Lesson 11: Partial Products and the Standard Algorithm

Standards Alignments

Addressing 4.NBT.B.5

Teacher-facing Learning Goals

- Identify similarities and differences between algorithms that use partial-products and the standard algorithm for multiplication.
- Make sense of the standard algorithm for multiplication.

Student-facing Learning Goals

- Let's compare multiplication algorithms.

Lesson Purpose

The purpose of this lesson is for students to analyze the standard algorithm for multiplication and compare it to an algorithm that uses partial products they saw in earlier lessons.

In previous lessons, students analyzed and used an algorithm that uses partial products to multiply multi-digit whole numbers. They learned that an algorithm can represent the base-ten diagrams and rectangular diagrams, but it is more efficient for keeping track of and recording partial products.

This lesson extends students' analysis to include the standard algorithm for multiplication of multi-digit numbers. In grade 4, the standards focus on understanding place value and how it is represented in different methods for finding products. The work here serves to build the groundwork for making sense of the standard algorithm in grade 5, so students are not expected to use the standard algorithm at this time.

Access for:

Students with Disabilities

- Engagement (Activity 2)

English Learners

- MLR8 (Activity 1)

Instructional Routines

Number Talk (Warm-up)

Lesson Timeline

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Lesson Synthesis	10 min
Cool-down	5 min

Teacher Reflection Question

In grade 5, students will use the traditional algorithm. How does the way they analyzed two different algorithms in Activity 2 build toward this work?

Cool-down (to be completed at the end of the lesson)

5 min

Choose a Way to Multiply

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Student-facing Task Statement

Find the value of each product. Show your reasoning.

1. 4×798
2. $8 \times 2{,}864$

Student Responses

1. 3,192. Sample reasoning:
   - $(4 \times 700) + (4 \times 90) + (4 \times 8) = 2{,}800 + 360 + 32 = 3{,}192$
   - I know that 798 is 2 less than 800. So 4 groups of 798 is 4×2 less than 4×800 or 8 less than 3,200, which is 3,192.
2. 22,912. Sample reasoning:
   - $(8 \times 2{,}000) + (8 \times 800) + (8 \times 60) + (8 \times 4) = 16{,}000 + 6{,}400 + 480 + 32 = 22{,}912$