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TEACHING FRACTIONS: FIVE FAVORITE STRATEGIES FOR MAKING SENSE OF FRACTIONS

Rakhimova Nargiza
The 2nd Master's Degree in Bukhara State Pedagogical Institute

Abstract:	Keywords:
This article discusses strategies for teaching fractions by connecting the abstract to the concrete with physical and visual models ,how to use fluency-building fraction activities to engage students when explaining fractions ,why it is important to demonstrate equivalent representations of numbers when teaching fractions, below is a preview of some of the various topics covered in this article.	fraction,visual model, equivalent fractions, numbers, portion.

In middle school and beyond, many students still struggle to understand the concept of how fractions work. Working with students in the fourth grade can help you give them the support they will need in the years to come. As a fourth grade math teacher, focus on the main concepts of how fractions work, including how they represent parts of a whole (e.g., pieces of a pie) or pieces of a collection (e.g., students in a classroom), as well as how to represent them using numbers (e.g., 1/4).

Explain that the circle on the board represents one pizza. Tell students that you and a friend want to split the pizza, and you want to have equal pieces. Demonstrate how to split the pizza in half. Then ask students how they would split the pizza if there were four of you or eight of you who each wanted a slice.

Use words (as opposed to written fractions) to discuss the fractions in the example above. For example, you might say, "There are four of us, so we'll split the pizza into fourths, or quarters. I have one fourth of the pizza, and each of my friends have a fourth too. If we each split our pizza pieces in half, we'll have eight pieces. Then we will each have two eighths."

Write the fraction 1/2 on the board, and explain that the bottom number (denominator) shows how many parts the pizza is divided into, and the top number (numerator) shows how many pieces of the pizza you are holding. Show students how to represent fractions like 3/4, 2/3, and 5/8.

Ask students to identify various physical representations of one quarter, one third, one eighth, two thirds, and similar basic fractions. They should be able to identify these both as phrases (e.g., one quarter) and numbers (e.g., 1/4). The physical representations should extend beyond circles. Ask students to fold rectangular paper into equal sections in order to represent fractions instead.

Use discrete models once students have mastered the continuous models of paper folding. For example, give students each handfuls of colored candies and show them how to figure out what fraction each color is of the whole. This is a tougher concept, which is why it should be introduced last.

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The Importance of Using Visual Models When Teaching Fractions,

research shows that students are most proficient in learning areas of mathematics, including fractions, when their learning progresses through a process of Concrete —> Visual —> Abstract and where discourse includes all three of these elements. (You may know this as Concrete Representational Abstract, or CRA.) Physical and visual models can help guide students through that process and build fluency. The maths scientists explore some of their favorite models for explaining fractions, including:

- Paper Folding: Concretely represent a fraction as part of a larger whole.

- Fraction bars are strips of material -- such as plastic or paper -- that are divided into pieces to represent fractions. The bars take the abstract concepts of a whole and fractions of a whole and put them into a concrete, manipulative form. You can use commercially produced plastic fraction bars or make them from paper strips. The fraction strips work for a variety of math activities that provide the practice necessary to master fractions.

- Having students make fraction bars reinforces the concept. Start with halves, fourths and eighths. Each child needs a strip of paper for each fraction plus an extra to represent the whole; in this case each child needs four strips. On the strip that stays whole, students write "1." They cut the next strip into two equal pieces and write "1/2" on each piece. Repeat with fourths and eighths, cutting the strips into four and eight equal pieces, respectively, and writing the corresponding fractions on each piece.

- Tape Diagrams and Circle Diagrams: Connect the concrete to the visual with these fluency-building fraction activities.

Students can make their own fraction bars using strips of paper. Students will use several strips of paper that are the same size. Each strip represents one whole. Students will divide each strip into parts representing different fractions. One strip remains whole as a reference to show the original size of the strips. Have students cut another strip in half. They should write the fraction 1/2 on each of the two pieces. This shows them what half of the whole strip looks like. They can place the two pieces next to the strip left whole to see that the two halves equal one whole. Repeat the process by cutting the next strip into three equal parts. Write 1/3 on each of the three sections. Continue to create other fractions as desired, such as cutting a strip into four equal sections for fourths or eight equal sections for eighths. You can use the same idea with other shapes, such as circles.

- Area Models: Help students to visualize multiplication of fractions.

Students use the fraction bars to understand how a whole -- in this case the strip of paper -- can be divided into sections or fractions. Have students place the strips next to one another to compare. When they put the four pieces representing fourths next to the whole strip, they see that they are equal. Give different scenarios to help with comparisons. Ask students how many 1/4 pieces it takes to equal a 1/2 piece, for example.

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- Number Lines: Students need to understand that fractions are numbers, and that you can count them in just the same way that you can count whole numbers. Using number lines as a visual aid while explaining fractions helps to drive this concept home.

Strategies for Teaching Fractions: Connecting Fractions with Whole Number

one of the challenges of teaching fractions is helping students understand that fractions are built upon whole numbers. with fractions, this property works the same, really. So two-fifths times one. That still equals two-fifths. However, the end result doesn't always look the same with fractions. That's kind of the answer with whole numbers, of course. We multiply a whole number by one, it looks just like the same whole number in the end. But with fractions, it really usually looks different.This article delves deeper into teaching fractions as being fundamentally connected to whole numbers, specifically exploring:

- The Concept of Units
- Fractions as Numbers
- Equivalent Fractions

Cut identical shapes from cardboard and split each one into different fractional parts. Students will be able to lay two one-fourth pieces onto the half piece to prove that they are equivalent. A fun game can be created by putting pieces of several identical shapes into a bag. Make sure the pieces are from related fractions, such as halves, fourths and eighths or thirds, sixths and ninths. Have players take turns choosing one piece at a time and see who can assemble a complete figure first.

- Addition and Subtraction with Fractions

Fraction bars help older students add fractions. Start by adding fractions with common denominators, such as 1/8 plus 3/8. By using the fraction bars, students learn the answer is 4/8. You can also use the bars to add fractions without common denominators, such as 1/2 plus 1/4. Students use the bars to determine that 1/2 is the same as 2/4. They can then determine the answer is 3/4.

- Multiplication and Division with Fractions

Strategies for Teaching Fractions: Equivalent Fractions,

Along with understanding that fractions are built upon whole numbers, students should grasp that they can rewrite the values of fractions into multiple equivalent representations of the same number. In mathematics, any quantity can be represented in many different ways, and this is a critical piece of understanding that students will need to build upon as they move on to middle school, high school, and even into college mathematics.

When multiplying fractions, the result of the multiplication does not always look the way a student might predict; this is an area where using concrete visual representations when teaching fractions can help a student connect to the idea that numbers can have multiple equivalent representations and can be written in many equivalent forms.

Effectively teaching fractions will help students understand core mathematics principles that they will build upon for the rest of their education.

For more insight into teaching fractions as well as engaging and useful fraction activities that help overcome the challenges of teaching fractions.

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