DMT COMPANION

Insight 50 · 2026 · for teachers, coaches, principals, and families

MATHEMATICAL THINKING IN THE AGE OF DIGITAL DEPENDENCE

How to Use This

This Companion accompanies DMT Insight 50 for educators. Work the three guiding questions before the Insight or the video, and again afterward. The move that makes it work is small: name the mathematical work the lesson is meant to teach, find the part a tool is doing, and give that part back to the student.

Three Guiding Questions

ANSWER THESE BEFORE THE INSIGHT, AND AGAIN AFTER

1. In this lesson, is the digital tool helping students do the mathematical thinking, or doing it for them?
2. What do your students build by hand, and what arrives on the screen already drawn?
3. Where are your students recognizing an answer when what they need is to rebuild it?

Before and After: What the Screen Supplies and What the Student Builds

The work a student does is the work a student learns. When a bar model arrives partitioned, shaded, and labeled, every decision that carries the mathematics has already been made. The same bar model, partitioned by the student, asks for the reasoning the lesson exists to build.

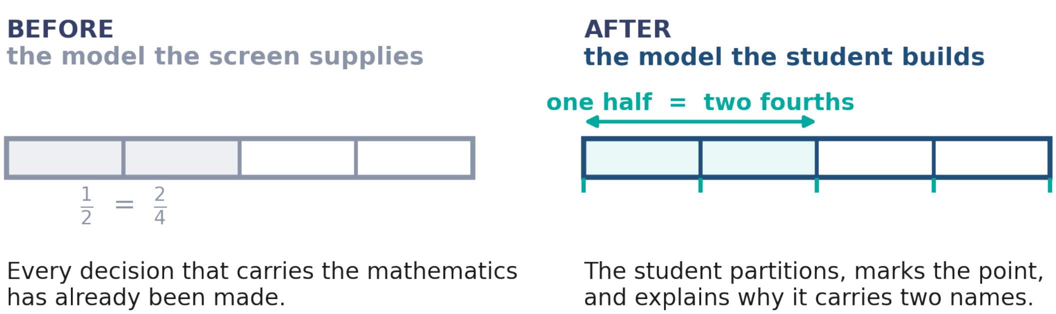

Figure 1. The same relationship twice: the model the screen supplies, beside the model the student builds.

The takeaway: a completed screen indicates that a student recognized an answer. A drawn, labeled, and explained model shows what the student understood about the relationship.

Worked Examples

Each example pairs the model students should build with the language that keeps the mathematical work with the student rather than with the tool.

Example 1 · Place value

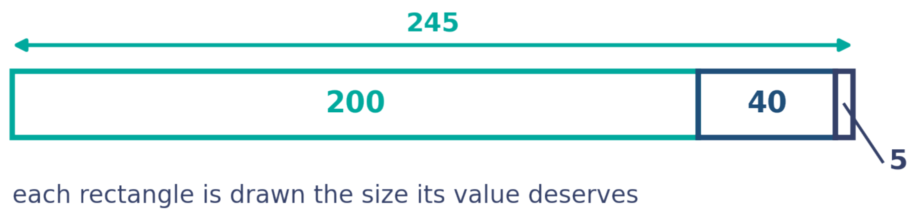

Figure 2. 245 drawn as one bar model. The rectangles for 200, 40, and 5 are sized to their values, so the bar model itself carries what the digits mean.

A screen can display 245 = 200 + 40 + 5 in a second. Drawing it takes longer, and the time is where the mathematics is. To draw the bar model, a student has to decide how much of the total 200 should cover, which forces a judgment about relative magnitude that reading the expanded form never asks for.

- “How much of the bar model should the 200 take, and how did you decide?”
- “Where is the 5 on your bar model, and why is it so small?”
- “What would change on your bar model if the number were 254?”

Example 2 · Equivalent fractions

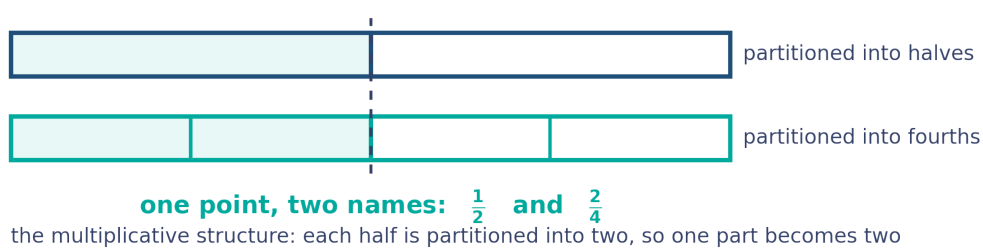

Figure 3. The same bar model partitioned into halves and into fourths. One point on the bar model carries two names.

A student who watches equivalent pairs appear on a screen learns which pairs go together. A student who partitions the bar model, marks the point, and explains why both names land there has built the multiplicative structure, and on meeting a pair not yet seen recognizes the structure rather than recalling the case.

- “Show me where both names land. Why is it the same point?”

- “What happened to each half when you partitioned it again?”
- “Which pair could you name next without drawing it, and how do you know?”

Example 3 · Multiplying by ten

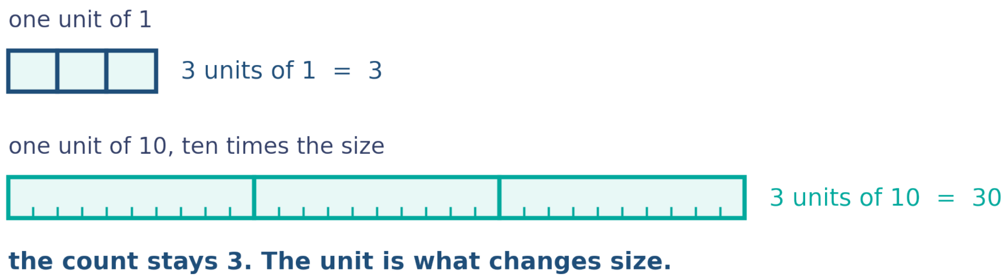

Figure 4. Three units of 1 above three units of 10. The count stays at three, and the unit is what changes size.

A tool that returns 30 conceals the relationship. Drawing both rows shows that multiplying by ten does not add a digit to a numeral. It replaces the unit with one ten times its size, which is the same reasoning students need later for scaling, for decimals, and for proportional relationships.

- “What is the unit in the first row, and what is the unit in the second?”
- “How many units are there in each row? What stayed the same?”
- “If the unit became ten times smaller instead, what would the total be?”

Example 4 · Ratio

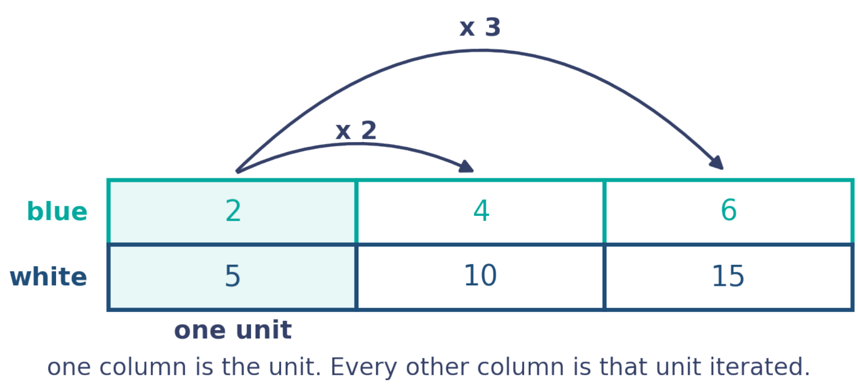

Figure 5. A ratio table for a paint mixture, 2 parts blue to 5 parts white. The first column is the unit, and every other column is that unit iterated.

Software will complete a ratio table on request, and the completed table looks the same either way. The reasoning is in choosing the multiplier and saying what it acts on. A student who fills the table by iterating one unit is doing the multiplicative reasoning that proportional relationships, slope, and linear functions later depend on.

- “Which column is the unit, and what does one unit represent?”

- “What did you multiply by to reach this column, and what did it act on?”
- “How would the table look if the mixture were 4 parts blue to 10 parts white?”

Example 5 · The unknown

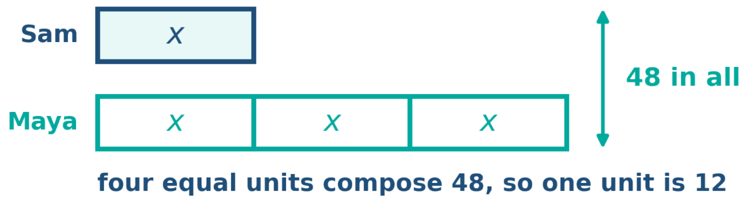

Figure 6. Maya has three times as many as Sam, and together they have 48. Four equal units compose the total, so one unit is 12.

A solver returns x = 12 without showing why. The bar model holds the unknown inside a structure the student drew, and the equation follows from that structure. Students who reason from the model first meet an unknown as a quantity with a size rather than as a symbol to isolate.

- “How many equal units compose the total on your bar model?”
- “What does one unit represent, and how did you find it?”
- “Write the equation your bar model already shows.”

The Language Shift

Wording can either hand the thinking to the tool or keep it with the student. Keep this by the board.

Instead of	Say
Use the tool to check your answer.	Draw the model first, then use the tool to check what you already reasoned.
The app will show you how.	Show me your model. What did you decide about the unit?
Watch the example again.	Rebuild it on paper without looking, then compare.
You got it right.	How do you know? Point to the part of your model that shows it.
Type your answer in the box.	Draw it, label it, and write one sentence explaining the relationship.
That is the shortcut.	What does the shortcut do to the unit?

What to look for in a classroom

- Students drawing before they reach for a device.
- Models sized to the quantities, drawn by hand, without a ruler.
- Students naming what one unit represents in their own drawing.
- Flawed drawings kept, because uneven spacing and mislabeled partitions indicate the thinking.
- Practice that asks for a model, an equation, and an explanation rather than a final answer in a box.
- Students rebuilding yesterday's idea from memory before new material begins.

Across the Grades

Band	What students build	Model	What changes in their thinking
K–2	Quantities built as lengths by hand, then composed and decomposed.	Part–whole and comparison bar models.	A number becomes a quantity with a size rather than a symbol to copy.
3–5	Units partitioned and iterated to build fractions, multiplication, and ratio.	Bar models, number lines, area models, and ratio tables.	The unit becomes something to identify, iterate, and partition.
6–8	An unknown held inside a structure the student drew.	Bar models with an unknown, and ratio tables.	Structure comes before symbols, and the equation follows from the model.

Where to Go Next

Read the full research overview and watch the accompanying video on the DMT Insights page at mathsuccess.io/dmtinsights. The Newsletter for this issue gives a one-page version for families and for staff meetings. For more classroom materials, visit mathsuccess.io.