MATH NEWS

Volume 5 | 5th Grade – Unit 5 | 3RD Nine Weeks

Unit 5 Focus

In this unit students extend their understanding of multiplying a fraction by a whole number to multiplying fractions by fractions. In previous grades, students have developed understanding of fractions as numbers. Students will develop an understanding of the connection between fractions and division.

Students build on their work with "compare" problems to develop a foundational understanding of multiplication as scaling. Scaling is foundational for developing an understanding of ratios and proportion in future grade levels.

Students will use their understanding of relationship of multiplication and division to develop a conceptual understanding of division with fractions.

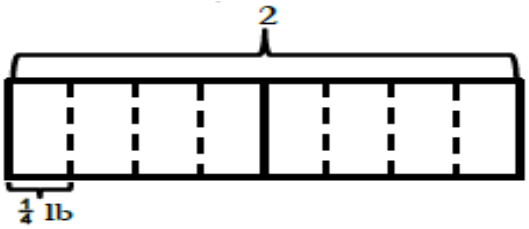
UNIT 5 GOALS:

- Interpret a fraction as division of the numerator by the denominator.
- Solve word problems involving multiplication of fraction and mixed numbers by using visual fraction models or equations to represent the problem.
- Solve word problems involving division of unit fractions by non-zero whole numbers and whole numbers by unit fractions using ***visual models and equations*** to represent the problem**.**
- Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; and explain 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* × *a*)/ (*n* × *b*) to the effect of multiplying *a*/*b* by 1.

Division Involving Fractions:

Practice Problem: Francois picked 2 pounds of blackberries. If he wants to separate the blackberries into $\frac{1}{4}$ pound bags, how many bags can he make?

Number Sentence: $2 \div \frac{1}{4} = 8$

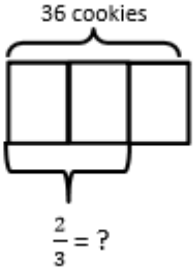


Multiplication Involving Fractions:

Mrs. Carter baked 3 dozen cookies. Two-thirds of them were chocolate chip. How many chocolate chip cookies did she bake?

1 dozen is 12 cookies, so 3 dozen is 36 cookies. (3 x 12)

$\frac{2}{3}$ of 36 cookies = _____ chocolate chip cookies



Using a Diagram to solve:

Thinking used

3 units = 36

1 unit = $\frac{36}{3}$ or 36 ÷ 3

= 12 cookies

2 units = 2 x 12 cookies

= 24 chocolate chip cookies

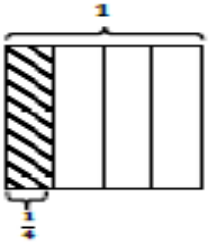
Numerical Procedure:

$\frac{2}{3}$ of $36 = \frac{2}{3} \times 36 = \frac{2 \times 36}{3} = \frac{72}{3} = 24$

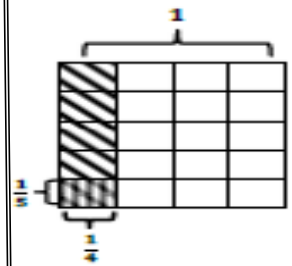
Multiplication of a Fraction by a Fraction

Solve. Draw a model to explain your thinking.

Joseph has $\frac{1}{4}$ of a chocolate cake. He gave his teacher $\frac{1}{5}$ of what he had. What fraction of cake did Joseph give to his teacher?



Step 1: Draw a rectangle and cut it vertically into 4 equal parts. Shade 1 part and label it $\frac{1}{4}$.



Step 2: We need to find $\frac{1}{5}$ of $\frac{1}{4}$. Split the whole rectangle into 5 equal parts by drawing horizontal lines. Now, shade 1 of the 5 parts (that are already shaded) and label it $\frac{1}{5}$.

What's the name of these units? Twentieths

$\frac{1}{5}$ of $\frac{1}{4} = \frac{1}{20}$ → $\frac{1}{5} \times \frac{1}{4} = \frac{1}{20}$ Joseph gave his teacher $\frac{1}{20}$ of the cake.

Images from Lafayette Parish School System

Interpret a fraction as division of the numerator by the denominator.

Using a picture, show how friends Sally, Adam, and Mandy could share two candy bars. Write an equation, solve, and check.

Strategy:

Draw two **tape diagrams** since there are 2 candy bars. Divide each candy bar into 3 equal parts and then share among the three friends.

Form: 6 thirds ÷ 3 = 2 thirds

Division Equation: $2 \div 3 = \frac{2}{3}$

Each friend gets $\frac{2}{3}$ ***of a candy bar.***

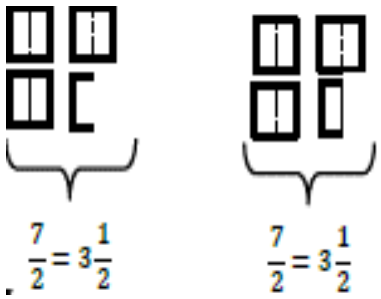
Ray has 7 crackers that he wants to share between his friend Gabe and himself equally.

***Think*:** If there are 7 crackers, you could give each boy 3 crackers. Then take the last cracker and split it in half and give each boy one of the halves.

$7 \div 2 = \frac{7}{2} = 3\frac{1}{2}$

Or you could split all the crackers in half first, and then share.

How many halves do we have to share in all? 14 halves



$\frac{7}{2} = 3\frac{1}{2}$ $\frac{7}{2} = 3\frac{1}{2}$

14 halves ÷ 2 = 7 halves

Multiplying a number times a number equal to 1, results in the original number.

Let's test this statement. We know $\frac{2}{2}$ and $\frac{10}{10}$ are examples of fractions that equal 1 whole.

Example 1: $6 \times \frac{2}{2} = \frac{6 \times 2}{2} = \frac{12}{2} = 6$ ✓

Example 2: $3 \times \frac{10}{10} = \frac{3 \times 10}{10} = \frac{30}{10} = 3$ ✓

Multiplying a number times a number less than 1 results in a product less than the original number.

Example 1: $6 \times \frac{2}{3} = \frac{6 \times 2}{3} = \frac{12}{3} = 4 \quad (4 < 6)$ ✓

Example 2: $3 \times \frac{7}{10} = \frac{3 \times 7}{10} = \frac{21}{10} = 2\frac{1}{10} \quad (2\frac{1}{10} < 3)$ ✓

Multiplying a number times a number greater than 1, results in a product greater than the original number.

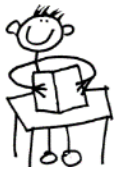
Let's test this statement.

Example 1: $6 \times \frac{4}{3} = \frac{6 \times 4}{3} = \frac{24}{3} = 8 \quad (8 > 6)$ ✓

Example 2: $3 \times \frac{15}{10} = \frac{3 \times 15}{10} = \frac{45}{10} = 4\frac{5}{10} \quad (4\frac{5}{10} > 3)$ ✓

Example 3: $\frac{2}{5} \times \frac{7}{4} = \frac{2 \times 7}{5 \times 4} = \frac{14}{20}$

Using the benchmark fraction of $\frac{1}{2}$, we know that $\frac{2}{5}$ is less than $\frac{1}{2}$ and $\frac{14}{20}$ is greater than $\frac{1}{2}$. $(\frac{14}{20} > \frac{2}{5})$ ✓



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