5th Grade Math

Module 4: Multiplication and Division of Fractions and Decimal Fractions

Math Parent Letter

This document is created to give parents and students a better understanding of the math concepts found in Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material which is taught in the classroom. Grade 5 Module 4 of Eureka Math (Engage New York) covers Multiplication and Division of Fractions and Decimal Fractions. This newsletter will address Topic C.

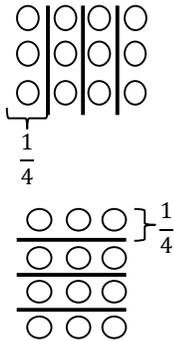Topic C.   **Multiplication of a Whole Number by a Fraction**

Words to know

- Product
- Array
- Numerator
- Tape Diagram
- Denominator
- Commutative Property

Things to Remember:

- Product – the answer to a multiplication problem
- Array – to arrange or display
- Commutative Property – property that allows is to multiply factors in any order ($\frac{1}{2} x 3$ *is the same thing as* $3 x \frac{1}{2}$)

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- To find $\frac{1}{4}$ of 12, make an **array** with 12 circles.
- Use lines to divide the **array** into 4 equal groups.
- Write a division sentence to represent what was done.

  12 ÷ 4 = 3   or $\frac{12}{4}$ = 3

- Each group is $\frac{1}{4}$ of all the circles.
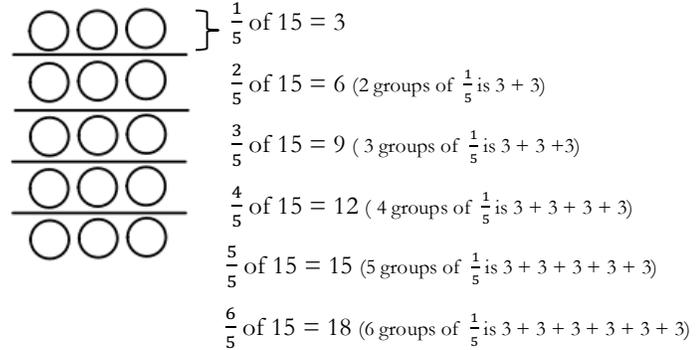- So $\frac{1}{4}$ of 12 = 3

Objectives of Topic C

- Relate fractions as division to fraction of a set.
- Multiply any whole number by a fraction using tape diagrams.
- Relate fraction of a set to the repeated addition interpretation of fraction multiplication.
- Find a fraction of a measurement, and solve word problems.

Focus Area– Topic C

Module 4: Multiplication and Division of Fractions and Decimal Fractions

Find $\frac{4}{5}$ of 15. Draw a set/**array** to show your thinking.

$\frac{1}{5}$ of 15 = 3

$\frac{2}{5}$ of 15 = 6 (2 groups of $\frac{1}{5}$ is 3 + 3)

$\frac{3}{5}$ of 15 = 9 (3 groups of $\frac{1}{5}$ is 3 + 3 +3)

$\frac{4}{5}$ of 15 = 12 (4 groups of $\frac{1}{5}$ is 3 + 3 + 3 + 3)

$\frac{5}{5}$ of 15 = 15 (5 groups of $\frac{1}{5}$ is 3 + 3 + 3 + 3 + 3)

$\frac{6}{5}$ of 15 = 18 (6 groups of $\frac{1}{5}$ is 3 + 3 + 3 + 3 + 3 + 3)

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There are 42 students going on a field trip. Three-sevenths are girls. How many are boys? How many are girls? Solve using a **tape diagram.**

42 students

7 units = 42

1 unit = 42 ÷ 7 or $\frac{42}{7}$

= 6

$\frac{3}{7}$ girls $\frac{4}{7}$ boys
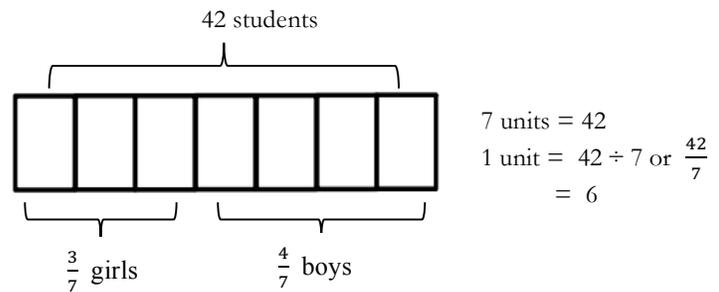
The **tape diagram** shows that three sevenths of the 42 students are girls so the remaining pieces are boys which are 4 pieces or four sevenths.

Each unit is equal to 6 students. The girls are 3 of the 7 units. To find how many girls are on the field trip we multiply 3 units by 6. 3 units = 6 x 3 = 18 students

There is a total of 18 girls on the field trip.

Boys are 4 of the 7 units. To find how many boys are on the field trip we multiply 4 units by 6. 4 units = 6 x 4 = 24 students
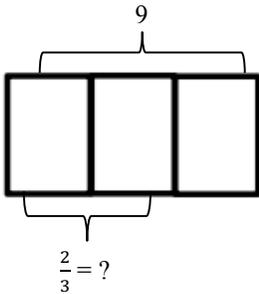
There is a total of 24 boys on the field trip.

Check: 18 girls + 24 boys = 42 total students

$$\frac{2}{3} \times 9$$

Ways to interpret the above expression

1. 2 thirds of 9 ($\frac{2}{3} \times 9 = \frac{2}{3}$ of 9)

9

$\frac{2}{3} = ?$

3 units = 9

1 unit = $\frac{9}{3}$ or 9 ÷ 3

= 3

2 units = 2 x 3

= 6

Answer: $\frac{2}{3} \times 9 = 6$

2. 9 copies of 2 thirds   OR   2 thirds added together 9 times
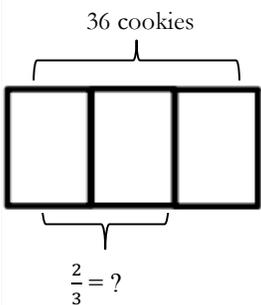
$$= \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3}$$

$$= \frac{2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2}{3}$$

$$= \frac{9 \times 2}{3}$$

$$= \frac{18}{3}$$

ANSWER ⟶ = 6

Solve the following problem using a tape diagram or an equation.

$$\frac{1}{3} \, lb = \underline{\qquad} oz$$

lb – pound
oz – ounce (16 oz is equal to 1 lb)

Tape Diagram

1 lb = 16 oz

$\frac{1}{3} = ?$

3 units = 16

1 unit = $\frac{16}{3}$ or 16 ÷ 3

$= 5\frac{1}{3} \, oz$

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Equation

$$\frac{1}{3} \, lb = \frac{1}{3} \times 1 \, lb$$

We know that 16 ounces is the same thing as 1 pound (lb), so we will rename the pound in our expression as ounces (oz). ⟶ $= \frac{1}{3} \times 16 \, ounces$

$$= \frac{1 \times 16}{3}$$

$$= \frac{16}{3}$$

ANSWER ⟶ $= 5\frac{1}{3} \, ounces$

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 x 3)

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

36 cookies

$\frac{2}{3} = ?$

Using **Tape Diagram**

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:

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

$$\frac{2}{3} \text{ of } 36 = \frac{2}{3} \times 36 = \frac{2 \times \overset{12}{\cancel{36}}}{\cancel{3}_1} = \frac{24}{1} = 24$$
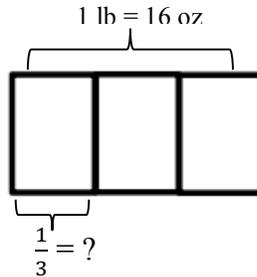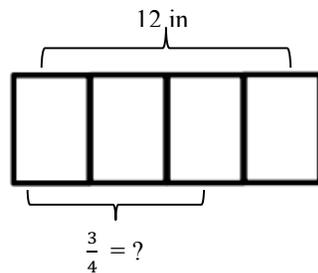
Students look for a factor that is shared by the **numerator** and the **denominator**.

Amanda measured the length of one of her books. It was $\frac{3}{4}$ of a foot. How long is her book in inches?

ft – foot   in – inches

$\frac{3}{4}$ of 1 foot = _____ inches

12 in

$\frac{3}{4} = ?$

Using **Tape Diagram**

4 units = 12

1 unit = $\frac{12}{4}$ or 12 ÷ 4

= 3 inches

3 units   = 3 x 3 inches

= 9 inches long

Equation: $\frac{3}{4}$ ft = $\frac{3}{4}$ x 1 ft

We know that 12 inches is the same thing as 1 foot (ft), so we will rename the foot in our expression as inches (in). ⟶ $\frac{3}{4}$ x 1 ft = $\frac{3}{4}$ x 12 inches

$$= \frac{3 \times 12}{4}$$

$$= \frac{36}{4} = 9$$

OR

$$= \frac{3 \times \overset{3}{\cancel{12}}}{\cancel{4}_1}$$

$$= \frac{9}{1} = 9$$