

5th Grade - Unit 5

Multiplication & Division of Fractions

In this unit, students will learn to multiply fraction and decimal fractions and start work with fraction division. Students will begin by using fraction tiles as a concrete way to understand fraction operations and eventually move to more abstract understanding.

Key Words

Denominator - show the fractional part, e.g. the fifths in 3 fifths.

Numerator - shows how many fractional units there are, e.g. 3 in 3 fifths.

Equivalent Fractions - fractions that have the same value, though they may look different.

Improper Fractions - fractions where the numerator is greater than the denominator.

Mixed Numbers - fractions made up of a whole number and a fraction.

Simplest Form - a fraction is written in simplest form when the greatest common factor of the numerator and denominator is 1.

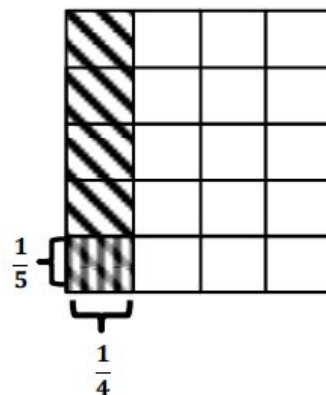
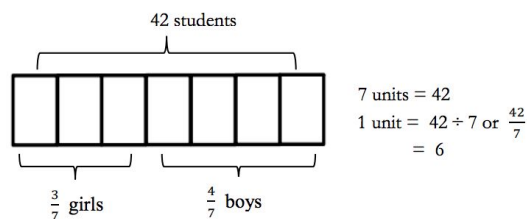
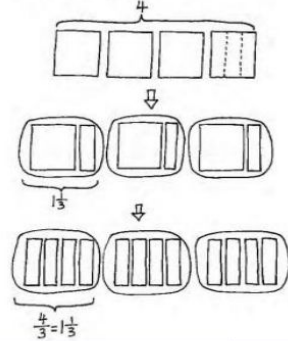
Product - the answer to an multiplication problem.

Quotient - the answer to a division problem.

A diagram of $4 \div 3$ showing fractional division:

$$4 \div 3 = \frac{4}{1} \div \frac{3}{1} = \frac{4}{3}$$

$$12 \text{ thirds} \div 3 = 4 \text{ thirds}$$



How can I help at home?

- ★ Ask your child what they learned in school and ask them to show you an example.
- ★ Look for opportunities in daily life to discuss fractional parts of a whole, e.g. pieces of pizza, parts of a hour, distances to familiar places
- ★ Bake together and talk about how much of each ingredient you need if you were to double or triple the recipe.
- ★ Look for opportunities in daily life to discuss both fraction parts of a whole and of other fractions, e.g. what is $\frac{1}{4}$ of 20? $\frac{1}{4}$ of $\frac{1}{2}$?

Common Core Standards

★ Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Sample Problems & Models

Regg 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 $\frac{1}{2}$ crackers. Then take the last cracker and split it in half and give each boy one of the halves.



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

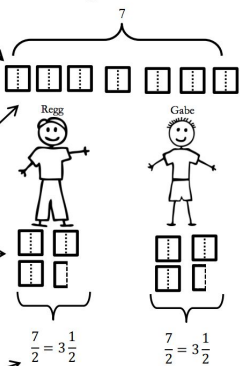
How many halves do we have to share in all? 14 halves

Share them equally with each boy.

How many crackers did each boy get? Each boy would get 7 halves.

Although the crackers were shared in units of one-half, what is the total amount of crackers each boy receives?

3 whole crackers and $\frac{1}{2}$ of another cracker.



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

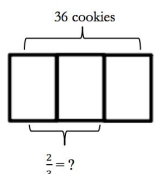
Division Equation: $7 \div 2 = \frac{7}{2} = 3 \frac{1}{2}$

Unit Form: $14 \text{ halves} \div 2 = 7 \text{ halves}$

Mrs. Collins 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 (12×3)

$$\frac{2}{3} \text{ of } 36 \text{ cookies} = \underline{\hspace{2cm}} \text{ chocolate chip cookies}$$



Using Tape Diagram

$$3 \text{ units} = 36$$

$$1 \text{ unit} = \frac{36}{3} \text{ or } 36 \div 3$$

$$= 12 \text{ cookies}$$

$$2 \text{ units} = 2 \times 12 \text{ cookies}$$

$$= 24 \text{ chocolate chip cookies}$$

Numerical Procedure:

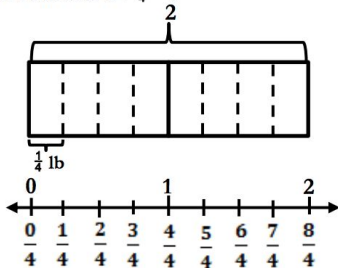
$$\frac{2}{3} \text{ of } 36 = \frac{2}{3} \times 36 = \frac{2 \times 36}{3} = \frac{72}{3} = 24$$

$$\frac{2}{3} \text{ of } 36 = \frac{2}{3} \times 36 = \frac{2 \times 36}{\cancel{3}^1} = \frac{24}{1} = 24$$

Students look for a factor that is shared by the numerator and the denominator.

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



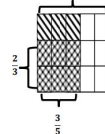
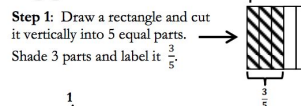
One whole has 4 fourths and 2 wholes has 8 fourths.

Francois can make 8 bags with $\frac{1}{4}$ pound of blackberries in each.

Of the students on Nia's track team, $\frac{3}{5}$ participate in running events. Of the students who participate in running events, $\frac{2}{3}$ are in the relay race. What fraction of the students on the track team ran in the relay race?



Think: We need to find $\frac{2}{3}$ of $\frac{3}{5}$.

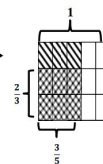


Step 2: Split the rectangle into 3 equal parts by drawing horizontal lines. Now shade 2 of the 3 parts (that are already shaded) and label it $\frac{2}{3}$.

How many units make our whole? 15
What's the name of these units? **Fifteenths**

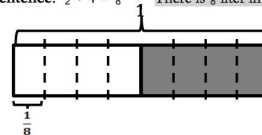
$$\frac{2}{3} \text{ of } \frac{3}{5} = \frac{6}{15} \rightarrow \frac{2}{3} \times \frac{3}{5} = \frac{6}{15}$$

$\frac{6}{15}$ or $\frac{2}{5}$ of the students ran on the relay race.



Practice Problem: If Bridget poured $\frac{1}{2}$ liter of lemonade equally into 4 bottles, how many liters of lemonade are in each bottle?

Number Sentence: $\frac{1}{2} \div 4 = \frac{1}{8}$ There is $\frac{1}{8}$ liter in each bottle.



A Problem to Try at Home

Forty students shared 5 pizzas equally. How much pizza did each student receive? Draw a model to determine what fraction of a pizza each student received.

Coming Up Next...

Students will begin reasoning about and working with three-dimensional shapes. They will explore cubic units and move toward calculations or volumes of rectangular prism. Students also extend their two-dimensional work with area of figures with fraction side lengths.