3rd Grade Math: Understanding Equivalent Fractions

What Are Equivalent Fractions?

- **Equivalent fractions** are different fractions that represent the same amount or value. Even though they have different numerators and denominators, they cover the same portion of a whole.

Example:

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$$

All of these fractions represent half of a whole, even though the numbers are different.

How to Find Equivalent Fractions

1. **Multiplying or Dividing Both the Numerator and Denominator by the Same Number**:
   - To create an equivalent fraction, multiply or divide the numerator and denominator by the same non-zero number.
   - **Example**:

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

     (Here, both the numerator and denominator are multiplied by 2, creating an equivalent fraction.)
2. **Using a Visual Model**:
   - You can use shapes like rectangles or circles divided into equal parts to show how fractions can be equivalent.
   - **Example**: If you shade half of a circle divided into 2 parts, and then shade 4 parts of a circle divided into 8 parts, both represent the same amount, $\frac{1}{2}$ and $\frac{4}{8}$.

Example of Finding Equivalent Fractions

Let's find an equivalent fraction for $\frac{3}{4}$:

- Multiply both the numerator and the denominator by 2:

$$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$$

  So, $\frac{3}{4}$ is equivalent to $\frac{6}{8}$.

- Multiply both the numerator and the denominator by 3:

$$\frac{3}{4} \times \frac{3}{3} = \frac{9}{12}$$

  So, $\frac{3}{4}$ is also equivalent to $\frac{9}{12}$.

Identifying Equivalent Fractions

1. **Using Multiplication**:
   - To find equivalent fractions, multiply the numerator and denominator by the same number.
   - **Example**:
     $\frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$
     $\frac{2}{5}$ is equivalent to $\frac{6}{15}$.
2. **Using Division**:
   - To simplify fractions and find an equivalent, divide the numerator and denominator by the same number.
   - **Example**:
     $\frac{6}{12} \div \frac{2}{2} = \frac{3}{6}$
     $\frac{6}{12}$ is equivalent to $\frac{3}{6}$.

Visualizing Equivalent Fractions

Imagine a rectangle divided into equal parts.

1. If you shade 2 out of 4 parts of a rectangle, this represents $\frac{2}{4}$.
2. Now, divide the same rectangle into 8 parts and shade 4 of them. This represents $\frac{4}{8}$, which is equivalent to $\frac{2}{4}$.

Using a Number Line to Find Equivalent Fractions

You can also use a **number line** to find equivalent fractions.

1. Draw a number line from 0 to 1.
2. Divide the number line into 2 equal parts. Mark $\frac{1}{2}$.
3. Now, divide the number line into 4 equal parts. You'll see that $\frac{2}{4}$ is at the same place as $\frac{1}{2}$, showing that they are equivalent.

Practice Problems

1. **Find an Equivalent Fraction**:
   What is an equivalent fraction to $\frac{4}{5}$ if you multiply both the numerator and denominator by 2?
   Answer: $\frac{8}{10}$
2. **Simplify the Fraction**:
   Simplify $\frac{12}{16}$ to its simplest equivalent fraction.
   Answer: $\frac{12}{16} \div \frac{4}{4} = \frac{3}{4}$
3. **Visual Fraction Comparison**:
   Draw two circles, one showing $\frac{1}{3}$ shaded, and the other showing $\frac{2}{6}$ shaded. Are these fractions equivalent?
   Answer: Yes, both represent the same amount.

Conclusion

Understanding equivalent fractions is important for comparing, adding, and subtracting fractions. You can find equivalent fractions by multiplying or dividing both the numerator and denominator by the same number, and visualizing them with shapes or number lines helps reinforce the concept.