

## Cue Cards – Solving Fraction Problems

Joseph, L. M. & Hunter, A. D. (2001). Differential application of a cue card strategy for solving fraction problems: exploring instructional utility of the cognitive assessment system. *Child Study Journal*, 31(2), 123-131.

**This targeted intervention enables students to understand and solve addition and subtraction fraction problems independently using addition, subtraction, multiplication and division with a cue card strategy.**

### Materials:

- Addition and/or subtraction fraction problems
- Cue Card 1: Fraction Words
- Cue Card 2: Fundamental Law of Fractions
- Cue Card 3: Making Both Denominators the Same

Note: Student(s) must be taught how to find the Least Common Multiple (LCM) prior to introducing this cue card strategy.

- Cue Card 4: Reducing Fractions to Simplest Terms
- Cue Card 5: Changing Improper Fractions to Mixed Numbers

### **Cue Card 1**

### **Fraction Words**

<b>Fraction Bar</b>	the line that divides the top number (numerator) from the bottom number (denominator)
<b>Numerator</b>	the number above the fraction bar; tells how many parts of the whole unit are shaded or circled
<b>Denominator</b>	the number below the fraction bar; tells us how many equal parts make up one whole unit
<b>Proper Fraction</b>	a fraction in which the numerator is less than the denominator; represents less than one whole unit
<b>Improper Fraction</b>	a fraction in which the numerator is equal to or greater than the denominator; represents one whole unit or more and can be converted to an equivalent mixed number

<b>Mixed Number</b>	a number made up of a whole number and a proper fraction; can be converted to an equivalent improper fraction
<b>Equivalent Fraction</b>	a fraction that has the same value as another fraction

**Cue Card 2                      Fundamental Law of Fractions**

The value of a fraction does not change if its numerator and denominator are multiplied by the same number.

This is true because the value of a number does not change when it is multiplied by one.

Examples:

- 1/1, 2/2, 3/3, 5/5, and 10/10 are all different names for the number one. There are infinite number of different names for one.
- 1/2, 2/4, 3/6, 5/10, and 10/20 are all equivalent fractions. For any fraction, there are an infinite number of equivalent fractions.
- To write an equivalent fraction, choose a fraction for the number one. Multiply by that fraction.

$$\frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$$

$$\frac{10}{15} \div \frac{5}{5} = \frac{2}{3}$$

$$2/3 = 10/15$$

**Cue Card 3****Making Both Denominators the Same**

Step 1:

Are the numerals of the fractions the same on the bottom (denominator)?  
If not, find the Least Common Multiple (LCM), and multiply the top (numerator) and the bottom (denominator) by the same number to get both bottom numbers (denominators) equal to each other.

Example:

$$\frac{1}{2} \times \frac{6}{6} + \frac{1}{3} \times \frac{4}{4}$$
$$\frac{6}{12} + \frac{4}{12}$$

Step 2:

Are the numbers of the fractions the same on the bottom (denominator)?  
If yes, add or subtract on top (numerator) only. The bottom number (denominator) stays the same.

Examples:

$$\frac{6}{12} + \frac{4}{12} = \frac{10}{12}$$
$$\frac{6}{12} - \frac{4}{12} = \frac{2}{12}$$

**Cue Card 4****Reducing Fractions to Simplest Terms**

Step 1:

Find the Greatest Common Factor (GCF) of the top number (numerator) and bottom number (denominator).

Example:

Write  $9/21$  in simplest terms.

1. Find the GCF of 9 and 21.
  - The factors of 9 are 1, 3, and 9
  - The factors of 21 are 1, 3, 7, and 21.
  - The GCF of 9 and 21 is 3.

Step 2:

Divide the fraction by a fraction equivalent to 1 (e.g.  $2/2$ ,  $3/3$ ,  $4/4$ ,  $5/5$ ) that has the GCF as the top number (numerator) and bottom number (denominator).

(This is true because the value of a number does not change when it is divided by 1.)

Example:

2. Divide  $9/21$  by  $3/3$

$$\frac{9}{21} \div \frac{3}{3} = \frac{3}{7}$$

3. The fraction  $3/7$  is in the simplest terms.

## **Cue Card 5      Changing Improper Fractions to Mixed Numbers**

Step 1:

In any fraction, the fraction bar that separates the top number (numerator) from the bottom number (denominator) means “divide.” To express an improper fraction as a mixed number, divide the numerator by the denominator.

Step 2:

List the remainder as a fraction of the divisor.

Example 1:

Express  $45/5$  as a mixed number.

(No Remainder)

$$45 \div 5 = 9$$

$$\frac{45}{5} = 9$$

Example 2:

Express  $15/2$  as a mixed number.

(Remainder)

$$15 \div 2 = 7 \text{ r } 1$$

$$\frac{15}{2} = 7 \frac{1}{2}$$

Steps:

1. The teacher models how to use the cue card to help understand fractions and solve addition and subtraction fraction problems.
2. The teacher gives sample fraction problems to the student and provides guided practice and feedback on how to use the cue card to solve the problems.
3. The students use the cue card independently to solve fraction problems.