

NEWSLETTER

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A MODEL IS MORE THAN A PICTURE

Use models to make mathematical relationships visible.

In today's edition, we explore:

- **The Classroom Reality:** Two students solve $24 \div 4$, and only one drawing does any reasoning
- **The Shift:** Why a model should hold a relationship, not repeat an answer already found
- **The Models:** A small set of models used again and again, instead of a new picture for every topic

Educators!

Two students solve $24 \div 4$. One writes 6 and then draws six circles. The other draws a bar representing 24, partitions it into four equal units, and determines that each unit is 6.

Both students drew something. Only one used the drawing to reason. That is the difference between a picture that illustrates an answer and a mathematical model that makes a relationship visible.

A Few Powerful Models

Students do not need a new model for every topic. They need a small set of models they understand well enough to use in increasingly sophisticated ways.

- **Bar models.** Relationships among quantities and units.
- **Number lines.** Magnitude, distance, iteration, and comparison.
- **Area models.** Composition and decomposition, multiplication, division, fractions, and later algebra.

Try This Tomorrow

- **Ask for the model before the answer.** Show me how the quantities are related.
- **Ask students to read the model.** What does this part represent? Where is the total? Where is the unknown?
- **Connect the model to the equation.** Where does each number in the equation live in your model?

- **Reuse models.** Where have we used this model before? What is the same? What is different?

A model's purpose is not to make mathematics prettier. It makes a relationship visible enough to reason about. The model holds the relationship. The equation records it.

What Does the Research Say?

Research on representation describes students moving from action to iconic models to symbols, with the iconic model carrying the relationship between them (Bruner, 1964). A small set of reused models, as in the bar models of Singapore mathematics, supports reasoning across many topics (Leinwand & Ginsburg, 2007).

A few models, used again and again, turn scattered procedures into one connected structure. When students reason through a model, we can see the mathematics they understand.

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 Insight 2, the Companion, and related classroom resources there.

Have a classroom story, tip, or question to share? We feature teacher voices in future editions. Email us at mathsuccess@dmtinstitute.com.

