MATH NEWS

Grade 5, Module 4, Topic G

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 an 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 discuss Module 4, Topic G. In this topic students will explore the meaning of division with fractions and decimal fractions.

Topic G: Division of Fractions and Decimal Fractions

Words to know:

- divide/division
- divisor
- unit fraction
- decimal divisor
- hundredths
- quotient
- dividend
- decimal fraction
- tenths

Things to Remember!

Quotient – the **answer** of dividing one quantity by another

Unit Fraction – a fraction with a numerator of 1

Decimal Fraction – a fraction whose denominator is a power of 10 (Examples: 0.7 0.23 4.58)

Decimal Divisor – the number that divides the dividend (whole) and has units of tenths, hundredths, thousandths, etc.

OBJECTIVES OF TOPIC G

- Divide a whole number by a unit fraction.
- Divide a unit fraction by a whole number.
- Solve problems involving fraction division.
- Write equations and word problems corresponding to tape and number line diagrams.
- Connect division by a unit fraction to division by 1 tenth and 1 hundredth.
- Divide decimal dividends by non-unit decimal divisors.

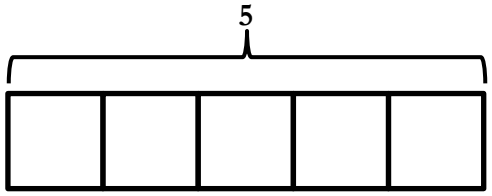
Focus Area– Topic G

Module 4: Multiplication and Division of Fractions and Decimal Fractions

Divide a whole number by a unit fraction

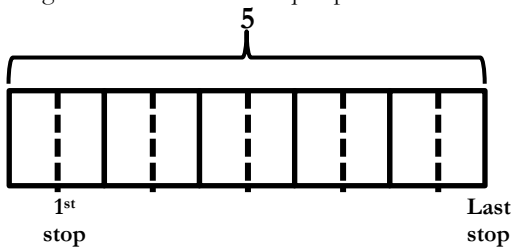
Garret is running a 5-K race. There are water stops every $\frac{1}{2}$ kilometer, including at the finish line. How many water stops will there be? **Number Sentence: $5 \div \frac{1}{2}$**

Step 1: Draw a tape diagram to model the problem.



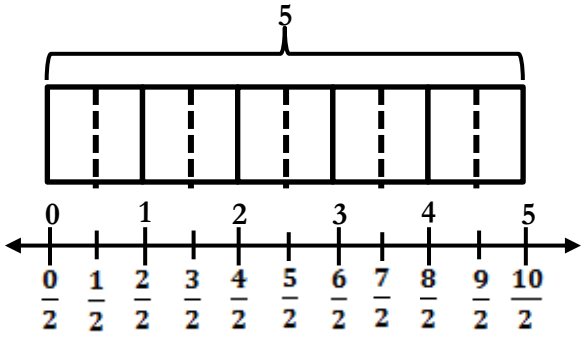
The tape diagram is partitioned into 5 equal units. Each unit represents 1 kilometer of the race.

Step 2: Since water stops are every $\frac{1}{2}$ kilometer, each unit of the tape diagram is divided into 2 equal parts.



When you count the number of halves in the tape diagram, you will determine that there are a total of 10. Therefore, there will be 10 water stops during the 5-K race.

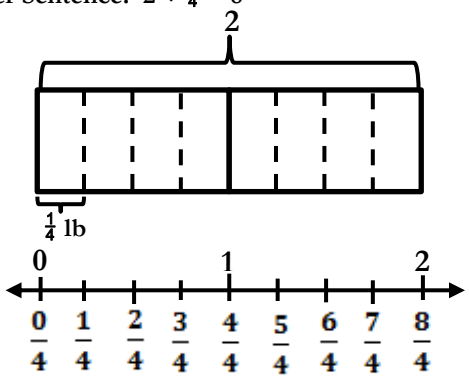
Step 3: Draw a number line under the tape diagram to show that there are 10 halves in 5 wholes.



Misconception: ***Students may believe that the quotient in division is always smaller than the dividend (whole) and the divisor. It is about asking how many groups there are of a certain size. For example, what happens to the number of pieces if we cut a carrot into 6 equal pieces? (There are more pieces of carrot.) This is the meaning of***

he wants to separate the blackberries into $\frac{1}{4}$ pound bags, how many bags can he make?

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



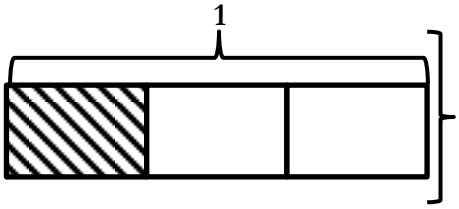
One whole has 4 fourths and 2 wholes has 8 fourths.

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

Divide a unit fraction by a whole number

Randy and 2 of his friends will share a pizza equally. What fraction/portion of the pizza will each get?

Number Sentence: $1 \div 3$



The tape diagram represents 1 whole pizza that has been partitioned into 3 equal units.

Each will receive $\frac{1}{3}$ of the whole pizza.

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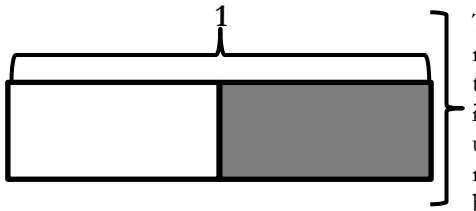
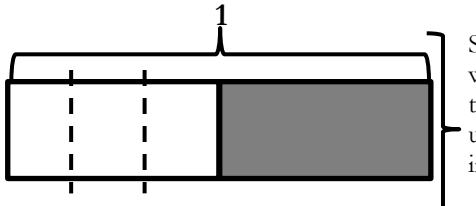
Now suppose there is only $\frac{1}{2}$ of a pizza that is shared equally among Randy and his 2 friends. What fraction/portion of the pizza does each person get?

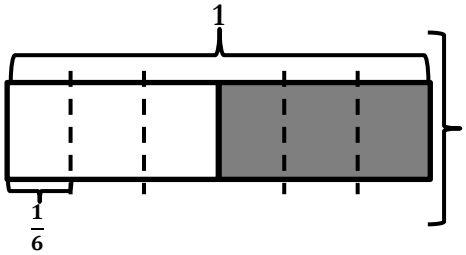
Number Sentence: $\frac{1}{2} \div 3$



The tape diagram represents 1 whole pizza that has been partitioned into 2 equal units. The unshaded part represents the portion to be shared equally.



Since there are 3 people who are sharing half of the pizza equally, the unshaded part is divided into 3 equal units.



To show equal sized units in the whole pizza, the shaded portion needs to be divided into 3 equal units. Now we can see that each part is $\frac{1}{6}$ of the whole pizza.

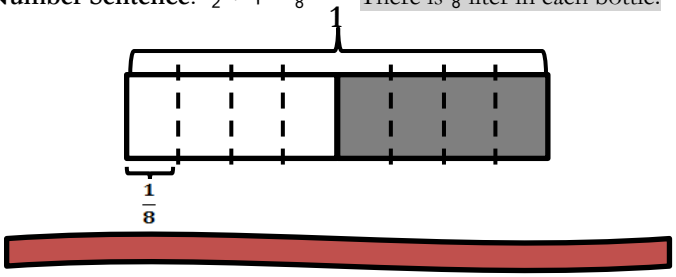
$\frac{1}{2} \div 3 = \frac{1}{6}$

3 sixths $\div$ 3 = 1 sixth (The unshaded part is showing 3 sixths.)

Each person will receive $\frac{1}{6}$ of the pizza.

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.



Divide by decimal divisors

$0.24 \div 0.4$

Step 1: Rewrite the division expression as a fraction. $\frac{0.24}{0.4}$

Step 2: Rename the divisor/denominator as a whole number by multiplying by a fraction equal to 1. $\frac{0.24}{0.4} \times \frac{10}{10} = \frac{2.4}{4}$

Step 3: Divide.

$$4 \overline{)2.4} \quad 0.6$$
$$\underline{2\ 4}$$

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$2.7 \div 0.03$

Step 1: $\frac{2.7}{0.03}$ **Step 2:** $\frac{2.7}{0.03} \times \frac{100}{100} = \frac{270}{3}$

Step 3:

$$3 \overline{)270} \quad 90$$
$$\underline{27}$$
$$00$$
$$\underline{0}$$

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Application Problem: $18 \div 2 = 9$

Explain why it is true that $1.8 \div 0.2$ and $0.18 \div 0.02$ have the same quotient.

$\frac{1.8}{0.2} \times \frac{10}{10} = \frac{18}{2} = 18 \div 2 = 9$ $\frac{0.18}{0.02} \times \frac{100}{100} = \frac{18}{2} = 18 \div 2 = 9$

They all have the same quotient because I can rename each fraction without changing their value by multiplying each by a fraction that equals 1. In the first fraction since both the numerator and denominator are in tenths, multiplying by $\frac{10}{10}$ resulted in both the numerator and denominator being whole numbers. In the second fraction both numerator and denominator are in hundredths. When I multiply each by $\frac{100}{100}$, it resulted in both numerator and denominator being whole numbers. Each fraction resulted in $18 \div 2$.

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Application Problem: Mrs. Morgan has 21.6 pounds of peaches to pack for shipment. She plans to pack 2.4 lb of peaches in each box. How many boxes are required to ship all the peaches?

$21.6 \div 2.4$ $\frac{21.6}{2.4} \times \frac{10}{10} = \frac{216}{24}$

$$24 \overline{)216} \quad 9$$
$$\underline{216}$$

Mrs. Morgan needs 9 boxes to ship all the peaches.