Math Background

Build Models of Fractions

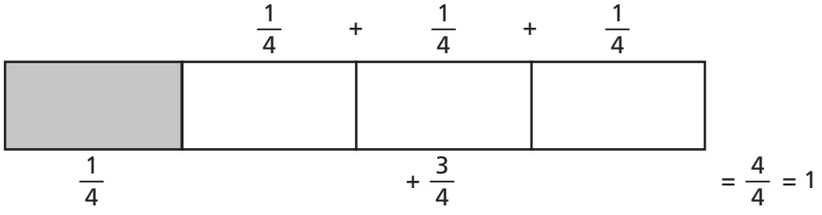
Fraction Chains

We focus on unit fractions first, or fractions that represent 1 of the equal parts of the whole, such as $\frac{1}{3}$ or $\frac{1}{5}$. Students build the whole with unit fractions arranged in a fraction chain. Activities with fraction chains help students understand that non-unit fractions are made by putting together unit fractions, and help to overcome typical fraction identification and addition errors.

A Basic Fraction Chain:

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

Gradually this understanding of unit fractions is extended as students build more complex fractions. Here, non-unit fractions are emerging.



This model also helps students see the fractional addends of 1: the two fractions that together form one whole. Knowing these addends is useful in finding out how many more need to be added to get one whole. (For example, "I ran $\frac{4}{5}$ of the distance. What fraction of the distance do I still have to run?")

Fraction chains are also useful for helping students visualize fractional subtraction. The subtraction chain below is a solution to the problem: $\frac{6}{7} - \frac{2}{7}$. Again, this kind of representation helps students see and understand that the denominator does not change for addition and subtraction.

$$\frac{6}{7} - \frac{2}{7} = \cancel{\frac{1}{7}} + \cancel{\frac{1}{7}} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} = \frac{4}{7}$$

When students encounter subtraction in the context of comparison situations (Who has more? How much more?), they can identify the larger fraction and the difference with the help of fraction chains, as shown below.

Katie $\frac{1}{8} + \frac{1}{8}$

Otto $\frac{1}{8} + \frac{1}{8} + \boxed{\frac{1}{8} + \frac{1}{8} + \frac{1}{8}}$

$$\frac{5}{8} - \frac{2}{8} = \boxed{\frac{3}{8}}$$