

What are FRACTIONS?

- A small part, amount, or proportion of something.

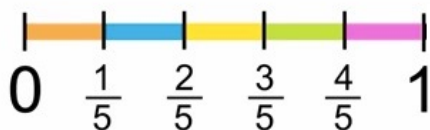
Example types:

Regular: $\frac{1}{4}$ Irregular: $\frac{5}{4}$

Mixed: $1\frac{1}{4}$

What does the RESEARCH say?

- Focusing on only one model does not sufficiently support student comprehension of fractions. A combination of multiple models is required, with extensive practice offered.
- The use of a variety of manipulatives can build deep fraction background knowledge.
- The Linear Model is most effective in helping students understand the relationship between rational and whole numbers.



3 Types of Fractions

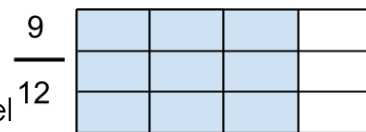
SET Model

- A set of objects make up a whole
- A subset of a whole make up fraction parts



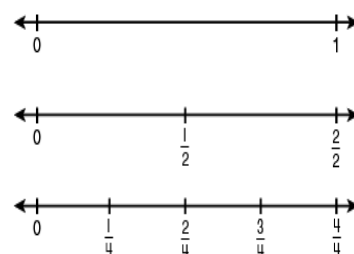
AREA Model

- Uses rectangular area
- Can be used for multiplying fractions
- 'Typical' pizza/pie model



LINEAR Model

- The length of a line is divided into equal parts
- Each fraction is measured from the start of the line
- Uses number lines and Cuisenaire rods



Linear Model Activity:

Procedure:

- Distribute several fraction cards to each student
- Students take turns placing their fraction cards on the class number line
- Students engage in discussion about each card placement, and can make adjustments as needed

Materials & Set Up:

- Hang a 3m string across classroom wall
- Provide clothespins for clipping fraction cards
- Cardstock with printed fractions in various forms (words, standard notation, pictures)

Activity Continued...

Building Background Knowledge:

- Use Cuisenaire rods, pattern blocks, and Unifix cubes to represent and compare fractions
- Use fraction card games to order and compare fractions
- See attached handout for suggested lesson activities for each grade level

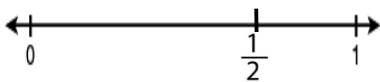
Tips for Accommodation:

- Label the benchmarks (0, 1/2, 1) on the number line and discuss their meaning
- Visual support: Specify a colour of cardstock for each type of fraction model (ex. Red for area model, yellow for set model) to show connections between the different models.

Number Line Specific ERRORS

1) Using unconventional notation

Example: Students might use unequal spacing between the benchmarks on the number line



2) Focusing on discrete tick marks (or parts) rather than the distances

Example: Students might not start counting at 0, but rather they start at 1 or 2 on the number line.

Common Fraction ERRORS

Students fail to understand that the denominator and numerator are only associated when all divided parts are equal



The shaded part is not truly $\frac{1}{3}$, as all divided parts are not equal

Students fail to understand that irregular fractions are greater than one whole

Students might not realize $\frac{9}{5}$ is greater than 1. When it is really equivalent to $1\frac{4}{5}$

Students often rely on whole number strategies when comparing fractions

Students might think:

$$\frac{1}{4} > \frac{1}{2}$$

Because $4 > 2$

Recommended MATERIALS:

- Cuisenaire Rods
- Dice
- Fraction Kits
- String & Clothespins

Main TAKE AWAY:

Effective teaching of fractions includes a combination of all 3 fraction models (Set, Area, & Linear)

Using the linear model, such as a number line, supports:

- Understanding the relationship between numbers and equivalent fractions
- Conceptualization that fractions can be beyond one whole