



Topic B

The Standard Algorithm for Multi-Digit Whole Number Multiplication

5.OA.1, 5.OA.2, 5.NBT.5

Focus Standard:	5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
	5.OA.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. <i>For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</i>
	5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
Instructional Days:	7	
Coherence	-Links from:	G4–M3 Multi-Digit Multiplication and Division
	-Links to:	G6–M2 Arithmetic Operations Including Division of Fractions
		G6–M4 Expressions and Equations

In Topic B, place value understanding moves toward understanding the distributive property by using area models to generate and record partial products (**5.OA.1**, **5.OA.2**) which are combined within the standard algorithm (**5.NBT.5**). Writing and interpreting numerical expressions in Lessons 1 and 2, and comparing those expressions using visual models, lay the necessary foundation for students to make connections between the distributive property, as depicted in area models, and the partial products within the standard multiplication algorithm. The algorithm is built over a period of days, increasing in complexity as the number of digits in both factors increases. Reasoning about zeros in the multiplier, along with considerations about the reasonableness of products, also provides opportunities to deepen understanding of the standard algorithm. Although word problems provide context throughout Topic B, the final lesson offers a concentration of multi-step problems that allows students to apply this new knowledge.

A Teaching Sequence Towards Mastery of the Standard Algorithm for Multi-Digit Whole Number Multiplication

- Objective 1:** Write and interpret numerical expressions and compare expressions using a visual model.
(Lesson 3)
- Objective 2:** Convert numerical expressions into unit form as a mental strategy for multi-digit multiplication.
(Lesson 4)
- Objective 3:** Connect visual models and the distributive property to partial products of the standard algorithm without renaming.
(Lesson 5)
- Objective 4:** Connect area models and the distributive property to partial products of the standard algorithm with renaming.
(Lessons 6–7)
- Objective 5:** Fluently multiply multi-digit whole numbers using the standard algorithm and using estimation to check for reasonableness of the product.
(Lesson 8)
- Objective 6:** Fluently multiply multi-digit whole numbers using the standard algorithm to solve multi-step word problems.
(Lesson 9)