Family Support Materials

Extending Operations to Fractions

In this unit, students think about how fractions can be composed (put together) and decomposed (taken apart). They also learn about fraction operations: multiplying fractions and whole numbers, adding and subtracting fractions with the same denominator, and adding tenths and hundredths.

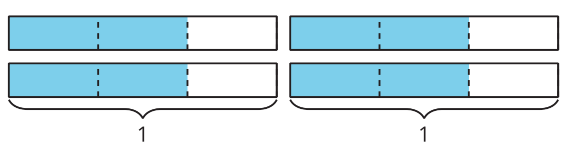
Section A: Equal Groups of Fractions

Previously, students thought about multiplication as equal groups of whole numbers of objects, such as 5 bags with 2 oranges in each bag. In this section, they think about equal groups of fractional pieces, such as 5 plates with $\frac{1}{2}$ orange on each plate. They see that the amount can be represented by $5 \times \frac{1}{2}$, which is $\frac{5}{2}$.

Students then make sense of diagrams and equations that represent the multiplication of a whole number and a fraction, such as $4 \times \frac{2}{3} = \frac{8}{3}$.

They learn that the numerator in the resulting fraction is the product of the whole number (the 4) and the numerator of the fractional factor (the 2 in $\frac{2}{3}$), and the denominator is the same as in the fractional factor (the 3 in $\frac{2}{3}$).

Diagrams can help students see that some fractions can be represented by more than one multiplication expression. For example, the diagram shows that the following expressions all have the value of $\frac{8}{3}$.



$4 \times \frac{2}{3}$

$2 \times 4 \times \frac{1}{3}$

$4 \times 2 \times \frac{1}{3}$

$8 \times \frac{1}{3}$

Section B: Addition and Subtraction of Fractions

In this section, students learn to add and subtract fractions by decomposing them into sums of smaller fractions, writing equivalent fractions, and using number lines.

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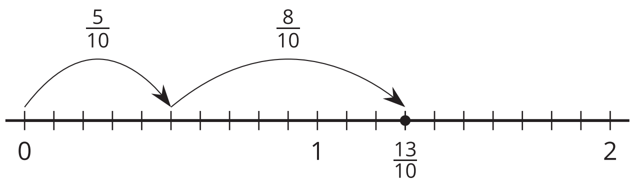
Students first think about a fraction as a sum of other smaller fractions. They represent different ways to decompose a fraction by drawing “jumps” on number lines and writing different equations. Later, they use number lines to represent subtraction of fractions.

$$\frac{13}{10} = \frac{5}{10} + \frac{8}{10}$$



Working with number lines helps students see that a fraction greater than 1 can be decomposed into a whole number and a fraction, and then written as a mixed number. For example, to find the value of $3 - \frac{2}{5}$, it helps to first decompose the 3 into $2 + \frac{5}{5}$, and then subtract $\frac{2}{5}$ from the $\frac{5}{5}$ to get $2\frac{3}{5}$.

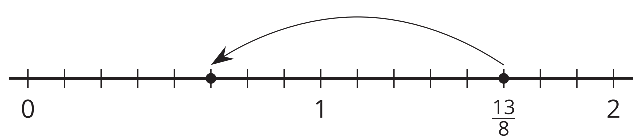
Section C: Adding Tenths and Hundredths

In this section, students learn to add tenths and hundredths. Previously, students learned that $\frac{1}{10} = \frac{10}{100}$. They use this reasoning to find equivalent fractions that can help them add tenths and hundredths.

Try it at home!

Near the end of the unit, ask your student to solve the following problems:

What equation is represented by the jump on the number line?



Find the value of $\frac{8}{10} + \frac{29}{100}$.

Questions that may be helpful as they work:

- How did you know those fractions were needed for the equation?
- How did you find your answer?
- How could you solve your problem in a different way?

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