

NEWSLETTER

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Fraction Understanding: From Two Numbers to One Quantity

DMT Insight 15 · Fraction Understanding: Challenges, Misconceptions, and Effective Practices

In today's edition, we explore:

- **The Classroom Reality:** Why a correct procedure can hide a missing sense of size
- **The Language:** How count and unit size turn a fraction from two numbers into one quantity
- **Classroom Tips:** Three moves that build fraction understanding rather than fraction rules

Educators!

Fractions carry more weight than almost anything else in the elementary curriculum. Number sense is either built or quietly lost with them, and the algebra years depend on them. Careful students also make fraction errors that look careless and are not.

The shift this Insight asks for is from reading a fraction as two whole numbers to reading it as a count of units of a named size. A student who adds $\frac{1}{2}$ and $\frac{1}{3}$ and writes $\frac{2}{5}$ has followed a procedure faithfully. The student is missing the sense of size that would have signaled that the answer had shrunk.

Classroom Tips

1. **Say count and unit size.** The denominator says how many equal units the space from 0 to 1 is partitioned into. The numerator counts them. The fraction $\frac{3}{4}$ is three units, each $\frac{1}{4}$.
2. **Estimate before computing.** Ask whether the answer will be more or less than $\frac{1}{2}$ and more or less than 1. Use 0, $\frac{1}{2}$, and 1 as benchmarks on a number line. Use the visual model before the equation.
3. **Start with length, not circles.** Begin with one-dimensional contexts such as a length of ribbon or a distance, then bar models and number lines, and leave area models until students can reason about area.

A Teacher's Perspective

"By incorporating number lines and bar models in my fraction lessons, I've seen a significant improvement in my students' understanding of fraction problems. They're now able to approach fraction problems with greater confidence."

Sam D., a Grade 5 Math Teacher

Confidence follows from having something to reason with. A number line gives a student a place to check an answer before trusting it.

What Does the Research Say?

Many students never come to hold a fraction as a quantity with a location, and a part-whole view alone limits them to fractions less than 1 (Simon et al., 2018). Children whose understanding of two-dimensional figures is still developing often struggle to reason with area models, so bar models and number lines are a better place to start (Watanabe, 2002).

Keep developing mathematical thinkers!

More Information

For the full research overview and the accompanying video, visit the DMT Insights page at mathsuccess.io/dmtinsights. You will find the Insight, the Companion, classroom resources, and related materials there.

Have a classroom story, tip, or question to share? We feature educator voices and ideas. Email us at contact@dmtinstitute.com to contribute a teaching tip or share your experience.

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