

NEWSLETTER

2026 · Math Success with DMTI



FROM READING A NUMBER LINE TO BUILDING ONE

DMT Insight 38 · Drawing Understanding: Why Students Should Build the Number Line

In today's edition, we explore:

- **The Research:** Why a correct placement on a printed line can hide the reasoning behind it
- **The Structure:** What students establish when they choose the unit, the partition, and the scale
- **Classroom Tips:** Three routines that begin with a blank line
- **The Evidence:** What number-line research does and does not show

Educators!

A student can place 47 correctly on a printed number line and still not say how far 47 is from 0, or what one unit on that line represents. The printed line has already fixed the endpoints, the spacing, and the position of 0, so the student reads a location rather than measuring a distance. Performance on these bounded tasks reflects the measurement and proportion strategies that the printed frame invites (Cohen & Sarnecka, 2014).

When students build the line themselves, they make those decisions. They choose the endpoints, decide what one unit represents, iterate that unit to produce equal-sized intervals, and partition the intervals when they need smaller units. Those four actions are measurement, and students use the same actions with a ruler, a fraction strip, and the axis of a graph. A student who has never established that equality can locate a number correctly without ever having reasoned about distance.

Classroom Tips

1. **Start with a blank line.** Give students a segment with no ticks and no labels. Ask where 0 belongs, what one unit represents, and how they know that the spacing is equal.
2. **Vary the endpoints, then partition.** Use 0 to 1, 0 to 50, and 2 to 10 across the week, and ask students to partition a line they have drawn into fourths and then into tenths. Changing the range prevents students from reusing one unit, and partitioning lets them treat $\frac{1}{4}$ and $\frac{1}{10}$ as distances measured from 0.
3. **Build the axis before you graph.** Have students draw the axis, choose the scale, and label the intervals before any point is plotted, so that graphing begins with scale-making rather than with point-plotting.

A Teacher's Perspective

Once I stopped handing out the printed lines, I could see who was counting tick marks and who was measuring. Their spacing told me more than their answers did.

What Does the Research Say?

Number-line estimation is strongly associated with mathematical competence across ages and measures (Schneider et al., 2018), and linear representations of number improve young children's numerical understanding under experimental conditions (Siegler & Ramani, 2009). Students' conceptions of the line are also more rigid than they appear. Many expect 0 at the center or increments of 1, and that understanding develops through identifiable stages rather than arriving all at once (Ünal et al., 2024).

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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