

NEWSLETTER

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WHEN NAMING THE PLACE IS NOT KNOWING THE NUMBER

DMT Insight 51 · Place Value: The Understandings That Predict Later Math Success

In today's edition, we explore:

- **The Classroom Reality:** Why a student can label the tens place and still not know that the 7 in 472 stands for 70
- **The Structure:** Why units and magnitude, rather than place names, are what predict later achievement
- **The Instructional Shift:** How to assess and teach for reasoning about units and magnitude

Educators!

A student points to the 7 in 472 and says, correctly, that it is in the tens place. Asked how many tens are in 470, she pauses, then counts up by ones. She can name the place. She does not know that it means 47 tens. Another student says 590 is greater than 509 because the 9 is bigger, and spaces his points evenly when asked to place 472 on a line from 0 to 1,000. A third multiplies by ten by adding a zero, and the rule works until decimals arrive and 0.5 becomes 0.50.

Each of these students produces the right surface behavior, but none reasons about the two ideas that make place value work: how the number is built from units, and how large it is. The Place Value MLP makes that reasoning visible through four connected constructs: how students compose and rename units, reason about magnitude, connect a digit's position to its value, and coordinate the $\times 10$ structure of the base-ten system. Naming a place is not the same as understanding it, and in Grades 3 to 6 the difference begins to show.

Classroom Tips

- Ask how many tens, not what is in the tens place. "How many tens are in 340?" asks the student to unitize. "What is in the tens place?" asks only for a label.
- Build magnitude on a number line. Have students locate numbers rather than label the endpoints. Mark the benchmarks first, then ask which one the number is closest to and why.
- Separate digit, unit, and value. Do not stop with "What place is the 7 in?" Ask, "What unit does the 7 count?"

What is its value? How many complete tens are in the number?

- Never say add a zero. Ask how many times greater, and use a place-value chart with times-ten and divided-by-ten arrows that extend past the ones place into tenths and hundredths.

A Teacher's Perspective

I used to ask my students to name the places. Now I ask how many tens are in the number, and I find out in ten seconds whether a student is reasoning about units or reading a digit.

The question moves the student from labeling a position to counting in composite units, which later grades keep drawing on.

What Does the Research Say?

Place value rests on unitizing, treating ten ones as one ten and 340 as 34 tens while still knowing what is inside each unit (Fuson, 1990). Magnitude matters as much. Across a meta-analysis of 263 effect sizes from 10,576 students aged 4 to 14, number-line estimation correlated moderately with broader mathematical competence, and the correlation was stronger for fraction number lines than for whole-number lines (Schneider et al., 2018). Place-value processing carries forward as well: among first graders followed into third grade, the place-value components of basic numerical tasks predicted particular aspects of later addition performance (Moeller et al., 2011).

Keep developing mathematical thinkers.

More Information

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

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