Rational Number Project

Initial Fraction Ideas Lesson 11: Overview	Materials
Students use fraction circles to order 2 fractions by comparing them to one-half.	∞ Fraction Circles for students and teacher ∞ Student Pages A, B

Teaching Actions

Warm Up

Draw a picture of paper folding strips to show the fraction $\frac{2}{3}$. Now partition your picture to show how many ninths equal $\frac{2}{3}$.

Large Group Introduction

1. Ask students to take out the black circle and to cover one-half of the circle with 1 yellow.

2. Show on the overhead that 3 blues, which is 3/4 of the black, is greater than 1 yellow ($\frac{1}{2}$ of the black).

   Record: 3 blues > 1 yellow so
   $$\frac{3}{4} > \frac{1}{2}$$

3. Ask students to find 4 other fractions greater than $\frac{1}{2}$. Model and record their responses on the overhead.

4. Now ask them to imagine fraction pieces greater than 1 yellow or $\frac{1}{2}$ of the circle. Have them write down at least 3 estimates for amounts greater than $\frac{1}{2}$. Encourage students to share their estimates and explain what they thought of or pictured.

   Ex: A child may say, "I can see that 3 pinks are the same as 1 yellow, so 5 pinks must be greater than $\frac{1}{2}$."

Comments

Students need many experiences with concrete materials to develop mental images of fractions so they can develop a quantitative notion of fraction.

Comparing to $\frac{1}{2}$ is a powerful strategy for judging the relative size of fractions and is a characteristic of having a quantitative notion of fraction.

Looking at specific numerical relationships between numerator and denominator to determine if fractions are greater or less than $\frac{1}{2}$ is not the goal for all students. Some students may show that see number patterns for $\frac{1}{2}$.

We encourage students to rely on their mental images related to the fraction circles or paper folding to guide their ordering strategies.

Teaching Actions

5. Have students verify each guess with their circles and record results with fraction notation.

Small Group /Partner Work

6. Student Page A provides independent practice with circles comparing fractions to $\frac{1}{2}$.

7. Student Page B provides more practice with ordering and equivalence ideas developed so far.

Wrap Up

8. End class by presenting these problems for discussion. Emphasize student verbalization of their thinking as they order these fractions. They may or may not use the circles.

   Which is bigger or are they equal?

   Examples:

$\frac{1}{3}$	$\frac{3}{4}$
$\frac{1}{4}$	$\frac{1}{3}$
$\frac{6}{7}$	$\frac{3}{7}$
$\frac{4}{100}$	$\frac{4}{70}$
$\frac{6}{8}$	$\frac{4}{6}$
$\frac{4}{12}$	$\frac{2}{4}$
$\frac{4}{6}$	$\frac{2}{3}$

Comments

Ordering fractions using common denominator rule is not part of these lessons. Many students should be able to order these fraction pairs using mental images for fractions.

You can use the problems in the wrap up to evaluate which students can order fractions using their mental images of fraction circles. Keep returning to order tasks like these to informally assess students' number sense.

A common error students make is to look only at the denominator to make an order decision. For example, when comparing $\frac{1}{3}$ vs. $\frac{3}{4}$, a student may say $\frac{1}{3}$ is the bigger fraction since thirds are larger than fourths.

Encourage students to reflect on the numerator and denominator to determine the fraction's relative size.

Translations

- ∞ Written symbols to manipulative
- ∞ Manipulative to verbal to written symbols
- ∞ Written symbols to verbal

Draw a picture of paper folding strips to show the fraction $\frac{2}{3}$.

Now partition your picture to show how many ninths equal $\frac{2}{3}$.

Exploring $\frac{1}{2}$ With Fraction Circles

Use the whole circle as your unit. Make the fraction $\frac{2}{5}$ with the fraction circles.

Decide if $\frac{2}{5}$ is greater or less than $\frac{1}{2}$.

Record your response in the box:

$\frac{2}{5}$ | *is less than* | $\frac{1}{2}$

Complete the problems below. Use these choices:

is less than
is greater than or
is equal to

$\frac{2}{3}$		$\frac{1}{2}$	$\frac{1}{4}$		$\frac{1}{2}$
$\frac{5}{12}$		$\frac{1}{2}$	$\frac{8}{10}$		$\frac{1}{2}$
$\frac{3}{4}$		$\frac{1}{2}$	$\frac{1}{5}$		$\frac{1}{2}$
$\frac{2}{8}$		$\frac{1}{2}$	$\frac{4}{6}$		$\frac{1}{2}$
$\frac{7}{12}$		$\frac{1}{2}$	$\frac{9}{15}$		$\frac{1}{2}$

Using Fraction Circles to Order Fractions

Use fraction circles to show each fraction. Compare the fractions. Circle the largest fraction. If the fractions are equivalent, circle both.

(1) $\frac{3}{4}$ $\frac{1}{2}$

(2) $\frac{1}{3}$ $\frac{8}{12}$

(3) $\frac{4}{6}$ $\frac{2}{3}$

(4) $\frac{4}{12}$ $\frac{2}{4}$

(5) $\frac{9}{12}$ $\frac{2}{6}$

(6) $\frac{1}{3}$ $\frac{1}{4}$

(7) $\frac{4}{8}$ $\frac{1}{2}$

(8) $\frac{3}{4}$ $\frac{6}{8}$

(9) $\frac{1}{8}$ $\frac{1}{12}$

(10) $\frac{4}{8}$ $\frac{5}{8}$

(11) $\frac{2}{4}$ $\frac{3}{6}$

(12) $\frac{2}{6}$ $\frac{2}{12}$

(13) $\frac{3}{6}$ $\frac{5}{6}$

(14) $\frac{6}{8}$ $\frac{8}{8}$

(15) $\frac{4}{8}$ $\frac{6}{12}$