

Notes for the Teacher

Students add fractions with unlike denominators by building equivalent fractions with a common denominator on a number line. The activity assumes that students have some prior experience working with common denominators.

Objectives:

- Students will add fractions with unlike denominators.
- Students will find equivalent fractions with a common denominator in order to add fractions with unlike denominators.

Common Core Mathematical Practices: (1) Make sense of problems and persevere in solving them; (2) Reason abstractly and quantitatively; (3) Construct viable arguments and critique the reasoning of others; (5) Use appropriate tools strategically; (7) Look for and make use of structure.

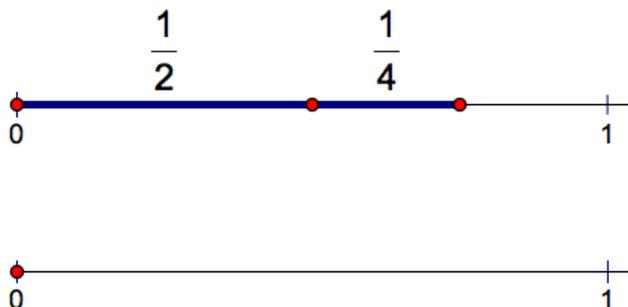
Common Core State Content Standards: 5.NF1

Grade Range: Grades 4–5

Introduce:

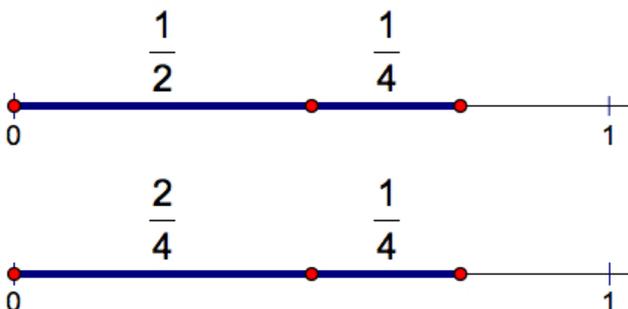
Use a projector to show sketch page “A” and distribute the worksheet. Follow worksheet steps 1 and 2, choosing **Make Fraction** to demonstrate how to add $\frac{1}{2} + \frac{1}{4}$ on the top number line. First build $\frac{1}{2}$. Notice that a blue line segment of length $\frac{1}{2}$ appears after you’ve clicked the number 1 and clicked the number 2. You can then move the segment and click to place it so that its left endpoint coincides with 0 on the top number line.

Now build $\frac{1}{4}$ in a similar way. A blue line segment of length $\frac{1}{4}$ appears after you’ve clicked the number 1 and clicked the number 4. Move the segment and click to place it so that its left endpoint coincides with the right endpoint of the $\frac{1}{2}$ line segment. Ask students to name the location of the endpoint farthest right—the sum of $\frac{1}{2} + \frac{1}{4}$. It’s difficult to tell!



Now say, “We know how to add two fractions with a common denominator. Is there a way we can build equivalent fractions with a common denominator to find this sum? What common denominator can we use?” (4) Ask, “What fraction with a denominator of 4 can we build that is equivalent to $\frac{1}{2}$?” ($\frac{2}{4}$) Demonstrate how to build $\frac{2}{4}$ using the fraction tool, and then place the $\frac{2}{4}$ line segment on the bottom number line so that its left endpoint coincides with 0. Use the **Arrow** tool to drag the bottom number line on top of the top number line, aligning 0’s, to show that $\frac{2}{4}$ is equivalent to $\frac{1}{2}$. Then drag the number lines apart.

Ask, “Do we need to find an equivalent fraction for $\frac{1}{4}$? Explain.” Students should say no because the fraction is already written using the common denominator. Use the **Make Fraction** tool to build $\frac{1}{4}$. Then place the $\frac{1}{4}$ line segment so that its left endpoint coincides with the right endpoint of the $\frac{2}{4}$ line segment on the bottom number line. Ask, “What fraction has the same length as $\frac{2}{4} + \frac{1}{4}$?” ($\frac{3}{4}$) “So, what is $\frac{1}{2} + \frac{1}{4}$?” ($\frac{3}{4}$)



Explore:

Assign students to partners, and send them in pairs to the computers. Tell students that they will add fractions with unlike denominators. Ask students to start on sketch page “B” and then continue through page “J.” Some students may find common denominators by multiplying the two denominators; this method won’t work for all the sketch pages because that product is not a number given as a possible denominator. Encourage students to find the least common denominator. On pages “I” and “J,” students find equivalent fractions for improper fractions.

As you circulate, observe students as they work. Tell students that they can choose **Edit | Undo Make Fraction** to delete fractions they don’t want to keep. Make sure students record the sums and their explanations on the worksheet.

Discuss:

Call students together to discuss and summarize what they learned. Have students share the strategies they used to add the fractions. Below are some sample student replies.

- *We multiplied the two denominators to find a common denominator. Sometimes the product wasn’t a number listed on the sketch page, though. Then we just looked for a number that both denominators divided into evenly.*
- *We went through the list of numbers on the sketch page and found the first number that both denominators divided into evenly.*
- *First, we looked to see if one denominator was a multiple of the other denominator. If so, we used that as the common denominator. If not, we listed multiples until we found a common one. We used the least common multiple as the common denominator.*

Use a projector to show sketch page “Make Your Own.” Have students work in pairs, using paper and pencil, to create their own fraction addition problems similar to the ones they just solved. The two fractions should have unlike denominators. Check to ensure students are making sums that can be solved using the given list of values.

When students are done, send them in pairs back to the computers and have them create their fraction addition problems by changing the expression on the sketch page. To change the problem, students should use the **Arrow** tool to double-click the text box, highlight a question mark, and type a number on the keyboard. Have pairs share their problems with the class or with other student pairs.

Related Activities:

- *Fractions on a Number Line—Sums of One*

- *Time-Saver Games, Part One—Adding Fractions*
- *Time-Saver Games, Part Two—Adding Fractions*
- *Fractions on a Number Line—Addition and Subtraction Games*
- *Measuring with Fractions—Fractions on a Number Line*

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