
Math Success with DMTI

DRILLS vs. STRATEGIES: BUILDING FLEXIBLE THINKERS

In today's edition, we explore:

- **The Research:** Why “Drill and Kill” does not build lasting fluency
- **The Strategy Solution:** How structure and retrieval build flexibility
- **Classroom Application:** Small shifts that create long-term results
- **Parent Partnership:** Supporting fluency at home without flashcard fatigue

Educators!

Are your students fast—but forgetting? Many third graders can recite their math facts, yet by eighth grade, only about 17% still show fluency. This drop reveals a key truth: *memorization without meaning does not last*.

In classrooms filled with one-minute tests and flashcards, students often learn to go faster, rather than thinking more deeply. Research shows that speed alone does not develop flexible, durable understanding. To create *mathematical thinkers*, we need a better balance—teaching *strategies first* and *retrieving facts meaningfully* through practice that connects structure to understanding.

Why Drills Alone Do Not Work

Routine drills can create the illusion of fluency but rarely support long-term transfer. Students may recall 6×7 today but struggle to apply it to 7×8 or $42 \div 7$ next week.

Cognitive science explains why: isolated repetition leads to *shallow encoding* and memory interference (Sweller et al., 2011; Rohrer & Taylor, 2007). When facts are disconnected, the brain has no web of meaning to hold onto.

Timed tests also increase math anxiety, consuming the very working-memory space that automaticity depends on (Ramirez et al., 2018). *Equity-minded instruction replaces speed pressure with reasoning opportunities, ensuring all learners can demonstrate competence*.

Strategy + Smart Practice = Durable Fluency

The most effective learning happens when we **first teach strategies**—rooted in *structural language* (*unit, compose, decompose, partition, iterate, equal*)—and then help students practice retrieval through *purposeful, spaced, and varied practice*.

Addition/Subtraction Strategies:

- **Use Doubles/Near Doubles:** "For $6 + 7$, I know $6 + 6 = 12$, then $12 + 1 = 13$. So, $6 + 7 = 13$."
- **Make Ten:** "For $8 + 6$, decompose 6 into 2 and 4. Then, $8 + 2 = 10$, and 4 more is 14. So, $8 + 6 = 14$."
- **Compensation:** "For $8 + 9$, I know $8 + 10$ is 18. But I only had 9, so I need to subtract 1 from 18 to get 17. So, $8 + 9 = 17$."

Multiplication/Division Strategies:

- **Doubling/Halving:** "If $4 \times 6 = 24$, then 8×3 must also be 24."
- **Benchmark facts:** "For 7×8 . I know 7×5 is 35 and 7×3 is 21. And 35 and 21 is 56. So, $7 \times 8 = 56$."
- **Compensation:** "For 6×9 , I know 6×10 is 60. I only had 9, so I need to subtract 6. 60 minus 6 is 54. So, I know $6 \times 9 = 54$."

Try This Tomorrow: Classroom Shifts That Work

Replace Timed Tests with "Think-Alouds." Ask: "*How did you figure that out?*" rather than "What is the answer?" This signals that reasoning matters as much as recall.

Use Number Talks. Spend 10 minutes on a problem like 18×5 . Have students share mental strategies—highlighting efficiency, structure, and flexibility.

Mix and Space Practice. Instead of practicing only 6s or 7s, mix addition, subtraction, multiplication, and division. Mixing reduces interference and improves long-term retention.

Anchor With Visual Models. Start with bar models, arrays, or number lines to help students move from enactive (hands-on) to iconic (visual) to symbolic (equation) understanding.

Get Inspired—Share Your Story!

When we teach facts through structure and strategy, we build mathematicians, not memorizers. How have you helped your students move from drilling to thinking? Share your tip or classroom story—you might be featured in our next *Math Success with DMTI* newsletter!

For the complete research overview, downloadable strategy cards, and professional learning resources, visit mathsuccess.dmtinstitute.com

Keep inspiring mathematical minds!

MORE INFORMATION

This newsletter is just a preview—there is more to explore! For the complete research overview and additional videos, visit the "Research Overviews" page at dmtinstitute.com/research. You will find deeper insights, classroom strategies, downloadable resources, and more ways to expand your math teaching.

Have a classroom story, tip, or question to share? We love featuring educator voices and ideas. Email us at mathsuccess@dmtinstitute.com to contribute a teaching tip or share your experience—your story could be in our next newsletter!

For ongoing support, expert advice, and practical updates, join our DMTI community on social media or visit our website anytime: contact@dmtinstitute.com



facebook.com/dmtinstitute



instagram.com/dmtinstitute/



[@DMTInstitute.bsky.social](https://bsky.app/profile/DMTInstitute.bsky.social)



mathsuccess.dmtinstitute.com



x.com/dmtinstitute



linkedin.com/company/dmt-institute



Tiktok.com/@math.success



youtube.com/@dmtinstitute