

## Fractions: Manipulatives

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[http://www.cehd.umn.edu/ci/rationalnumberproject/89\\_1.html](http://www.cehd.umn.edu/ci/rationalnumberproject/89_1.html)

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**This targeted intervention helps students develop a conceptual understanding of fractions. Manipulatives help students construct representations that enable them to understand and perform fraction tasks.**

### Materials:

- Manipulatives such as:

paper circles

paper-folding activities

counters

paper fraction strips

**Primary Grades:** The major purpose is to give early experiences with manipulatives.

Unit and non-unit fractions with denominators no larger than 8 should be used for primary grades. Words (i.e. three-fourths) should be used first before introducing the symbol (i.e.  $\frac{3}{4}$ ).

### Steps:

1. The teacher should introduce the part-whole concept using the continuous model (circles, paper folding) and then the discrete model (counters). The teacher then relates the discrete model to the continuous model.

2. The teacher shows how to name fractions represented by physical models and diagrams. The teacher then asks students to name fractions represented by physical models and diagrams, providing guided practice and feedback.
3. The teacher shows the students how to use physical models and diagrams for fraction names and symbols. The teacher then asks the student(s) to model or draw pictures for fraction names or symbols, providing guided practice and feedback.
4. The teacher introduces the “concept of unit.” The student(s) name fractions when the unit is varied. Example: If using circles, each  $\frac{1}{2}$  piece is one, rather than having the whole circle as the unit ( $\frac{1}{2}$ ,  $\frac{2}{2}$ ). The teacher asks the value of the other pieces. The teacher provides guided practice and feedback.

**Intermediate Grades:** The major purpose is to extend the student(s)’ concepts of fractions through ordering strategies and equivalent fractions.

Denominators should be no larger than 12.

Steps:

1. The teacher introduces equivalent fractions using manipulatives for common fractions.  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and  $\frac{3}{4}$  should be stressed with the greatest emphasis on  $\frac{1}{2}$ . The teacher provides guided practice and feedback.
2. The teacher introduces ordering pairs of fractions by comparing them to  $\frac{1}{2}$  or 1. (Example:  $\frac{3}{10}$  is less than  $\frac{2}{3}$  because  $\frac{3}{10}$  is less than  $\frac{1}{2}$  and  $\frac{2}{3}$  is greater than  $\frac{1}{2}$ .) The teacher provides guided practice and feedback.

Note: Once the student has a conceptual understanding of fractions, then the teacher can introduce adding and subtracting fractions with like denominators using manipulatives.