



Grade 4 - Unit 2 - Multiplication, Division and Strategies Oh My!

Unit Focus

This unit focuses on an applied and visual approach to multi-digit multiplication and early division with remainders. Students deepen their understandings of multiplication and division continuing on the journey to multiplicative reasoning developed in unit 1. They apply number sense to developing useful models such as the ratio table and the array or area model and mental strategies such as doubling and halving for multiplying and dividing with an increasing degree of efficiency. They also continue to develop proficiency with basic multiplication and division facts. As they are solving various problems, students justify their reasoning using clear models and mathematical language as they create products.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Standards - Common Core <i>Mathematics: 4</i> - Use the four operations with whole numbers to solve problems. - Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (<i>CCSS.MATH.CONTENT.4.OA.A.1</i>) - Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.1 (<i>CCSS.MATH.CONTENT.4.OA.A.2</i>) - Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (<i>CCSS.MATH.CONTENT.4.OA.A.3</i>) - Gain familiarity with factors and multiples. - Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. (<i>CCSS.MATH.CONTENT.4.OA.B.4</i>) - Generalize place value understanding for multi-digit whole numbers. - Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division. (<i>CCSS.MATH.CONTENT.4.NBT.A.1</i>)	<i>Students will be able to independently use their learning to...</i> T1 Represent situations using mathematical reasoning and symbols. T2 Apply models to solve problems. T3 Demonstrate fluency with mathematical computations and definitions.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians make sense of quantities to represent situations mathematically. U2 Mathematicians attend to the underlying meaning of quantities and symbols. U3 Mathematicians calculate efficiently and accurately while using appropriate symbols and labels. U4 Mathematicians communicate precisely and clearly using mathematical definitions. U5 Mathematicians create or use models to generalize, represent, and solve problems.	<i>Students will keep considering...</i> Q1 How can the relationship between quantities be represented? Q2 What do the quantities mean? Q3 How can I use mathematical definitions to better explain my solution? Q4 What can I do to make my solution sufficiently clear? Q5 What model best represents this problem? Q6 How can I decompose a number to make it easier to work with?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 estimations to multiplication or division problems help you determine if a solution is reasonable	<i>Students will be skilled at...</i> S1 building and drawing arrays of multi-digit multiplication equations

Stage 1: Desired Results - Key Understandings

- Use place value understanding and properties of operations to perform multi-digit arithmetic.
- Fluently add and subtract multi-digit whole numbers using the standard algorithm. *(CCSS.MATH.CONTENT.4.NBT.B.4)*
- Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. *(CCSS.MATH.CONTENT.4.NBT.B.5)*
- Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. *(CCSS.MATH.CONTENT.4.NBT.B.6)*
- Solve problems involving measurement and conversion of measurements.
- Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. *(CCSS.MATH.CONTENT.4.MD.A.3)*
- Mathematical Practices
- Reason abstractly and quantitatively. *(CCSS.MATH.MP.2)*
- Model with mathematics. *(CCSS.MATH.MP.4)*
- Attend to precision. *(CCSS.MATH.MP.6)*

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- Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. *(POG.1.2)*
- Product Creation: Effectively use a medium to communicate important information. *(POG.3.2)*

K2 associative property, commutative property and the distributive property of multiplication
K3 strategies for multiplication facts can be applied to solving multi-digit multiplication problems and division problems.
K4 each digit represents ten times what it represents in the place to its right in a multi-digit number
K5 Vocabulary: divide, remainder, quotient, dividend, divisor, area, dimension, multiply place value, factor, product, ratio table, unit
K6 there is a specific formula to determine the area of a rectangle

S2 multiplying by multiples of 10, 100 and 1,000
S3 solving problems with ratio tables
S4 interpreting remainders in division story problems
S5 solving multi-step story problems involving all four operations
S6 multiplying 2 and 3 digit numbers by 1 digit numbers and 2 digit by 2 digit numbers using strategies based on place value and properties of operations
S7 using an equation or rectangular array to explain strategies for multiplying with multi-digit number
S8 dividing a 2 or 3 digit number by a 1-digit number using strategies based on place value and the properties of operations