

From Telling to Thinking:

Disrupting Math Instruction That Doesn't Work



What happens when math classrooms are designed so students do the thinking, instead of following steps?

Add.

$$\frac{3}{8} + \frac{2}{8}$$

Add.

$$\frac{3}{8}$$

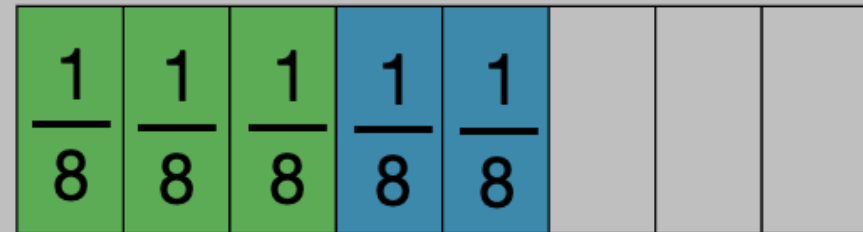
$$\frac{2}{8}$$

Student 1:

$$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$

Add the top, copy the bottom.
So, $3 + 2 = 5$, keep the 8.

Student 2:



$$\frac{5}{8}$$

Both fractions are eighths. So, we have three eighths and two eighths. Together, that's five eighths.

Why Math Matters Right Now

- Math achievement shows slow nationwide recovery.
- Students who fell behind struggle to reengage.
- Strong math instruction supports long-term success.

EducationWeek[®]

Five Years Later, Student Achievement Still Lags Behind Pre-Pandemic Levels



By Jennifer Igbonoba — August 19, 2025 | Corrected: August 20, 2025 ⌚ 3 min read

EdWeek[®] Market Brief[®]

Student Engagement in Learning Is Low. A Survey Offers Clues on How to Bring Them Back



By Emma Kate Fittes — October 24, 2024 ⌚ 3 min read



LEARNING POLICY INSTITUTE

Research. Action. Impact.

REPORT

Positive Conditions for Mathematics Learning: An Overview of the Research

PUBLISHED JUNE 6, 2025

By Julie Fitz, Heather Price

Agree

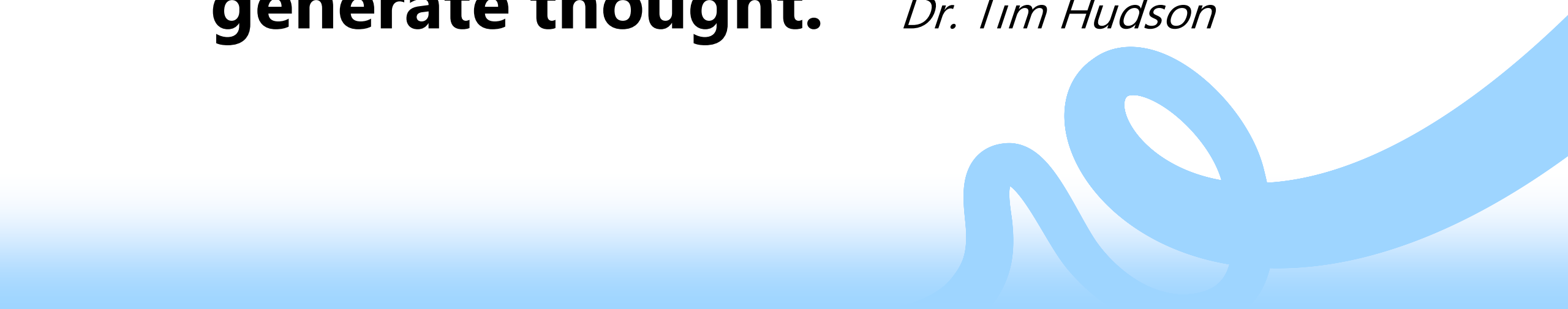
**Strongly
Agree**

Edtech should do the thinking for students when they get stuck.

**Strongly
Disagree**

Disagree

“The goal of teaching is not to put a thought in a student’s mind. The goal of teaching is to empower a student’s mind to generate thought.” *Dr. Tim Hudson*



WALK & THINK

Think of a skill you learned that
you can STILL do today!



AUTHENTIC LEARNING EXPERIENCES

Purposeful Struggle



Productive Struggle



- ✓ **Deeper Understanding**
- ✓ **Grit**
- ✓ **Resilience**
- ✓ **Long Term Success**



Support when needed, independence when ready

AUTHENTIC LEARNING EXPERIENCES

What does authentic learning mean?

Real-world problems that matter to students, tied to their lives and curiosity.

What does it look like? Sound like?

Students wrestling with open questions, collaborating, and explaining their thinking.

Is it the same for all students?

No, tasks flex to meet each learner where they are.



Purposeful tasks lead to productive struggle, which leads to lasting learning.

PRODUCTIVE STRUGGLE

It's not just "making students work hard."
It consists of:

- ❖ Shape classroom culture intentionally
- ❖ Celebrate effort over right answers
- ❖ Select the right tasks
- ❖ Question instead of tell

[Edutopia video – How Productive Struggle Fires Up Learners](#)

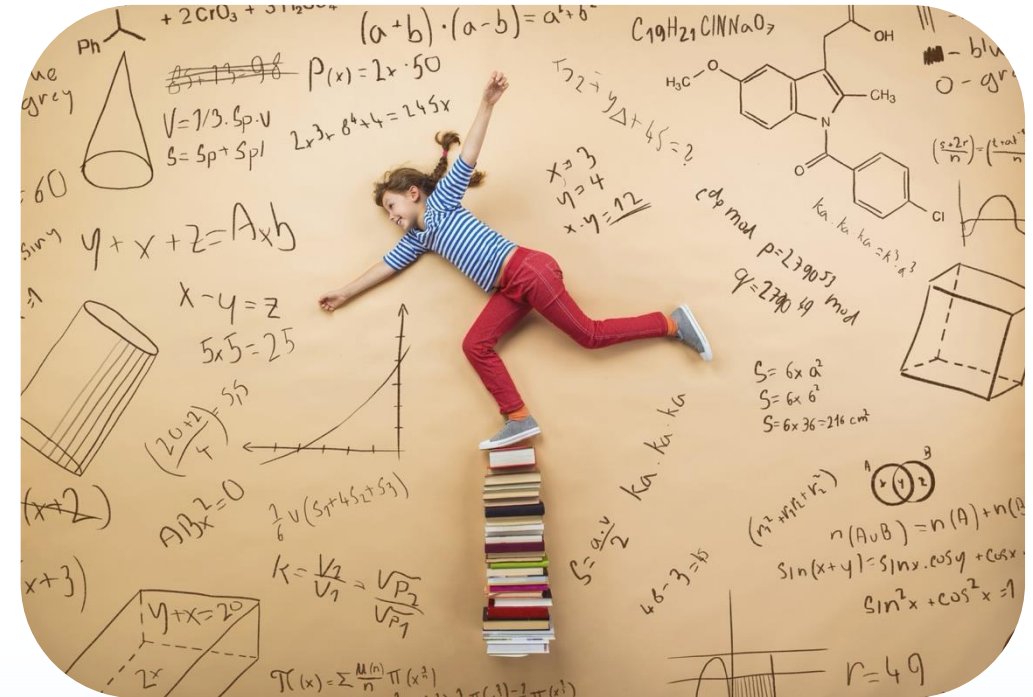
[Article from Science of Learning on youCubed – Supporting Teachers in Developing Productive Classrooms](#)



LEARNING PROGRESSION

- ❖ Conceptual understanding
- ❖ Critical thinking & applying strategies
- ❖ Application & fluency

When learning something new, which stage do you spend the most time in?



LEARNING PROGRESSION

- ❖ Conceptual understanding
- ❖ Critical thinking & applying strategies
- ❖ Application & fluency

How do you know when a student has true conceptual understanding versus surface-level recall?

Productive struggle should be with the math, not the learning tool.



LEARNING PROGRESSION

- ❖ Conceptual understanding
- ❖ Critical thinking & applying strategies
- ❖ Application & fluency

How do you encourage students to compare and choose strategies rather than default to one?



Task selection is key when determining what will promote critical thinking and moving students to apply essential strategies.

LEARNING PROGRESSION

- ❖ Conceptual understanding
- ❖ Critical thinking & applying strategies
- ❖ Application & fluency

How do you help students transfer learning from one context to another?



Real fluency is not blind application of a strategy; it is thinking of the numbers and the situation to apply what makes mathematical sense.

What if students had a resource that:



- ✓ Encouraged productive struggle in a purposeful way
- ✓ Adapted to what each student understands
- ✓ Supported the learning progression from sense-making to strategy to fluency
- ✓ Offered tasks that required real thinking
- ✓ Helped students build confidence through effort and success
- ✓ Created consistent opportunities for long-term understanding

How would that impact students?

What would that mean for teachers?

Design Elements to Support Thinking

Context

- Creates purpose and engagement through **meaningful situations**
- Fairness, challenge, and curiosity spark **student thinking**

Manipulatives

- Students act, explore, and discover **ideas for themselves**
- Scales **authentic “lightbulb” moments** every learner deserves

Hints

- **Just-in-time** clarity that preserves thinking
- Supports explicit instruction **without replacing reasoning**

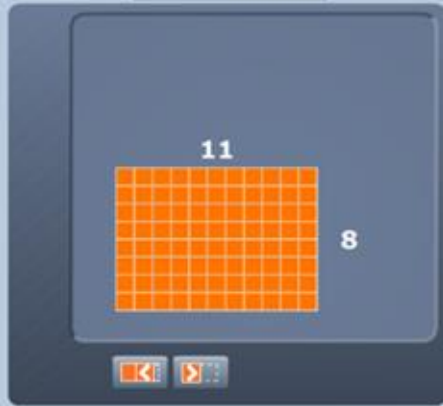
Intentional Numbers

- Numbers shape strategy opportunities, adapt to the learner
- **Standards are the floor, not the ceiling**

 Digital learning experiences should surface student thinking and strengthen the learning progression.



$$8 \times 11$$



Conceptual Understanding

- Sense making and exploration
- Open-ended investigation



Use the helper equations to solve 9×13 .

$$9 \times 13 = 117$$

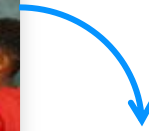
$$9 \times 10 = 90$$

$$9 \times 3 = 27$$



Finding Structure & Relationships

- Develop strategic thinking
- Apply multiple strategies



Select and solve as many equations as you can.



Procedural Skills & Fluency

- Apply strategies accurately, efficiently, & flexibly
- Mental math may be required

Intentional lesson design and progression



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Sandbox Quick Start Guide

Learn more about DreamBox Math and the impact it can have with your students! [Watch this quick overview video](#)

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☐ Go to <https://play.dreambox.com/play/login> to log into our Educator Sandbox Account.

Username:

Password:

 **Helpful Hint:** Use the Navigation Bar across the top to explore DreamBox!

2 Navigating The Home Page

☐ Sort columns by clicking on the header.

 **Helpful Hint:** Use the legend to see how students are doing in their activities.

☐ Lesson Highlights: SEE student thinking in lessons

☐ Alerts & Achievements:

1.800.323.9084

EducationPartnerships@discoveryed.com



Classroom Home Page



Lesson Highlights



Alerts & Achievements



Classroom Progress Report



Classroom Standards Report



Curriculum Guide, Domains



Curriculum Guide, Lessons



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[Click here to Explore DreamBox Math](#)

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