Unit 5 - *Multiplying and Dividing Whole Numbers and Fractions*

Overview

In Unit 5, students extend their understandings of multiplication and division to working with fractions. During the first module, students review and extend skills and concepts first introduced in Grade 4 to solidify their understandings of whole-number-by-fraction multiplication. In Modules 2 and 3, they use rectangular arrays to model and solve fraction-by-fraction multiplication problems. Module 4 features an introduction to division of whole numbers by unit fractions, and unit fractions by whole numbers. There is a strong emphasis throughout the unit on sense-making and understanding, as students tackle material that is conceptually challenging.

21st Century Capacities: Synthesizing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP2 Reason abstractly and quantitatively
MP3 Construct viable arguments and critique the reasoning of others
MP4 Model with Mathematics
MP5 Use appropriate tools strategically

Use equivalent fractions as a strategy to add and subtract fractions.
CCSS.MATH.CONTENT.5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
CCSS.MATH.CONTENT.5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
CCSS.MATH.CONTENT.5.NF.B.4.A Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the

Transfer:

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

A. Justify reasoning using clear and appropriate mathematical language
B. Demonstrate fluency with math facts, computation and concepts.
C. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution (synthesizing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians create dependable arguments by calculating efficiently and accurately.
2. Mathematicians argue the relationships between problem scenarios and mathematical representation.
3. Mathematicians examine the impact of operations and how they relate to one another.

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

A. How can I explain this mathematically?
B. What is another way that this problem could be solved?
C. What math tools/models/strategies can I use to solve the problem?
D. Does this solution make sense?
E. What does the solution tell me?

result of a sequence of operations $a \times q \div b$. CCSS.MATH.CONTENT.5.NF.B.4.B Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. CCSS.MATH.CONTENT.5.NF.B.5 Interpret multiplication as scaling (resizing), by: CCSS.MATH.CONTENT.5.NF.B.5.A Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. CCSS.MATH.CONTENT.5.NF.B.5.B Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1. CCSS.MATH.CONTENT.5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[1] CCSS.MATH.CONTENT.5.NF.B.7.A Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. CCSS.MATH.CONTENT.5.NF.B.7.B Interpret division of a whole number by a unit fraction, and compute such quotients. CCSS.MATH.CONTENT.5.NF.B.7.C Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. CCSS.MATH.CONTENT.5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. CCSS.MATH.CONTENT.5.NF.B.5.A Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.	***Acquisition:***	
	Students will know… 1. The difference between multiplication of fractions and division of fractions. 2. How to find the product and quotient of fractions 3. How to model division and multiplication of fractions 4. How the size of the fractional factor impacts the product 5. Vocabulary: denominator, numerator, factor, fraction, improper fraction, product, quotient, equivalent fraction, area model, equation, expression, fraction model	*Students will be skilled at…* 1. Solving multiplication of fractions with the area model 2. Solving multiplication of fractions using the standard algorithm 3. Determining a fractional amount of a whole number. 4. Dividing fractions using a model 5. Dividing fractions using the standard algorithm 6. Determining the proper operation to solve fraction word problems (multiplication or division).