

Sherman School

Unit Overview

Subject: Mathematics

Unit: Multiplying and Dividing Fractions

Grade: 5

Pacing: February/20 days

Essential Question(s): How can we use what we know about whole number multiplication to extend our understanding to multiplication and division of fractions?

Big Idea(s):

- The product of two fractions can be found by multiplying numerators and multiplying denominators.
- The product of two positive fractions each less than one is less than either factor
- A fraction division calculation can be changed to an equivalent multiplication calculation
- rectangular array models.
- Different real-world interpretations can be associated with the product of a whole number and fraction, a fraction and whole number, and a fraction and fraction.

CCSS Priority Standards
5.NF.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. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.) 5.NF.4a: Interpret the product $(\frac{a}{b}) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(\frac{2}{3}) \times 4 = \frac{8}{3}$, and create a story context for this equation. Do the same with $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$. (In general, $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{ac}{bd}$.) 5.NF.4b: 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. 5.NF.6: Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. 5.NF.7a: Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(\frac{1}{3}) \div 4$ and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(\frac{1}{3}) \div 4 = \frac{1}{12}$ because $(\frac{1}{12}) \times 4 = \frac{1}{3}$. 5.NF.7b: Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (\frac{1}{5})$ and use a visual fraction model to show the

quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.

5.NF.7c: 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. For example, how much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$ -cup servings are in 2 cups of raisins?

5.MP.1 Make sense of problems and persevere in solving them.

Skills (What Students Need to Be Able To Do)
• Add and subtract fractions with unlike denominators, including mixed numbers. • Rewrite fractions with unlike denominators as equivalent fractions with a common denominator in order to find their sum or difference. • Multiply a whole number by a fraction. • Solve story problems involving multiplying a whole number by a fraction. • Multiply a fraction by a fraction. • Solve story problems involving multiplying a fraction by a fraction. • Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate size. • Demonstrate that the area of a rectangle with fractional side lengths can be found through tiling or by multiplying the side lengths. • Represent the product of two fractions as an array whose dimensions are the two fractions being multiplied. • Interpret multiplication as scaling (resizing) by explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; 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. • Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number.

- Solve story problems involving multiplication of fractions and mixed numbers.
- Divide a unit fraction by a whole number.
- Use a visual model to represent division of a unit fraction by a whole number.
- Divide a whole number by a unit fraction.
- Use a visual model to represent division of a whole number by a unit fraction.
- Solve story problems involving division of a unit fraction by a whole number.
- Solve story problems involving division of a whole number by a unit fraction.

Research Based Effective Teaching Strategies

Summarizing and note taking

Homework and practice

Non-linguistic representations

Cooperative learning

Productive struggle

Implicit instruction

Setting objectives and providing feedback

Questions, cues, and organizers

Explicit instruction

Assessments:

M1, S1 Unit 5 Pre-Assessment

M2, S1 Whole Number Times a Fraction Checkpoint

M3, S4 Fraction Times Fraction Checkpoint

M4, S6 Unit 5 Post-Assessment

5A-5B Workplace Observational Assessment

Instructional Resources:

Unit 5 Multiplying & Dividing Fractions, Bridges; [The Math Learning Center](#)

February Number Corner; [The Math Learning Center](#)

The Math Forum

Teacher Made Resources