

NEWSLETTER

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THE POWER OF VARIED PRACTICE

How contexts, models, language, and symbols support mathematical understanding and fluency.

In today's edition, we explore:

- **Varied Practice:** working with one relationship through a context, a model, and symbols
- **An example:** what $58 - 36 = 22$ can show about student understanding
- **Classroom tips:** three ways to design and use three-column tasks
- **The research:** what studies of multiple representations suggest

Educators!

Students need opportunities to develop accuracy and efficiency with facts and procedures. They also need opportunities to explain the quantities and relationships those procedures represent.

Varied Practice connects these purposes. Students examine the same mathematical relationship through a context, an iconic model, and an equation with mathematical language.

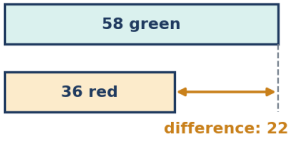
DMTI's three-column format asks students to construct and compare representations. Teachers can use students' responses to examine how they understand the mathematics and determine what needs further development.

One Relationship, Three Representations

There are 58 green apples and 36 red apples. How many more green apples are there than red apples? A student may calculate $58 - 36 = 22$ correctly. Varied Practice also asks the student to represent the quantities with a bar model and explain how the model and the equation show the same relationship.

Ask:

- What quantities are being compared?
- What does each part of the bar model represent?
- How does the model show the difference between 58 and 36?
- How does the equation $58 - 36 = 22$ represent that same relationship?

Contextual (Story or Situation)	Iconic (Visual Model)	Symbolic (Equation and Mathematical Language)
There are 58 green apples in one basket and 36 red apples in another basket. How many more green apples are there than red apples?		$58 - 36 = 22$ "I compared 58 and 36. There are 22 more green apples than red apples."

Classroom Tips

- 1. Select representations intentionally.** Choose a bar model, number line, area model, or other representation that makes the mathematical relationship visible. There is no requirement to begin with a physical or visual model in every lesson.
- 2. Focus on quantities and relationships.** Ask students to identify the units, explain how quantities are composed or decomposed, and describe how the representations are connected.
- 3. Vary what students are given.** Sometimes provide the context, sometimes the model, and sometimes the equation. Ask students to construct and justify the missing representations.

What Does the Research Say?

Research on multiple representations suggests that students can benefit from examining mathematical ideas in different forms (Ainsworth, 2006; Lesh, Post, & Behr, 1987). Bruner's work also provides a foundation for considering how action, images, and symbols contribute to learning. The instructional purpose is to help students identify and explain the mathematical relationships represented. The value comes from how the representations are selected, connected, and discussed, rather than from simply using more representations.

Keep developing mathematical thinkers.

More Information

Read DMT Insight 35 on Varied Practice at mathsuccess.io/dmtinsights.

What three-column task has worked in your classroom? Share it with us at contact@dmtinstitute.com.

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




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