

DMT COMPANION

Insight 12 · 2026 · for teachers, coaches, principals, and families



BUILDING PLACE VALUE UNDERSTANDING

How to Use This

This Companion accompanies the DMT Insight on place value, for teachers, coaches, principals, and families. Work through the guiding questions before the Insight or the video, and again afterward. One useful move is to ask how many of a unit are in a number, not which digit sits in a place. Ask: What unit is being counted? How many of those units? How large is the quantity?

Guiding Questions

ANSWER THESE BEFORE THE INSIGHT, AND AGAIN AFTER

1. **Unitizing, Composing and Decomposing.** How many tens are in 340? Can students name 340 as 34 tens, as 3 hundreds and 4 tens, and as 340 ones, and move among these?
2. **Magnitude and the Number Line.** Where does 472 fall on a 0 to 1,000 number line, and which benchmark helped decide? Can students reason about how large a number is, not only how to write it?
3. **Position and Value.** What unit does the 4 count in 340, and what value does it contribute? Can students separate the digit, the unit, its position name, and the value?
4. **$\times 10$ Structure and Equivalence.** Why is each place worth ten times the one to its right, and how can the same quantity be renamed without changing its value?

Before and After: Units, Not Digits

Many place-value errors reveal the same habit: students read the digits without asking what units the number is built from. A before-and-after makes the shift visible, from naming the place a digit sits in to counting the units the number composes.

Before: naming the place

340



"the 4 is in
the tens place"

After: counting the units

340 = 34 tens

3 hundreds and 4 tens = 34 tens = 340 ones

one quantity, composed and renamed

Figure 1. Before, a student names the place the 4 sits in. After, the student renames 340 as 34 tens and 340 ones, one quantity composed of units.

The takeaway: naming the place tells you a student knows a label. Renaming 340 as 34 tens shows the student is reasoning about the units the number is built from.

Worked Examples

Each example pairs the model students should reason with and the language that directs attention to the unit, the number of units, and the size of the quantity.

Example 1 • How many tens are in 340?

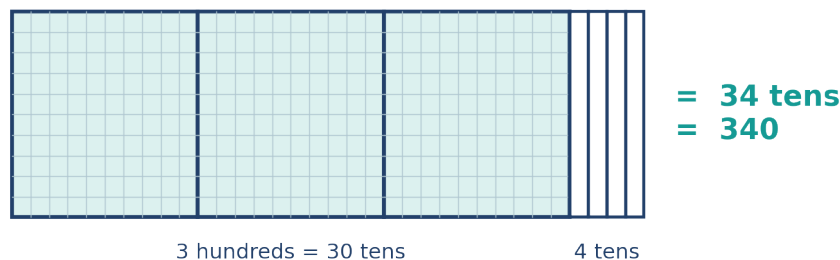


Figure 2. Three hundreds are thirty tens; with four more tens, 340 is 34 tens.

Unitizing treats ten ones as one ten and ten tens as one hundred, while still knowing what is inside each unit. A student who can rename 340 as 34 tens is counting units, not reading digits.

- How many tens are in 340? Not just the digit in the tens place.
- 3 hundreds is 30 tens, and 4 more tens makes 34 tens.
- 340 is also 340 ones, and 3 hundreds and 4 tens. It is one quantity named in different ways.

Example 2 • Locating 472 on the number line

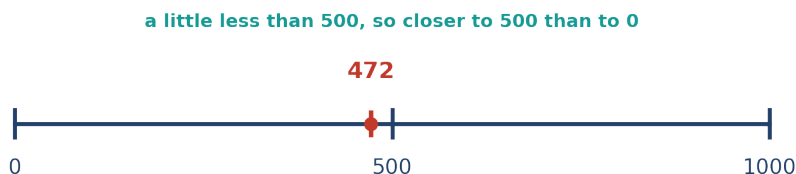


Figure 3. 472 sits a little left of 500, closer to 500 than to 0.

Magnitude is knowing how large a number is and where it falls, not only how to write it. Benchmarks like 0, 500, and 1,000 give students reference points to locate, compare, and estimate.

- Where does 472 go on a line from 0 to 1,000? Which benchmark helped you decide?
- 472 is a little less than 500, so it lands just left of the middle.
- Locating a number first makes comparing and rounding reasoning, not a rule.

Example 3 · What the 4 counts in 34, 340, and 3,400

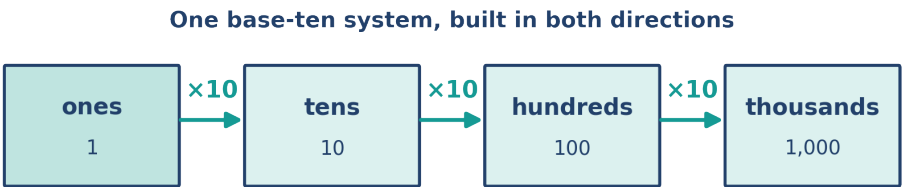
34	4 counts 4 ones	= 4
340	4 counts 4 tens	= 40
3,400	4 counts 4 hundreds	= 400

Figure 4. The same digit 4 counts ones, tens, or hundreds depending on its position: 4, 40, or 400.

Position and value asks students to separate three things: the digit, the unit its position names, and the value it contributes. Naming the place is not the same as knowing what it counts.

- The 4 is the same digit in each number. What unit does it count?
- In 340, the 4 counts 4 tens, which is 40; in 3,400, it counts 4 hundreds, which is 400.
- The digit tells how many; the position tells what unit; the value depends on both.

Example 4 · Why each place is ten times the next



Center the chart on the unit of one: iterate $\times 10$ to build larger units, and partition to build tenths and hundredths.

Figure 5. Centered on the unit of one, each place is ten times the one to its right.

The $\times 10$ structure makes the base-ten system work: each place is ten times the one to its right and one tenth of the one to its left. Centering the chart on the unit of one makes that relationship visible in both directions.

- Why is the hundreds place worth ten times the tens place?
- **Adding** a zero is a pattern; the reason is that the unit became ten times as large.
- The same quantity can be renamed, 340 as 34 tens, without changing how much it is.

The Language Shift

Wording can hide the mathematics or point at it. Keep this by the board.

Instead of	Say	Mathematical idea
What digit is in the tens place?	How many tens are in 340?	Unitizing, Composing and Decomposing
Borrow from the hundreds.	Partition one hundred into ten tens.	$\times 10$ Structure and Equivalence

Instead of	Say	Mathematical idea
Add a zero.	What happens to the value when the unit becomes ten times as large?	$\times 10$ Structure and Equivalence
Which number is bigger?	Where does each number fall on the number line?	Magnitude and the Number Line
The 4 is in the tens place.	The 4 counts 4 tens, which is 40.	Position and Value

What to Look For in a Classroom

- *Students naming 340 as 34 tens, not only as a digit in the hundreds place and a digit in the tens place.*
- *Students locating a number on a number line before comparing or rounding it.*
- *Students separating the digit, the unit, its position name, and the value it contributes.*
- *Students explaining why each place is ten times the one to its right.*
- *Students renaming a quantity in more than one way without changing how much it is.*
- *Student drawings and charts kept as evidence of how a student reasoned about the units.*

Developmental Understandings

These develop together rather than in a fixed order, and a diagnostic can look for each.

Developmental understanding	What it looks like when it is emerging
Unitizing, Composing and Decomposing	Treats ten ones as one ten while knowing what composes it; renames 340 as 34 tens, as 3 hundreds and 4 tens, and as 340 ones.
Magnitude and the Number Line	Reasons about how large a number is; locates, compares, and estimates using benchmarks on the number line.
Position and Value	Separates the digit, the unit its position names, and the value it contributes.
$\times 10$ Structure and Equivalence	Understands that each place is ten times the one to its right, and renames a quantity without changing its value.

Where to Go Next

Read the full research overview and watch the accompanying video on the DMT Insights page at mathsuccess.io/dmtinsights. This issue's newsletter includes a one-page version for families and staff meetings. For more classroom materials, visit mathsuccess.io.