

Unit 2 - Multiplication, Division and Strategies Oh My!

Overview

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.

21st Century Capacities: Synthesizing, Product Creation

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 3 Construct viable arguments and critique the reasoning of others
 MP4 Model with Mathematics
 MP8 Look for and express regularity in repeated reasoning

CCSS.MATH.CONTENT.4.OA.A.1 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.
 CCSS.MATH.CONTENT.4.OA.A.2 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
 CCSS.MATH.CONTENT.4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations,

Transfer:

Students will be able to independently use their learning in new situations to...

1. Use models and mental strategies for multiplication and division with more efficiency and accuracy (synthesizing)
2. Model relationships among quantities (synthesizing)
3. Demonstrate fluency with math facts, computation and concepts. (multiplication & division)
4. Justify reasoning using clear and appropriate mathematical language (product creation)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Tools and visual models help us to problem solve and explain our thinking
2. Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems.
3. Mathematicians examine relationships

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

- A. Does my answer make sense and how can I explain my answer to someone else?
- B. How can I break a problem down into manageable parts?
- C. What is the best way to show my thinking?

Grade 4 Math Curriculum

<p>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.</p> <p>CCSS.MATH.CONTENT.4.OA.B.4 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.</p> <p>CCSS.MATH.CONTENT.4.NBT.A.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents.</p> <p>CCSS.MATH.CONTENT.4.NBT.B.5 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.</p> <p>CCSS.MATH.CONTENT.4.NBT.B.6 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.</p> <p>CCSS.MATH.CONTENT.4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p>	<p>to discern a pattern, generalizations , or structure.</p> <p>4. Mathematicians use number sense to compute fluently and make reasonable estimates and justify their thinking.</p>	<p>D. Why is it important to understand the relationship between multiplication and division?</p> <p>E. How do place value patterns help me solve harder problems?</p> <p>F. Why is it important for me to understand a remainder in a division problem?</p>
Acquisition:		
	<p><i>Students will know...</i></p> <ol style="list-style-type: none"> How to determine if an estimate to a multiplication or division problem is reasonable Associative property, commutative property and the distributive property of multiplication Strategies for multiplication facts can be applied to solving multi-digit multiplication problems and division problems. That in a multi-digit number, each digit represents ten times what it represents in the place to its right Vocabulary: divide, remainder, quotient, dividend, divisor, area, dimension, multiply place value, product, ratio table, unit 	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> Building and drawing arrays of multi-digit multiplication equations Multiplying by multiples of 10, 100 and 1,000 Solving problems with ratio tables Interpreting remainders in division story problems Solving multi-step story problems involving all four operations Multiplying 2 and 3 digit numbers by 1 digit numbers using strategies based on place value and properties of operations Using an equation or rectangular array to explain strategies for multiplying with multi-digit numbers Dividing a digit number by a 1-digit number using strategies based on place value and the properties of operations