




## Fighting Fixed Mindsets

Juli Dixon, Ph.D.  
[JuliDixonMath@gmail.com](mailto:JuliDixonMath@gmail.com)  
 @julidixon



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

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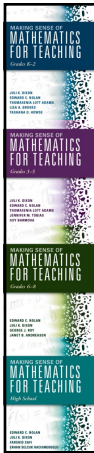
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## Guiding Question

How can we develop the reflective tools and practices of stopping, collaborating, and listening to engage one another and think mathematically together with the goal of creating joy and excitement around the work we do as math educators and leaders?

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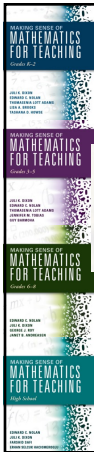
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## Solve this using drawings (no algorithms – at all):

**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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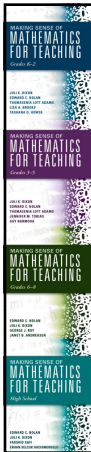
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## Goals for this Session

- Make sense of five culture shifts to promote use of the mathematical practices.
- Create a shared image of classrooms where teachers are actively fighting fixed mindsets.
- Explore strategies to engage and support each and every learner.

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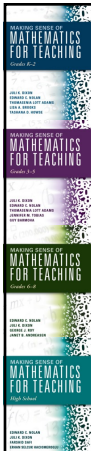
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## Five shifts in classroom culture

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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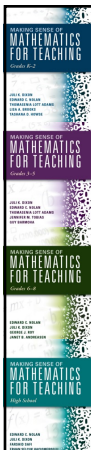
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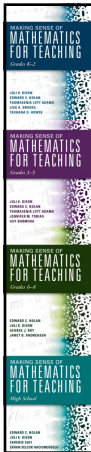
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**Shift 1: Teachers use engaging and multifaceted tasks**

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**

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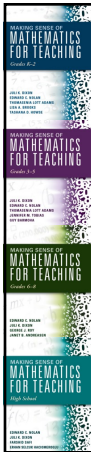
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**Shift 1: Teachers use engaging and multifaceted tasks**

I saw someone do this....

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

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# HMH



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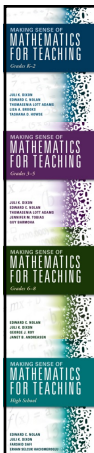
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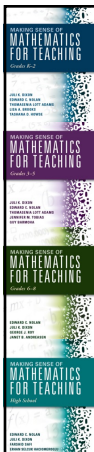
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**Shift 2: Students provide the strategies**

How are all learners supported when students provide the strategies?

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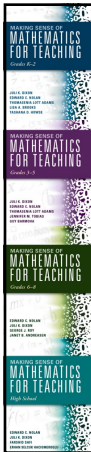
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### Shift 2: Students provide the strategies

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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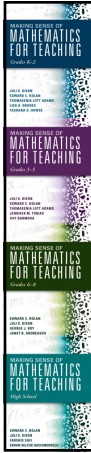
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### Shift 2: Students provide the strategies

The learning goal should determine the structure of the lesson.

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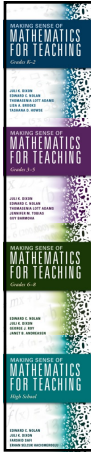
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### Plan with the TQE Process in Mind



- **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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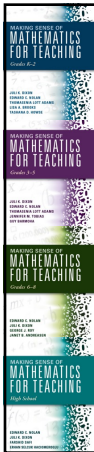
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Shift 2: Students provide the strategies

Teachers set the stage for students to provide the strategies.

What does this look like in grade 1?

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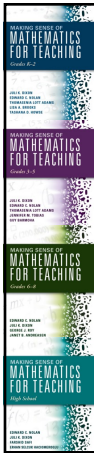
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Shift 2: Students provide the strategies

Learning Goal for Grade 1:  
Use strategies to addition and subtract within 20.

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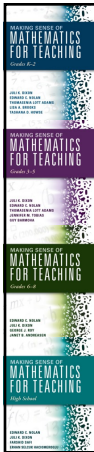
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Shift 2: Students provide the strategies

What strategies can you use to add 7 and 8?

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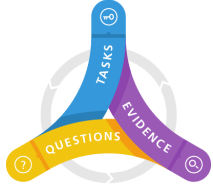
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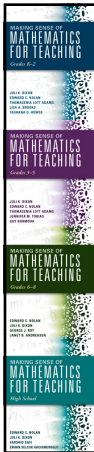
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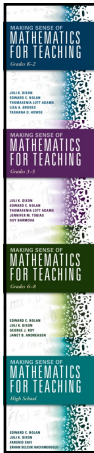
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## Five shifts in classroom culture

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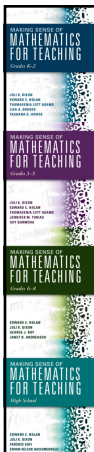
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### Shift 3: Teachers provide strategies "as if" from students

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

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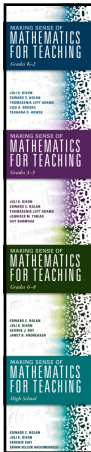
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Shift 3: Teachers provide strategies "as if" from students

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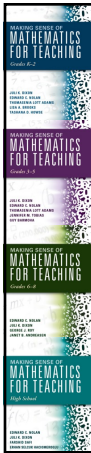
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Shift 3: Teachers provide strategies "as if" from students

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

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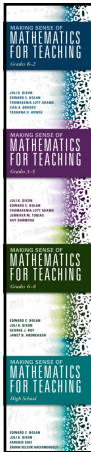
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Shift 3: Teachers provide strategies "as if" from students

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

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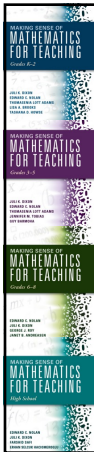
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Don't underestimate...

the power of "shush" 😊



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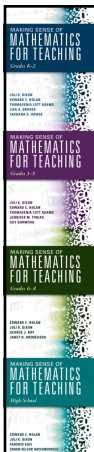
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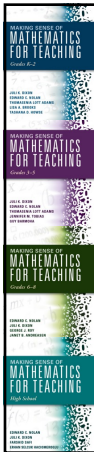
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### Culture Shift 4: Students do the sense making

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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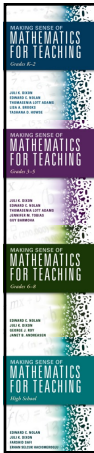
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### Culture Shift 4: Students do the sense making

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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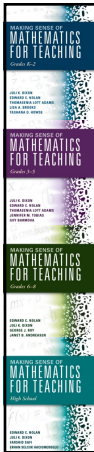
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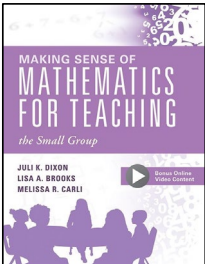

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### Making Sense of Mathematics for Teaching the Small Group

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**MATHEMATICS FOR TEACHING**  
 GRADE 2-5  
 JULIE BEALL  
 CHRISTOPHER BEALL  
 LARRY SHULTZ  
 FRANCIS STANLEY

## Cultivating Perseverance

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



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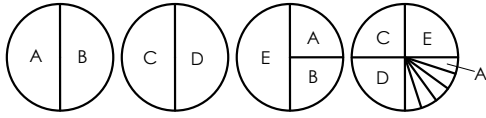
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**MATHEMATICS FOR TEACHING**  
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## Eliciting Student Errors



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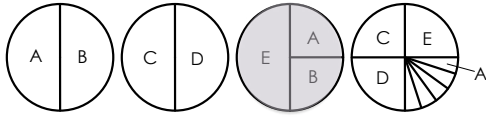
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**MATHEMATICS FOR TEACHING**  
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## Eliciting Student Errors



What was the thinking behind the common error of  $\frac{1}{3}$ ?

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**Eliciting Student Errors**

What was the thinking behind the common error of  $\frac{1}{5}$ ?

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**Culture Shift 4: Students do the sense making**

Teachers must expect students to do the sense making. This goes for high school too 😊.

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**Culture Shift 4: Students do the sense making**

Consider this geometry task:

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

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**MATHEMATICS FOR TEACHING**  
Volume 1: Middle School

**MATHEMATICS FOR TEACHING**  
Volume 2: Elementary

**MATHEMATICS FOR TEACHING**  
Volume 3: Middle School

**MATHEMATICS FOR TEACHING**  
High School

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Five shifts in classroom culture

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Culture 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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Consider this task:

**Spark Your Learning**

Imagine you are studying monkeys and how they move. Each monkey has 2 arms and 2 legs. Choose any number of monkeys from 1 to 9 to study. How many arms and legs are there?



Show your thinking.

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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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# HMH



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## Goals for this Session

- Make sense of five culture shifts to promote use of the mathematical practices.
- Create a shared image of classrooms where teachers are actively fighting fixed mindsets.
- Explore strategies to engage and support each and every learner.

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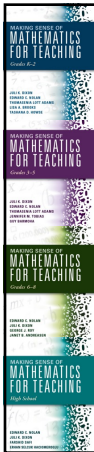


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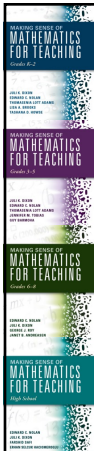
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### Guiding Question

How can we develop the reflective tools and practices of stopping, collaborating, and listening to engage one another and think mathematically together with the goal of creating joy and excitement around the work we do as math educators and leaders?

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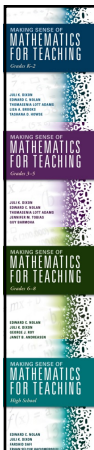
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### Guiding Response

- We need to get in the habit of **doing math** together.
- We need to spend more of our PLC time **planning for student responses** rather than exclusively looking at responses that have already occurred.
- We need to engage in **self care** so that we have the capacity to care for others.

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