Rational Number Project

Initial Fraction Ideas
Lesson 10: Overview

Students explore equivalence ideas with paper folding.

<table>
<thead>
<tr>
<th>Materials</th>
</tr>
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<tbody>
<tr>
<td>• Scissors and glue</td>
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<td>• Strips of paper (8.5” x 1”) for folding for each student.</td>
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<tr>
<td>• Student Pages A-C</td>
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</tbody>
</table>

Teaching Actions

Warm Up

Using your fraction circles find two fractions equal to $\frac{1}{4}$. Draw a picture for each equivalent fraction. Record the equivalent fraction under each picture.

Large Group Introduction

1. Throughout this activity, teacher and students do the examples. Teacher may choose to use larger strips of paper for demonstration purposes.

2. Ask students to fold strips of paper into halves and shade $\frac{1}{2}$ of the paper. Write the symbol for amount shaded on that strip.

3. Now have students fold the same strip to show 4 equal parts. Before they actually open up the folded paper, ask them to guess the number of shaded parts.

4. Open up the amount and record that amount on the paper strip.

5. Ask: Do you have more than 1 fraction written on your paper? Explain why.

6. Ask: How did the paper strips change after the second folding? Did the amount shaded change? Did the total number of parts change? What else change? Does $\frac{1}{2} = \frac{2}{4}$? Why is this true?

Comments

Students will benefit from seeing equivalent fractions with more than one manipulative.

Remember all this work with manipulatives is an investment that will pay off later as children learn to operate with fractions. The manipulative experiences will give them the mental images they need to operate (+, -, x, ÷) on fractions in a meaningful way.
### Teaching Actions

7. Repeat for ¼. Fold to show that \( \frac{1}{4} = \frac{2}{8} \)

8. Ask students to use their paper folding strips to show that \( \frac{3}{4} \neq \frac{7}{8} \)

### Small Group/Partner Work

9. Practice is provided in Student Pages A – C.

### Wrap Up

10. Ask: What does it mean for two fractions to be equivalent? What are some fractions equal to \( \frac{1}{2} \)?

11. Record on the board this set of equivalences for 1-half: \( \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} \). Ask students if they see any interesting number patterns in fraction pairs equal to \( \frac{1}{2} \).

### Comments

While students are working on the student pages, model as needed how to solve the problems with paper folding strips. Student could answer questions on Student Page A by drawing in the folding lines on strips of Page B.

Students may notice that for 1-half, the denominator is twice the size of the numerator; they may notice that if the numerator is doubled the denominator is doubled or if the numerator is tripled then the denominator is tripled. You are not formalizing the symbolic rule for equivalence, but just helping students start to notice the multiplicative nature of fractions starting with \( \frac{1}{2} \).

### Translations

- Written symbols to manipulative to written symbols
- Pictures to written symbols
Using your fraction circles find two fractions equal to $\frac{1}{4}$.

Draw a picture for each equivalent fraction.

Record the equivalent fraction under each picture.
PAPER FOLDING AND EQUIVALENT FRACTIONS

Cut out the strips on Student page B so you can fold them to solve these problems.

1. Write the symbol for the fraction shaded on strip A: ________
   Fold to make 8 equal sized parts.
   Write the equivalent fraction that is shown: ________

2. Write the symbol for the fraction shaded on strip B: ________
   Fold to make 9 equal sized parts.
   Write the equivalent fraction that is shown: ________

3. Write the fraction for the amount shaded on strip C: ________
   Fold to make 6 equal sized parts.
   Write the equivalent fraction that is shown: ________

4. Write the fraction for the amount shaded on strip D: ________
   Fold to make 12 equal sized parts.
   Write the equivalent fraction that is shown: ________

5. Write the fraction for the amount shaded on strip E. ________
   Fold to make 8 equal parts.
   Write the equivalent fraction that is shown: ________
Paper Folding and Equivalent Fractions

1) Show 3 fractions equal to 1/2. (Hint: you will need to start with 3 sheets of paper folded into 2 equal parts with one part shaded. Draw pictures to show your answers.

2) Use paper folding to find out which of these are true statements. Circle the number sentences that are true.

\[
\frac{1}{3} = \frac{2}{6} \quad \frac{2}{4} = \frac{4}{8}
\]

\[
\frac{1}{4} = \frac{3}{8} \quad \frac{1}{2} = \frac{6}{8}
\]

3) Use paper folding to find these equivalences.

\[
\frac{1}{2} = \frac{8}{8} \quad \frac{1}{3} = \frac{6}{6}
\]

\[
\frac{1}{4} = \frac{8}{8} \quad \frac{1}{2} = \frac{4}{4}
\]