

ADDITION 5.NF.1

Adding Fractions - Unequal Denominators

Purpose: To add fractions having unequal denominators

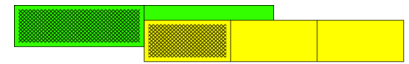
Materials: *Fraction Bars*, copies of "Adding Fractions from *Fraction Bars*" (attached), and *Fraction Bars Playing Cards* (optional)

TEACHER MODELING/STUDENT COMMUNICATION

Activity 1 *Fraction Bars* to add fractions with unlike denominators

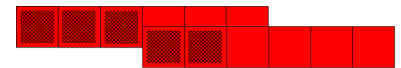
Fraction Bars

1. Ask students to find these *Fraction Bars* and place their shaded amounts end to end.



- Is the sum of the fractions for these bars less than 1 or greater than 1? (Less)
- Find the red bar with the same shaded amount as the green bar and the red bar with the same shaded amount as the yellow bar. What is the sum of the fractions for these bars? (5/6)

pencils and paper

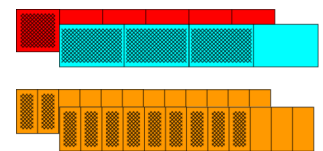


$$\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

- Explain why it is incorrect to add 1/2 and 1/3 by adding numerators and denominators. (1/2 plus 1/3 is not 2/5 because when you add something to 1/2 the result should be greater, and 2/5 is smaller than 1/2.)
- To add 1/2 and 1/3, you replaced 1/2 by 3/6 and 1/3 by 2/6. How can these new fractions be found without the bars? (Multiply the numerator and denominator of 1/2 by 3 and multiply the numerator and denominator of 1/3 by 2.)

Fraction Bars

2. Repeat these activities by asking students to find the red bar for 1/6 and the blue bar for 3/4. Then ask them to replace the red and blue bars by orange bars having the same shaded amount and write both the horizontal and vertical additions equations for the sum.



$$\frac{1}{6} + \frac{3}{4} = \frac{2}{12} + \frac{9}{12} = \frac{11}{12}$$

- How can 1/6 and 3/4 be replaced without using bars? (Multiply the numerator and denominator of 1/6 by 2 and the numerator and denominator of 3/4 by 3.)

3. Sometimes only one fraction needs to be replaced to obtain the same denominators.

- Find the yellow bar for 1/3 and the red bar for 3/6 and replace just one of these bars so the two fractions have the same denominator. Write the addition equation. (1/3 + 3/6 = 2/6 + 3/6 = 5/6) Point out that when one denominator divides the other (3 divides into 6 in this example) only one fraction needs to be replaced.

Adding Fractions from *Fraction Bars*

4. Distribute copies of "Adding Fractions from *Fraction Bars*" to each student and discuss the fact that replacing bars by bars of the same color is like replacing fractions with the same denominator.

pencils
and paper

Activity 2 Adding fractions without using *Fraction Bars*

1. Write the fraction sum shown here. $\frac{1}{3} + \frac{2}{5}$

- What fractions can $\frac{1}{3}$ and $\frac{2}{5}$ be replaced so that both fractions have the same denominator? (Multiply the numerator and denominator of $\frac{1}{3}$ by 5 to get $\frac{5}{15}$ and multiply the numerator and denominator of $\frac{2}{5}$ by 3 to get $\frac{6}{15}$)
- Write the equation for the sum of $\frac{1}{3}$ and $\frac{2}{5}$. ($\frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}$)

2. Repeat this activity for the following pairs of fractions. Remind students to compare denominators to see if one can be divided by the other.

a) $\frac{1}{2} + \frac{3}{5}$ b) $\frac{2}{3} + \frac{1}{2}$ c) $\frac{2}{3} + \frac{1}{4}$ d) $\frac{1}{2} + \frac{3}{4}$

Select students to show their computations.

a) $\frac{1}{2} + \frac{3}{5} = \frac{5}{10} + \frac{6}{10} = \frac{11}{10} = 1\frac{1}{10}$; b) $\frac{2}{3} + \frac{1}{2} = \frac{4}{6} + \frac{3}{6} = \frac{7}{6} = 1\frac{1}{6}$

c) $\frac{2}{3} + \frac{1}{4} = \frac{8}{12} + \frac{3}{12} = \frac{11}{12}$; d) $\frac{1}{2} + \frac{3}{4} = \frac{2}{4} + \frac{3}{4} = \frac{5}{4} = 1\frac{1}{4}$

- Look for patterns in these sums. (Multiplying the two denominators of the fractions gives the denominator of the new fraction. If one denominator divides into the other, only one fraction needs to be replaced, as in part d.)

*Fraction
Bars*
or
*Fraction
Playing
Cards*

Games: Play **Fraction Bars Blackjack** or the game **Units** with the *Fraction Bars* or *Fraction Bars Playing Cards*. If the cards are not available, write the 32 fractions for the bars on slips of paper. In both games the cards or bars are spread face down. In the blackjack game, select two or more cards and try to get a sum of fractions as close to 2 as possible without going over. In Units, turn over two cards at a time and try to get a sum of fractions equal to 1.

INDEPENDENT PRACTICE and ASSESSMENT

Worksheets 5.NF.1 #1, #2, #3, #4



fractionbars.com Set 2 **Target Sums** (A player competes against a robot, as shown in this screen capture, and the object is to obtain sums from the *Fraction Bars* that are equal to 1, $1\frac{1}{2}$ or 2.) Set 2 **Concentration-Whole Bars** (The object is to combine the shaded amounts of *Fraction Bars* to obtain whole bars. Two players can compete or one player can play as solitaire.)

