are best for the problem.

Try This Together!

- Dice Game. Have your student use dice to find their own numbers to practice multiplication. They can roll the dice once, twice, or three times to make one-, two-, and three-digit numbers. Have them record that number and then roll the dice again to find and record another multidigit factor. After they record the numbers, have your student multiply the two numbers using a strategy of their choice. Ask them to use place value to help explain the strategy they used.
- Estimate then Actual. Ask your student real-world questions such as, "If you read 225 minutes each week, how much will you read after 7 weeks? 12 weeks? 52 weeks?" Have them first estimate their answer, then solve using the standard algorithm.
- Would You Rather? Pose some "Would You Rather?" questions to your student using multiplication problems. For example, ask them "Would you rather 12 × 54 dollars or 34 × 27 dollars?" Have your student estimate the answer first, then find the actual answer and explain their strategy.