

NEWSLETTER

Issue 9 · 2024 · Math Success with DMTI



LINEAR MODELS OR 100S CHARTS? WHY THE DIFFERENCE MATTERS

Linear models for quantities, relationships, and operations.

In today's edition, we explore:

- What a bar model, a number line, and a hundreds chart each show
- One example, $14 + 10 = 24$, in three representations
- What the research says and what DMTI recommends

Educators!

A bar model represents quantities and relationships, a number line represents position and distance, and a hundreds chart organizes the counting sequence. DMTI recommends introducing bar models early and using them through algebra.

Classroom Tips

1. **Use bar models for operations.** Ask, “What is the unit? What are the quantities? How are they related?”
2. **Use number lines for position and distance.** On a number line, 14 and 24 are ten units apart.
3. **Use hundreds charts for counting patterns.** Count forward and backward. Why do columns share a ones digit?

An Example: $14 + 10 = 24$

Consider $14 + 10 = 24$. On a hundreds chart, 14 and 24 appear one row apart. The chart shows a counting pattern, but it does not directly represent the relative magnitudes of 14 and 10. A bar model shows how these quantities compose 24. A number line shows the ten-unit distance between 14 and 24. These linear representations help students examine the quantities and their relationships rather than rely on a movement across a chart.

Bar model



Number line



The bar model and the number line use the same scale.

Hundreds chart, rows 1 to 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

14 and 24 are one row apart.

Try This Tomorrow

Show 9 units of 1 and 1 more. Ask: How many units of 1? How many units of 10? How do you know?

Draw a bar of 37 with a part of 27. Ask: What is the other part? What equations does the model show?

On a hundreds chart, count forward from 14 and backward from 24. What patterns do you notice? What changes when you count by tens?

Each question asks students to reason about units, quantities, counting patterns, and relationships.

What Does the Research Say?

Research shows that bar models represent part-whole and comparison relationships and connect to algebra (Ng & Lee, 2009), and that number-line accuracy is associated with broader mathematical competence (Schneider et al., 2018). Research on hundreds charts examines how their layout affects counting by tens (Osana et al., 2023). None of these studies compares bar models with hundreds charts directly, so DMTI's preference for linear models is an instructional recommendation.

Bar models extend from whole numbers to fractions, ratios, and equations such as $3x + 4 = 19$, so the same representation supports students across the grades.

Keep developing mathematical thinkers.

More Information

This is a quick overview. Read DMT Insight 9 and download the Companion at mathsuccess.io/dmtinsights.

To share a classroom example or a question, contact us at contact@dmtinstitute.com.

For more information on professional development and curricular resources, visit mathsuccess.io.

