

## Grade 5, Module 4: Multiplication and Division of Fractions and Decimal Fractions



**What is this module about?** In this 38-lesson module, students learn to multiply fractions and decimal fractions and start work with fraction division. Students will begin by measuring fractional parts on a number line as a concrete way of understanding fractional parts of a whole and eventually move to more abstract fraction operations.



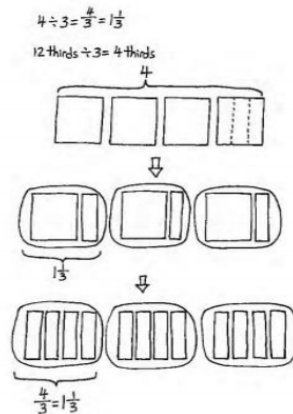
**What came before this module?** We learned to add and subtract fractions with unlike denominators, moving from concrete to abstract examples.



**What comes after this module?** In Module 5, we will work with the area and volume of two- and three-dimensional figures.

## How can you help at home?

- Continue to practice and review multiplication and division math facts; this greatly supports work with fractions!
- Look for opportunities in daily life to discuss both fractional parts of a whole and of other fractions, e.g., what is  $\frac{1}{4}$  of 20?  $\frac{1}{4}$  of  $\frac{1}{2}$ ?

A diagram of  $4 \div 3$  showing fractional division. $4 \div 3$ , shown as a traditional algorithm division problem.

$$\begin{array}{r} 1\frac{1}{3} \\ 3 \overline{)4} \\ \underline{-3} \\ 1 \end{array}$$

check:  $3 \times 1\frac{1}{3}$   
 $= \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$   
 $= 3 + \frac{3}{3}$   
 $= 4$

Each bag of cats weighs  $1\frac{1}{3}$  Kilograms.

## Key Words and Ideas in this Module

- **Decimal divisor:** the number that divides the whole and that has units of tenths, hundredths, thousandths, e.g.,  $\frac{1}{100}$
- **Simplify:** using the largest fractional unit possible to express an equivalent fraction, e.g.,  $\frac{4}{6}$  simplifies to  $\frac{2}{3}$ , with the denominator 3 being a larger fractional units than 6
- **Familiar terms:** denominator, decimal fraction, equation, equivalent fraction, factors (numbers that are multiplied to obtain a product), line plot, mixed number, numerator, tape diagram, unknown, whole unit

## Key Standards in this Module

- Write and interpret numerical expressions
- Perform operations with multi-digit whole numbers and with decimals to hundredths
- Apply and extend previous understandings of multiplication and division to fractions
- Convert like measurement units within a given measurement system
- Represent and interpret data

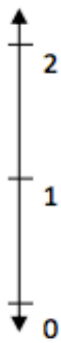


## Spotlight on Math Models

### Number Lines

The number line is a powerful, flexible model that students use in many ways. In this particular module, students begin to understand the idea of fractions as division by marking a ruler or line plot with  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$  increments. The number line is used beginning in Kindergarten and will continue to appear in various forms through Grade 5. It is used to develop a deeper understanding of whole number units, fraction units, measurement units, decimals and negative numbers. Often, the mathematical concepts in a module move from concrete to more abstract, and the number line is an important concrete conceptual step for students of all ages.

#### Various types of number lines:



Vertical number line



The clock - a circular number line!



A ruler number line

### Sample problem from Module 4 (Lesson 5)

Forty students shared five pizzas. How much pizza did each student receive? What fraction of the pizza did each student receive?

Note the use of a tape diagram as well as the drawing showing division of a whole number into fractional parts.

