


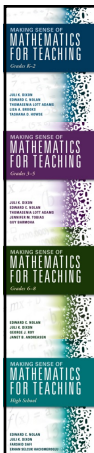
**Fighting Fixed Mindsets:
Instructional Shifts for
Mathematics**

Juli K. Dixon, Ph.D.




Handout:
<http://www.dnamath.com/presentations/>

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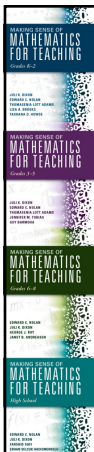


Solve this:

Spark Your Learning 

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?

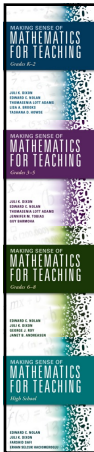
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Goals for this Session

- Make sense of five instructional shifts to support students to engage in mathematical thinking and reasoning.
- Create a shared image of classrooms where teachers actively fight fixed mindsets.
- Examine techniques for supporting each and every learner.

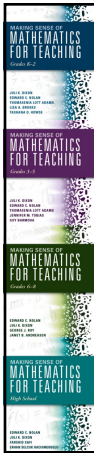
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Five shifts in classroom culture

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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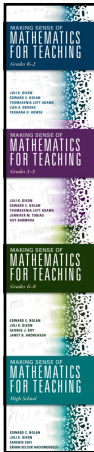


Shift 1: Teachers use engaging and multifaceted tasks

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

Think about the hiking problem. Did it Spark Your Learning?

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Shift 2: Students provide the strategies

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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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

The learning goal should determine the structure of the lesson.

MA.1.NSO.2.2 Add two whole numbers with sums from 0 to 20, and subtract using related facts with procedural reliability.

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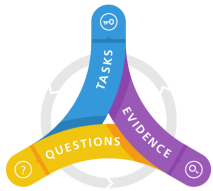
Shift 2: Students provide the strategies

PROBLEM

Stefan has 7 stickers. How many more stickers does he need to have 15 stickers altogether?

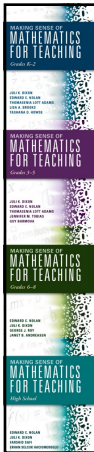
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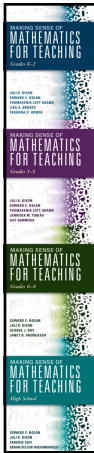
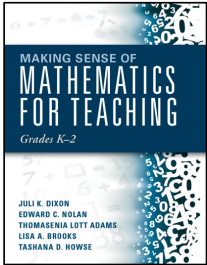
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Shift 2: Students provide the strategies

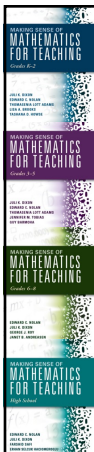
How are all learners supported when students provide the strategies?

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Making Sense of Mathematics for Teaching
Grades K-2

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Plan with the TQE Process in Mind



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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

Let's return to this problem:


Spark Your Learning 

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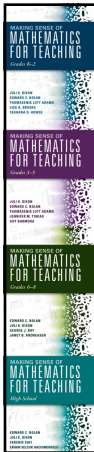
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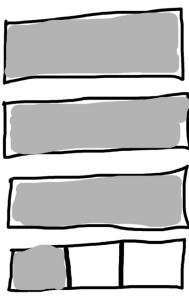
Shift 2: Students provide the strategies

I saw someone do this....

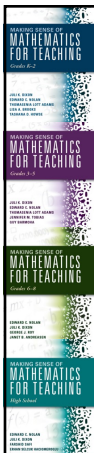


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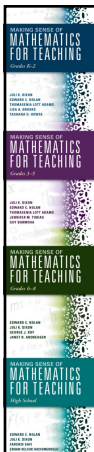
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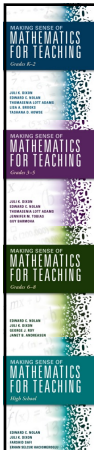
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Shift 3: Teachers provide strategies "as if" from students

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

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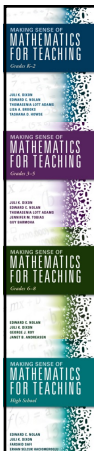
Shift 3: Teachers provide strategies "as if" from students

I saw someone do this....

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

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

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

I saw someone do this....

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

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

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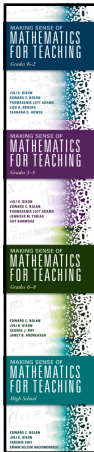




Cultivating Perseverance

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

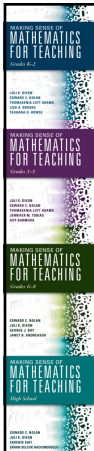
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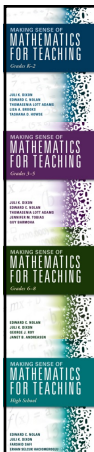
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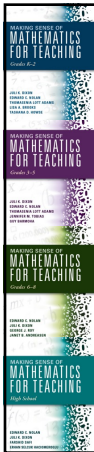
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Shift 4: Students do the sense making

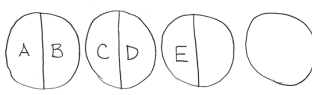
Teachers must *expect* students to do the sense making.

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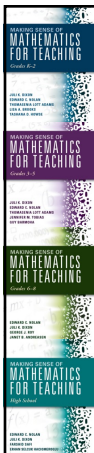


Shift 4: Students do the sense making

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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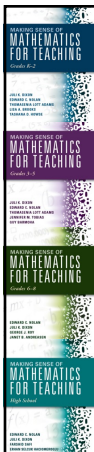


Try this.

Think through the process of adding fractions with unlike denominators without using:

- numerator & denominator, or
- top number & bottom number

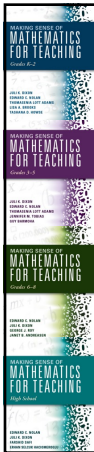
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What happens when you don't use academic vocabulary?

Everyday language should come first – take a lesson from our English Language Learners!

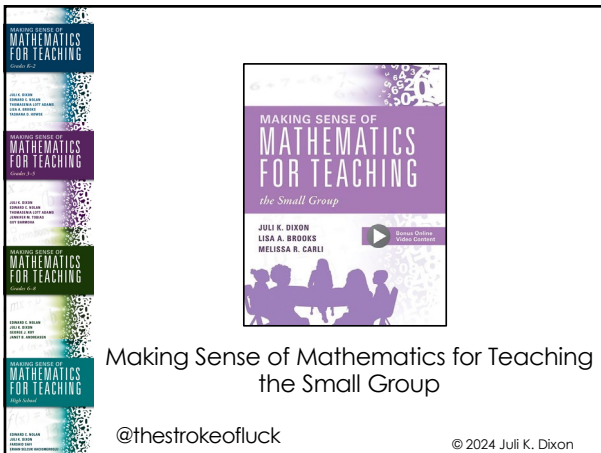
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Academic vocabulary is still important – when you introduce it is what needs to be adjusted.

Introduce academic vocabulary as you connect concepts to procedures.

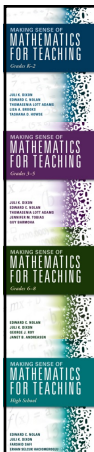
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Making Sense of Mathematics for Teaching
the Small Group

JULI K. DIXON
LISA A. BROOKS
MELISSA R. CARLI

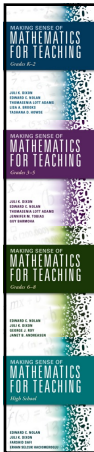
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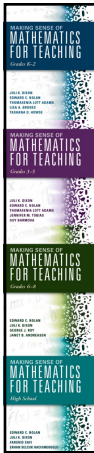


Shift 5: Students talk to students

Teachers set the stage for students to talk to students.

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

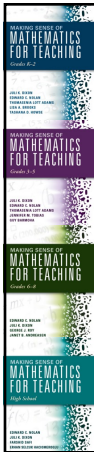
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Discourse Norms

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

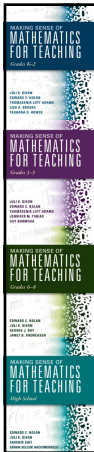
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Five Instructional Shifts

These shifts are for each and every learner...

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Creating a Productive Perspective for Intervention

- How to prioritize helped me to rethink MTSS:
 - What do you do with students are very far behind?
 - Focus on basic facts
 - Reteach everything
 - Focus on prerequisites and teach them for understanding

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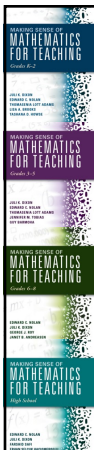


Creating a Productive Perspective for Intervention

- How to prioritize helped me to rethink MTSS:
 - What we need to do:
 - Focus on fact strategies.
 - Use context to make sense of operations.
 - Build to using place value and strategies for multi-digit addition and subtraction.

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