

**Fighting Fixed Mindsets:  
 Five Classroom Culture  
 Shifts for Mathematics  
 Teaching and Learning**

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[www.DNAMath.com](http://www.DNAMath.com)

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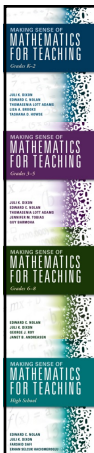
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Solve this:

Connect Concepts and Skills  
3 **Concepts**

Name:

**Explore Division of Mixed Numbers**

**1 Can** find the quotient of a mixed number or fraction and a mixed number, fraction, or whole number.

**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?

Do not use an algorithm.

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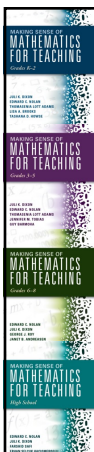
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Solve this:

**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?

Once you solve the problem, think about how students in grade 5 or 6 might solve it.

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## Goals for this Session

- Make sense of five culture 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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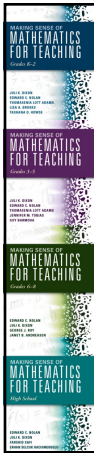
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## Five shifts in classroom culture

1. Students provide the strategies.
2. Teacher provides strategies "as if" from students.
3. Students create the context.
4. Students do the sense making.
5. Students talk to students.

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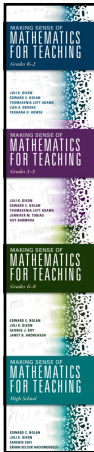
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## Culture Shift 1: Students provide the strategies

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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**Culture Shift 1: Students provide the strategies**

Let's return to this problem:

**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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**Culture Shift 1: Students provide the strategies**

I saw someone do this....



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**Culture Shift 1: Students provide the strategies**

I saw another student do this....



What do you think the student did next?

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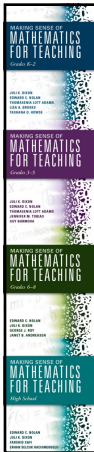
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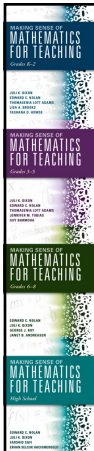
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Culture Shift 2: Teacher provides strategies "as if" from students

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

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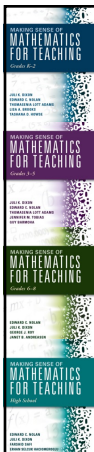
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Culture Shift 2: Teacher provides strategies "as if" from students

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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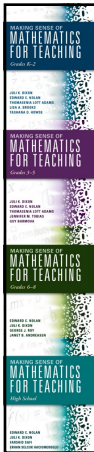
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Don't underestimate...

the power of "shush" ☺

Blog: <https://tinyurl.com/yyz6alrl>

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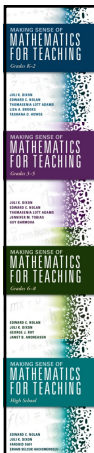
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Culture Shift 2: Teacher provides strategies "as if" from students

I saw someone do this....

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

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

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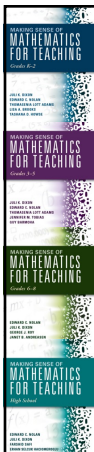
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Culture Shift 2: Teacher provides strategies "as if" from students

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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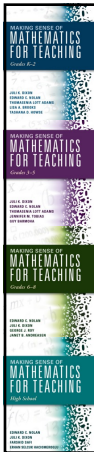
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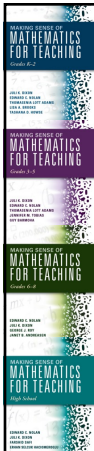
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Five shifts in classroom culture

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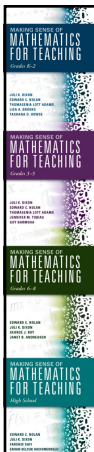
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Culture Shift 3: Students create the context

Creating context helps to create meaning.

Consider these problems:

$$3\frac{1}{3} \div 4 \text{ versus } 3\frac{1}{4} \div \frac{3}{4}$$

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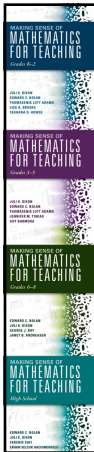
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Culture Shift 3: Students create the context

$$3\frac{1}{3} \div 4$$

If four friends share  $3\frac{1}{3}$ -quarts of water equally, how much of a quart will each friend get?

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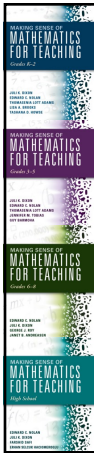
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Culture Shift 3: Students create the context

$$3\frac{1}{4} \div \frac{3}{4}$$

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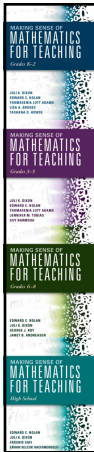
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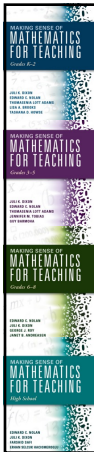
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**Culture Shift 4: Students do the sense making**

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

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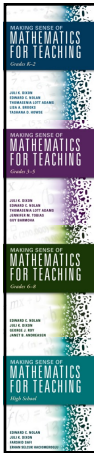
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**Culture Shift 4: Students do the sense making**

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

If the goal is for students to do the sense making, then the teacher can't demonstrate how to do the problem first!

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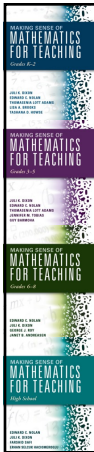
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**Culture Shift 4: Students do the sense making**

High school geometry students answer the question:

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

How does the teacher shift the focus to the students?

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Mifflin  
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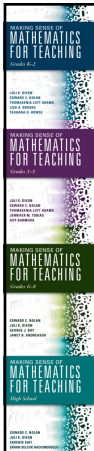
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## Cultivating Perseverance

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

Blog: <https://tinyurl.com/y5pcxcoq>

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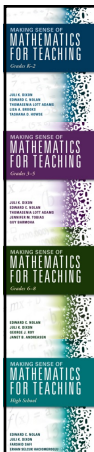
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## Plan with the TQE Process in Mind



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

Learning Goal for Grade 1:

Add two whole numbers with sums to 20 by choosing a method that can be used reliably.

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

What strategies can you use to add 7 and 8?

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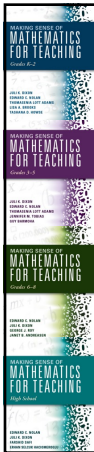
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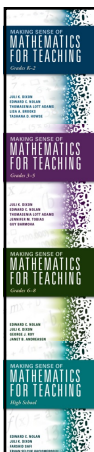
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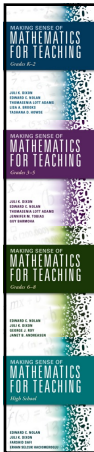
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## Discourse Norms

- 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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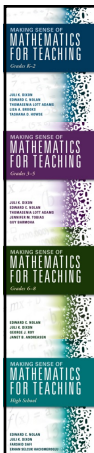
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## Culture Shift 5: Students talk to students

Teachers set the stage for students to talk to students.

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

This takes substantial planning, so be reasonable.

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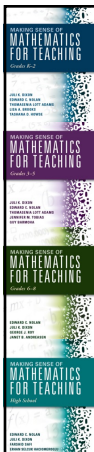
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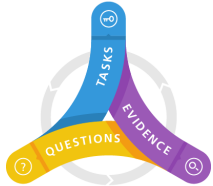
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