

Lesson Plan - Creating Fraction Bar Sets with Your Students

Common Core Standards Addressed:

CCSS.MATH.CONTENT.3.NF.A.1

Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.

CCSS.MATH.CONTENT.4.NF.A.1

Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

CCSS.MATH.CONTENT.5.NF.A.2

Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result $2/5 + 1/2 = 3/7$, by observing that $3/7 < 1/2$.

Guiding Questions:

What strategies can I use to create a set of fraction bars?

How do I know that I have completed a fraction bar correctly?

How do halves, fourths, eighths, and twelfths relate to each other?

How do thirds, sixths, ninths, and twelfths relate to each other?

Pre-lesson Preparation:

Cut 9 by 12 inch construction paper into long 1 inch strips using the 12 inch side as the length. Each student will need a strip of each color. You will need 10 different colors for the following:

Whole

Halves

Thirds

Fourths

Fifths

Sixths

Eighths

Ninths

Tenths

Twelfths

*Sevenths and elevenths are rarely used in real world problems and do not contribute significantly to the connection among the other fractions the students will make in this lesson. Feel free to include them if you wish - this could serve as an interesting challenge for some students.

*It is advisable to cut extras of each color in case students need a second or third strip to make their pieces as equal as possible.

Opening Activity:

You will need several strips of pre-cut construction paper, chart paper, or a few sentence strips for the opening activity. Use different colors so that students can easily see the differences among the fraction bars you are creating.

Tape or clip a strip of paper or sentence strip up that is labeled 1 or 1 whole. Use this to refer back to as you model halves, thirds, and fourths with students.

Show students a new strip of the pre-cut paper or sentence strip and ask what would happen if you folded the paper so that the edges matched. Model folding the strip in half. Students should notice that you have created two halves. Use a marker to trace the fold line and label each piece $\frac{1}{2}$. It is very important to show students that each half is labeled $\frac{1}{2}$ rather than counting up $\frac{1}{2}$ and $\frac{2}{2}$.

Now show students a new strip of paper or sentence strip and ask how you could make thirds.

Guiding Questions:

1. Does folding the paper in half help us make thirds? Why or why not?
2. How will we know when we have thirds?
3. What methods or tools could we use to make sure we have equal size pieces?

Take student suggestions and model the different ways that they think of to fold or draw thirds. It is possible that students might think of measuring the strip with a ruler. This would be a great way to connect division to fractions because students would need to consider how to break up the total number of inches or centimeters into three equal groups or parts.

Show students one more strip of paper or sentence strip and ask how you could make fourths.

Guiding Questions:

1. Does folding the paper in half or into thirds help us make fourths? Why or why not?
2. How will we know when we have fourths?
3. What methods or tools can we use to make sure we have equal size pieces?

Take student suggestions and model the different ways that they think of to fold or draw fourths. Emphasize how the half can be used to help create fourths. This will visually lay a foundation for students as to why fractions can be equivalent and how we can find common denominators.

Tell students that they will now make their own fraction bars and can use ideas generated from the opening activity to create their set.

Work Session:

Provide students with their own pre-cut strips and the list of fractions they will create. It is advisable to list the color construction paper to use for each strip so that the class has similar sets for future fraction lessons. Circulate to make sure students are using appropriate methods for finding halves and thirds from the opening activity. Allow students to discuss strategies for folding and drawing each fraction bar.

*Students often struggle with creating fifths and need two or three strips before they have equal pieces. Look for students who come up with interesting ways to find fifths to model for the class.

Listen and note students' strategies and methods for finding the different fractions. Use these notes to guide the closing discussion.

Provide students with a way to store their fraction bars. Suggestions: plastic zipper bag, sheet protector in a binder, envelope, or hole punch one side and attach with a brad

Closing Activity:

Have students share some of the strategies they used to create their fraction bar set. Emphasize strategies that relate fractions to each other like halves, fourths, eighths, and twelfths. Have students consider why twelfths could be made so many different ways.

If time permits, have students write in their math journals or on an exit ticket about a fraction that they struggled with creating and how they solved their problem. They could also journal or write about the connection between two fractions like sixths and twelfths.