

Rational Number Project

Level 1 / Lesson 7 / Overview

This lesson reinforces the idea that as the number of parts the unit is divided into increases, the size of the parts decreases.

Materials

- 8.5" x 1" strips of paper for each student and teacher
- Student Pages A, B, C

Teaching Actions

1. Ask children to fold a strip of paper into 4 equal parts. Using the same strip of paper ask them how they can increase the number of equal parts to 8. Have them do so, but before they open up the strip of paper to show eighths ask: Before you open up the strip, can you tell me if the size of the equal parts will be larger or smaller than fourths? Why?
2. Repeat for: 3rds changed to 6ths
then to 12ths
4ths changed to 12ths
3. Now ask students to fold, shade and label these fractions with paper folding:

$$\frac{1}{3} \quad \frac{1}{4}$$

$$\frac{2}{3} \quad \frac{2}{6}$$

$$\frac{3}{4} \quad \frac{1}{4}$$

[do more if needed]

Comments

1. Children need opportunities to use new ideas in order to ensure they internalize them.

Many experiences with physical models are needed to overcome the influence of children's whole number thinking.

In this lesson students use paperfolding to relook at the relationship between size of piece and number of pieces the whole is divided into.
2. Encourage children to explain their ordering. Don't let them refer to only one part of the fraction, as for example: $\frac{1}{3}$ vs. $\frac{1}{4}$ "thirds are bigger". Thirds may be bigger but that information is enough to order 2 fractions only if the numerators are the same. "Thirds are bigger so 1 of a larger piece is greater than 1 of a smaller piece." By talking like this children are coordinating numerator and denominator to approximate the size of the fraction. You want to build the notion of a fraction as a single entity!

Teaching Actions

4. You may want to refer back to the pizza problem from lesson 6. Model with paperfolding or pictures the answer to the question in that story.
5. Put students in pairs and assign Student Page A. Student 1 will make fraction 1 with paperfolding; student 2 will make fraction 2. They will then compare and circle the larger fraction.
6. Conclude the lesson by asking children to create their own context for comparing 2 fractions.

Ex: Mary had $\frac{3}{4}$ of large pizza;
Joan had $\frac{2}{4}$ of large pizza.
Who ate more?

Lianna ate $\frac{4}{8}$ parts of a candy bar; Rodrigo ate $\frac{4}{7}$ of same sized candy bar. Who ate less?
7. Student Pages Band C offer extra practice if needed.

Comments

3. Students may overgeneralize and think bigger is always more. Check for this.
4. Some children may be able to compare without manipulatives

 $\frac{1}{3}$ vs. $\frac{1}{5}$; $\frac{2}{10}$ vs. $\frac{2}{20}$

but there is no need to push abstraction at this level.
5. Some students may try to compare fractions without the manipulatives and make errors. Encourage them to use paperfolding at least to verify their guesses.
6. In grade 4 we don't expect mastery of this idea at the symbolic level. Consider these lessons as needed foundation that students will use in level 2 to formalize these ideas with abstract notation.
7. Challenge Student Page B: The problem here is that the two units are not the same. $\frac{1}{5} < \frac{1}{2}$ only if the two units are the same. Comparing fractions assumes equal units.

Directions:Circle the larger fraction. Use your paper strips to determine the answers.

$\frac{1}{2}$

$\frac{1}{3}$

$\frac{2}{6}$

$\frac{2}{12}$

$\frac{2}{4}$

$\frac{2}{6}$

$\frac{1}{3}$

$\frac{2}{3}$

$\frac{3}{4}$

$\frac{1}{4}$

$\frac{3}{9}$

$\frac{3}{3}$

$\frac{3}{8}$

$\frac{3}{4}$

$\frac{5}{6}$

$\frac{4}{6}$

$\frac{1}{3}$

$\frac{1}{12}$

$\frac{5}{12}$

$\frac{5}{8}$

Without your paper strips,
circle the larger fraction.

$\frac{1}{2}$

$\frac{1}{12}$

$\frac{1}{100}$

$\frac{1}{99}$

$\frac{5}{12}$

$\frac{8}{12}$

$\frac{3}{40}$

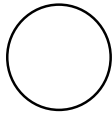
$\frac{3}{50}$

$\frac{2}{10}$

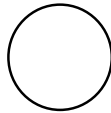
$\frac{4}{10}$

Directions:

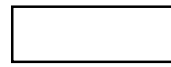
Shade each picture to show the fraction. Circle the SMALLER fraction.



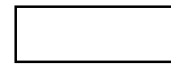
$$\frac{1}{2}$$



$$\frac{1}{4}$$



$$\frac{1}{4}$$



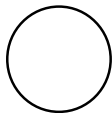
$$\frac{1}{3}$$



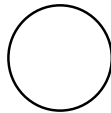
$$\frac{2}{3}$$



$$\frac{2}{4}$$



$$\frac{2}{3}$$

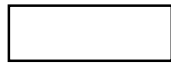


$$\frac{2}{6}$$

Challenge
!



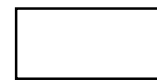
$$\frac{1}{8}$$



$$\frac{1}{4}$$



$$\frac{1}{5}$$

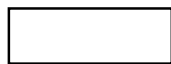


$$\frac{1}{2}$$

What's wrong with this picture?



$$\frac{2}{4}$$



$$\frac{2}{3}$$

Name _____

Lesson 7
Student Page C

Directions

A friend has been out of school for two days and missed the math lessons dealing with comparing fractions. Write your friend a letter explaining how to compare fractions like the ones you have been working with. [You may want to draw pictures].

Post Lesson Reflection

Lesson _____

1) Number of class periods allocated to this lesson: _____

2) Student pages used: _____

3) Adaptations made in lesson development part:
[For example: added extra problems, eliminated problems, changed fractions used]

4) Adaptations made on Student pages:

5) To improve lesson, next time I should: