# Rational Number Project

| Initial Fraction Ideas<br>Lesson 10: Overview | Materials |
|---|---|
| Students explore equivalence ideas with paper folding. | ∞ Scissors and glue<br>∞ Strips of paper (8.5″ x 1″) for folding for each student.<br>∞ Student Pages A-F |

## Teaching Actions

### Warm Up

Using your fraction circles find three 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 thirds and shade $\frac{2}{3}$ of the paper. Write the symbol for amount shaded on that strip.

3. Now have students fold the same strip to show 6 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 on the paper strip.

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

6. Ask students to refold and create 12 equal parts. Unfold and note how many total equal parts; how many parts are shaded? Record that amount.

## 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.

Notes regarding Student Pages:

B and C: After cutting out rectangles and sorting into equivalent groups you may want students to paste groups onto paper and record fraction names on that paper, omitting Student Page C.

D and E: Students may want to just draw lines on the paper strips instead of folding.

| Teaching Actions | Comments |
|---|---|
| 7. Ask: In what way are $\frac{2}{3}$, $\frac{4}{6}$, and $\frac{8}{12}$ alike? Different? | |
| 8. Replicate the above starting with $\frac{1}{2}$; go to $\frac{2}{4}$, $\frac{4}{8}$ | |
| **Small Group/Partner Work** | |
| 9. Practice is provided in Student Pages A-F | |
| **Wrap Up** | |
| 10. Record on the board this set of equivalences for 1-half: $\frac{1}{2}=\frac{2}{4}$; $\frac{1}{2}=\frac{3}{6}$; $\frac{1}{2}=\frac{5}{10}$. Ask students if they see any interesting number patterns in fraction pairs equal to ½. | Students may notice that for 1-half, the denominator is twice the size of the numerator; they may notice that 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 ½. |

**Translations**

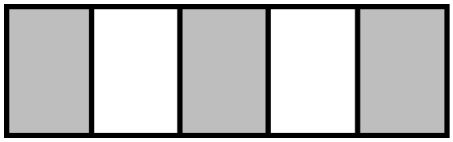
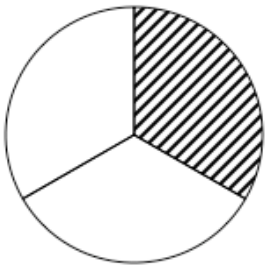
- ∞ Written symbols to manipulative to written symbols
- ∞ Pictures to written symbols

Using your fraction circles find three fractions equal to $\frac{1}{4}$.

Draw a picture for each equivalent fraction.

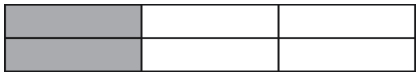
Record the equivalent fraction under each picture.

Name_____ Lesson 10 / Student Page A

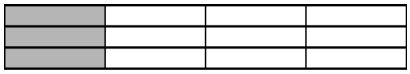
| | |
|---|---|
| 1.  | A. Fraction shaded: _____<br><br>B. Make into six equal-sized parts drawing in lines on picture.<br><br>C. Fraction shaded now: _____ |
| 2.  | A. Fraction shaded: _____<br><br>B. Make into 15 equal-sized parts drawing in lines on picture.<br><br>C. Fraction shaded now: _____ |
| 3.  | A. Fraction shaded: _____<br><br>B. Make into 12 equal-sized parts drawing in lines on picture.<br><br>C. Fraction shaded now: _____ |
| 4.  | A. Fraction shaded: _____<br><br>B. Make into six equal-sized parts drawing in lines on picture.<br><br>C. Fraction shaded now: _____ |

Directions:
Cut out the rectangles. Put the rectangles together into groups so that each rectangle in the group has the same amount shaded. After you have grouped them, fill in the table by writing the fraction name for each rectangle in the group. Fractions in the same group are called equivalent fractions.

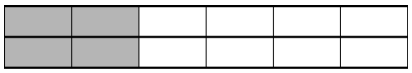
a) 

b) 

c) 

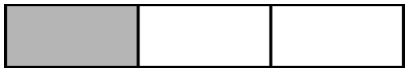
d) 

e) 

f) 

g) 

h) 

i) 

j) 

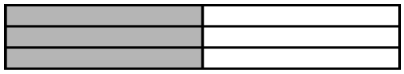
k) 

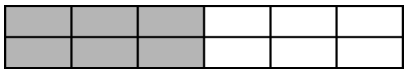
l) 

m) 

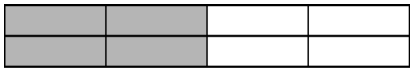
n) 

o) 

p) 

q) 

r) 

s) 

t) 

Name_____ Lesson 10 / Student Page C

# Record Sheet for Student Page B

Write equivalent fractions for each group you made.

| | | | | |
|---|---|---|---|---|
| $\frac{1}{2}$ | | | | |

| | | | |
|---|---|---|---|
| $\frac{1}{3}$ | | | |

| | | |
|---|---|---|
| $\frac{2}{3}$ | | |

| | | |
|---|---|---|
| $\frac{3}{4}$ | | |

| | | |
|---|---|---|
| $\frac{5}{6}$ | | |

# PAPER FOLDING AND EQUIVALENT FRACTIONS

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

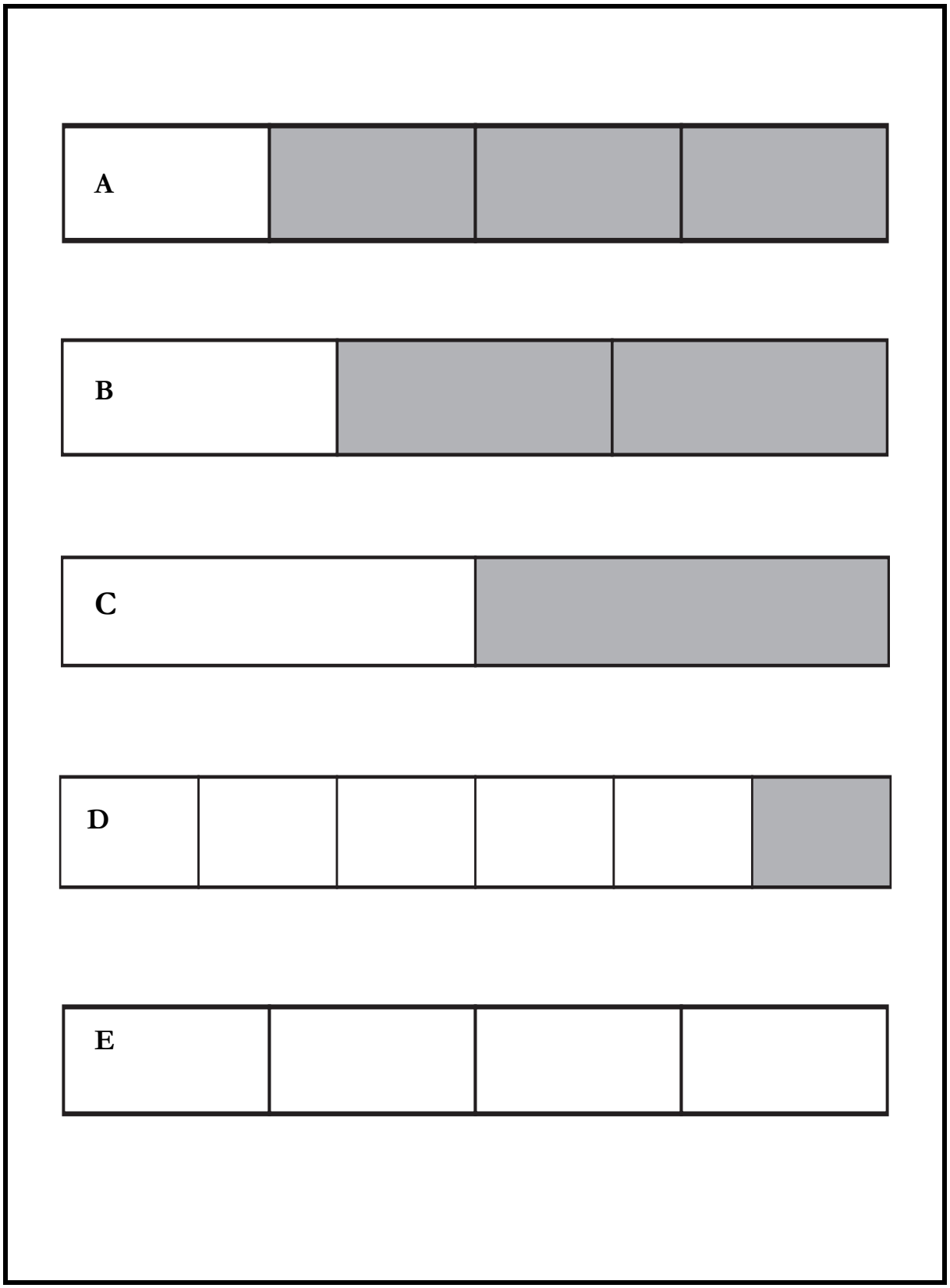
1. Write the symbol for the fraction shaded on strip A:
   _____
   Fold to make **8 equal sized parts.**
   Write the symbol for the fraction which is shown: _____

2. Write the symbol for the fraction shaded on strip B:
   _____
   Fold to make **12 equal sized parts.**
   Write the symbol for the fraction which is shown: _____

3. Write the symbol for the fraction shaded on strip C:
   _____
   Fold to make **6 equal sized parts.**
   Write the symbol for the fraction which is shown: _____

4. Write the symbol for the fraction shaded on strip D:
   _____
   Fold to make **12 equal sized parts.**
   Write the symbol for the fraction which is shown: _____

5. Be careful! Think! Take folding strip E.
   Fold to make 3 equal parts.
   Shade 2 of the 3 equal parts.
   Write the fraction for the amount shaded in strip E:
   _____


A
B
C
D
E

# 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 a picture to show your answers.

2) Use paper folding to find out which of these are true statements.

$\frac{1}{3}=\frac{2}{6}$ $\frac{1}{4}=\frac{2}{6}$

$\frac{3}{4}=\frac{9}{12}$ $\frac{4}{6}=\frac{2}{3}$

3) Use paper folding to find these equivalences..

$\frac{1}{2}=\frac{}{8}$ $\frac{2}{6}=\frac{}{3}$

$\frac{1}{4}=\frac{}{12}$ $\frac{3}{6}=\frac{}{2}$