

CREATING FRACTION KITS

(From *Teaching Arithmetic: Lessons for Introducing Fractions* by Marilyn Burns, Math Solutions Publications)

Students should create their own kits since there are basic concepts about fractions to be learned from the process of creating the kit.

Cut 12-by-18-inch construction paper lengthwise into 3-by-18-inch strips.

For the fractions 1 , $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$: you will need 5 different colors. To include $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{12}$, you will need an additional 3 colors (for a total of 8 colors.)

- Ask students to take a strip of a particular color (that you choose), fold it in half, and cut it into two pieces. Have them label each piece $\frac{1}{2}$ (and possibly also with the name ‘one half’) and discuss why this label is appropriate (because the pieces are the same size, each is one of the two pieces, which we represent as $\frac{1}{2}$)
- Choose a color for a second strip and have the students fold and cut it into four equal pieces. Instruct students to label each piece $\frac{1}{4}$ (and possibly with the name ‘one fourth’). Have students explain why the label is appropriate.
- Have students fold, cut, and label a third strip in eighths and a fourth strip in sixteenths. (For the sixteenths, students may need to fold a strip in half, cut it, and then fold each half into eighths.)
- Students leave one of the strips whole and label it 1 or $\frac{1}{1}$ (ask students first what they should label it).
- For creating thirds, students would probably be inaccurate in folding. One strategy is to measure the strip, divide the length into three equal segments, and then measure and cut and label. For sixths, they can cut thirds and then fold the thirds in half. (The issue of why this works would be a good topic for class discussion.) Use a similar process for twelfths.

FRACTION CONCEPTS LEARNED FROM WORKING WITH FRACTION KITS

1. Fractions as part of a whole (emphasizes relationship to the whole)
2. Meaning of unit fraction notation (would help to also write the appropriate word on the pieces, e.g. an eighth)
3. A fraction is an entity in itself: it represents one thing (not two separate numbers)
4. Inverse relationship between size of unit fractions and their denominators (larger denominator means a smaller size unit fraction)
 - a. Can be used to understand comparison of fractions
5. Meaning of standard fraction notation.
6. All fractions are built from unit fractions.
 - a. Different combinations of fractions can represent the same fraction (e.g., three-fourths of a whole can be represented by three of the one-fourth pieces or by one one-fourth piece and one one-half piece).
7. Concrete practice with the meaning of equivalence of fractions – equivalence concepts emerge naturally as students use the kits.
8. When working with fraction kits, students think of, for example, an eighth, as one size of fraction piece so it makes sense that we can add or subtract collections of same size pieces.
9. The above leads to understanding why one uses a common denominator in adding or subtracting fractions.