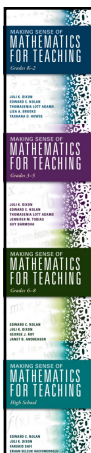


Fighting Fixed Mindsets: Instructional Shifts to Engage Learners

Juli Dixon, Ph.D.
JuliDixonMath@gmail.com
www.DNAMath.com



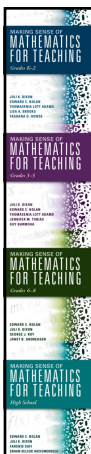
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Divide this:

$$3 \div \frac{1}{7}$$

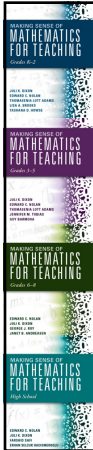
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Goals for this Session

- Make sense of five instructional shifts to support students to engage in mathematical practices.
- Create a shared image of classrooms where teachers are actively fighting fixed mindsets.
- Explore strategies for supporting each and every learner.

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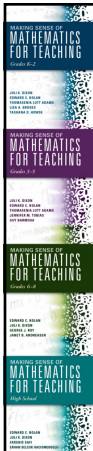


Where do we learn to divide?

In grade 3 – but not with fractions.

Create a word problem to represent $12 \div 4$

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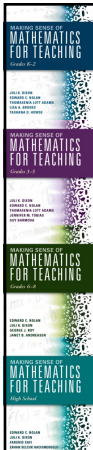
Where do we learn to divide?

In grade 3 – but not with fractions.

Create a word problem to represent $12 \div 4$

How can this help us to make sense of $3 \div \frac{1}{7}$?

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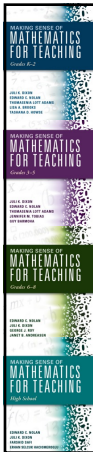


Cultivating Perseverance

- Just-in-case scaffolding
- Just-in-time scaffolding



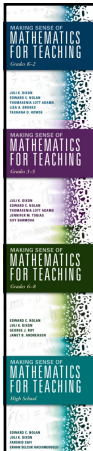
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Five Instructional Shifts

1. Teachers use engaging and multifaceted tasks.
2. Students provide the strategies.
3. Teachers provide strategies "as if" from students.
4. Students do the sense making.
5. Students talk to students.

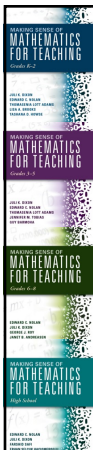
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Shift 1: Teachers use engaging and multifaceted tasks

The right tasks have the potential to provide access to all learners as well as to elicit understandings and common errors.

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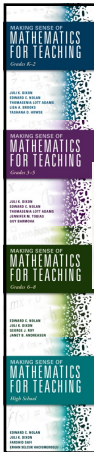


Shift 1: Teachers use engaging and multifaceted tasks

Teachers set the stage for students to provide the strategies.

This has the greatest return on investment if teachers have a plan for what to do with what students provide.

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Shift 1: Teachers use engaging and multifaceted tasks



Four friends go hiking. They bring snacks, a compass, and $3\frac{1}{3}$ quarts of water. If they share the water equally, how many quarts will each person get?

Please use drawings (not an algorithm) to solve this.

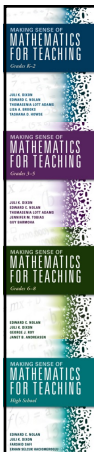
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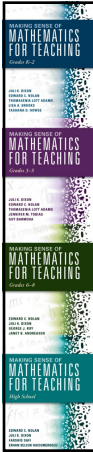


Shift 2: Students provide the strategies

What happens when the teacher uses **Gradual Release of Responsibility (I do, we do, you do)**?

If the goal is for students to provide the strategies, then the teacher can't demonstrate them first!

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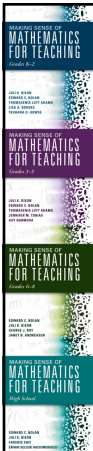


Shift 2: Students provide the strategies

Learning Goal for Grade 1:

Use strategies to add and subtract within 20.

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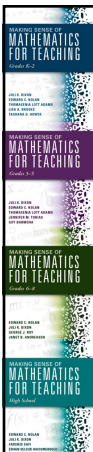


Plan with the TQE Process in Mind



- Tasks** connect to learning goals and help identify student errors.
- Questions** elicit mathematical understandings and common errors.
- Evidence** drives scaffolding and guides extensions.

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Shift 2: Students provide the strategies

What strategies can you use to add 7 and 8?

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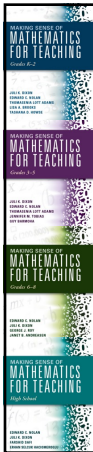
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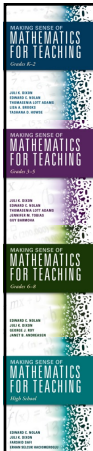
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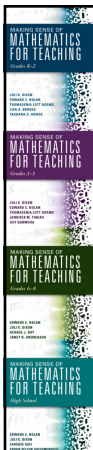
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Shift 3: Teachers provide strategies "as if" from students

Teachers maintain control of the learning target by providing strategies "as if" they came from the students when necessary.

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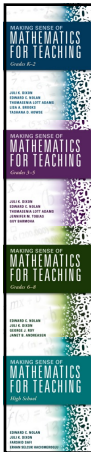
Shift 3: Teachers provide strategies "as if" from students

I saw someone do this....

$$\frac{1}{2} \frac{1}{3} \quad \frac{1}{2} \frac{1}{3} \quad \frac{1}{2} \frac{1}{3} \quad \frac{1}{2} \frac{1}{3}$$

What do you think the student did next? And how would you respond?

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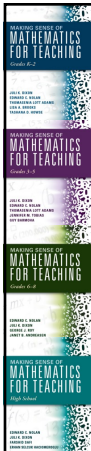
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I saw someone do this....

$\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$

“I heard someone say they added the fractions and got $\frac{2}{5}$ ”

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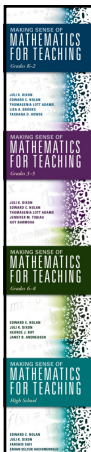
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I saw someone do this....

$\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$

Anticipating student errors may be the most important part of anticipating student thinking.

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Shift 3: Teachers provide strategies “as if” from students

I saw someone do this....

$\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$
 $\frac{1}{2} \frac{1}{3}$

We need to anticipate student errors **and** make space for them...

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HMH



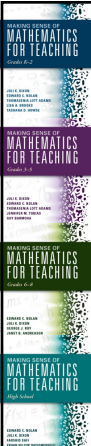
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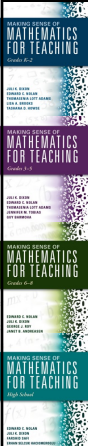


Shift 4: Students do the sense making

Teachers must *expect* students to do the sense making.

Supporting good tasks during instruction is the key – including during small group instruction...

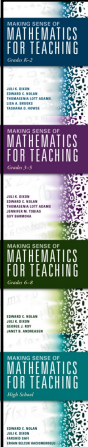
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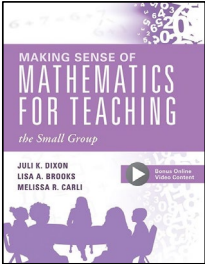


Shift 4: Students do the sense making

Brandon shared 4 cookies equally between himself and his 4 friends. He started by giving each person (including himself) a half of a cookie. What could he have done next?

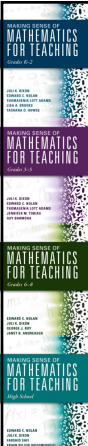
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Making Sense of Mathematics for Teaching the Small Group

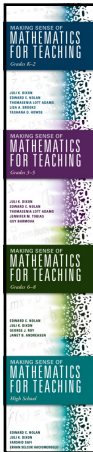
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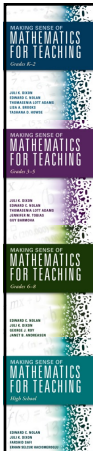


Shift 5: Students talk to students

Teachers set the stage for students to talk to students.

This occurs when the teacher is an active facilitator of instruction.

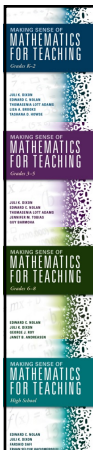
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Discourse Norms

- Provide explanations and justifications with solutions.
- Make sense of others' solutions.
- Communicate when you don't understand or don't agree.

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Shift 5: Students talk to students

Consider this geometry task:

“What 3-dimensional shapes can be created by rotating a 2-dimensional shape about an axis?”

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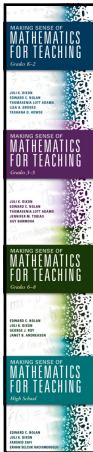
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