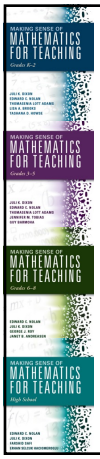
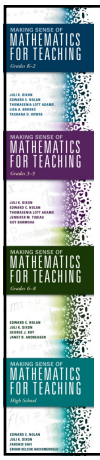


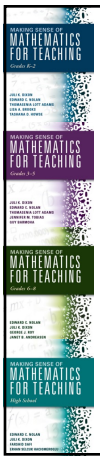
Fighting Fixed Mindsets: Five Shifts for Teaching and Learning Elementary Mathematics

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



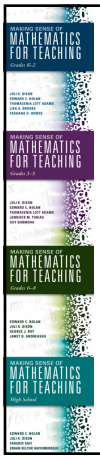
Divide this:

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



Goals for this Session

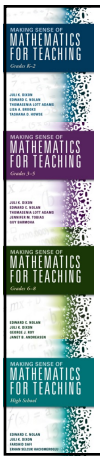
- Make sense of five instructional shifts to support students to engage in mathematical practices.
- Create a shared image of classrooms where teachers are actively fighting fixed mindsets.
- Explore strategies for supporting each and every learner.



Where do we learn to divide?

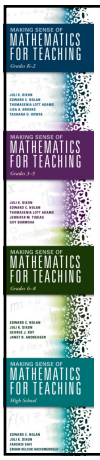
In grade 3 – but not with fractions.

Create a word problem to represent 12 ÷ 4



Cultivating Perseverance

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



Five Instructional Shifts

1. Teachers use engaging and multifaceted tasks.
2. Students provide the strategies.
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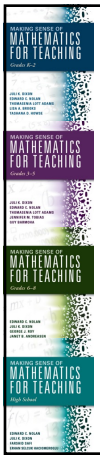

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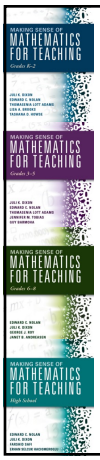
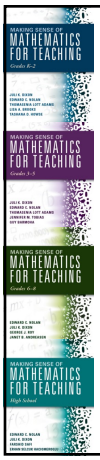


Shift 1: Teachers use engaging and multifaceted tasks

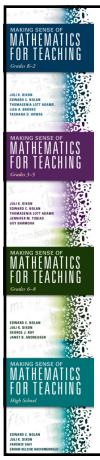
The right tasks have the potential to provide access to all learners as well as to elicit understandings and common errors.



Shift 1: Teachers use engaging and multifaceted tasks

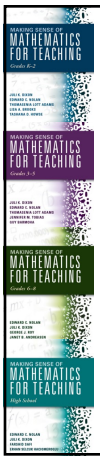
Teachers set the stage for students to provide the strategies.

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



Plan with the TQE Process in Mind

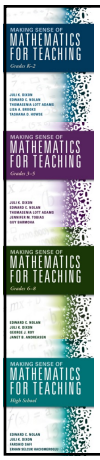
- **Tasks** connect to learning goals and help identify student errors.
- **Questions** elicit mathematical understandings and common errors.
- **Evidence** drives scaffolding and guides extensions.



Shift 1: Teachers use engaging and multifaceted tasks

Learning Goal for Grade 1:

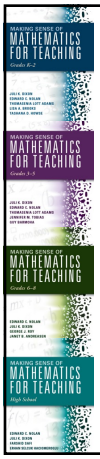
Use strategies to add and subtract within 20.



Shift 1: Teachers use engaging and multifaceted tasks

What strategies can you use to add 7 and 8?

What makes this task engaging and multifaceted?



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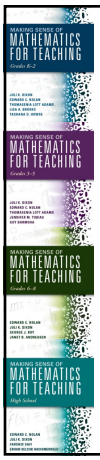
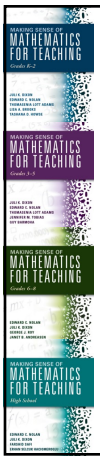


Shift 2: Students provide the strategies

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

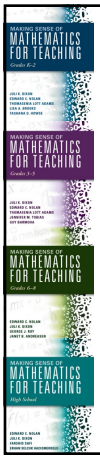
If the goal is for students to provide the strategies, then the teacher can't demonstrate them first!



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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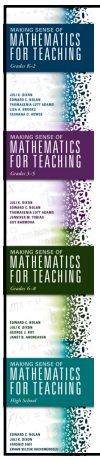

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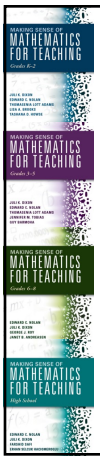

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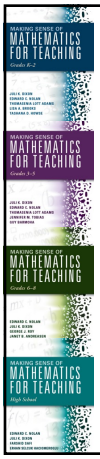
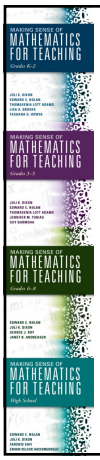


Shift 3: Teachers provide strategies "as if" from students

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



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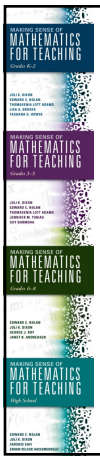
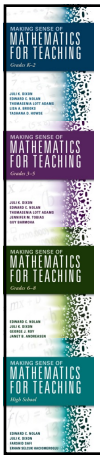


Shift 4: Students do the sense making

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

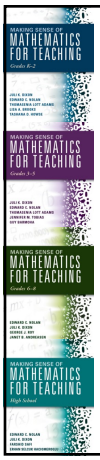
It can be frustrating for students at first – a reminder might be helpful ☺.



Shift 4: Students do the sense making

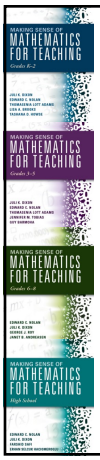
Teachers must *expect* students to do the sense making.

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



Shift 4: Students do the sense making

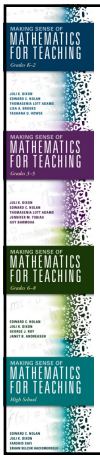
Brandon shared 4 cookies equally between himself and his 4 friends. He started by giving each person (including himself) a half of a cookie. What could he have done next?



Try this.

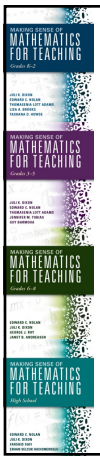
Talk through the process of adding the fractions without using:

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



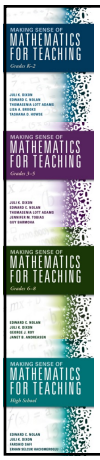
What happens when you don't use academic vocabulary?

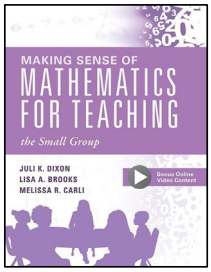
Everyday language should come first – take a lesson from our English Language Learners!



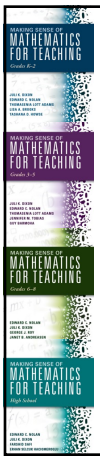
Academic vocabulary is still important – when you introduce it is what needs to be adjusted.

Introduce academic vocabulary only after students have the opportunity to explore the concept.

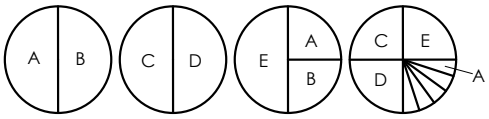


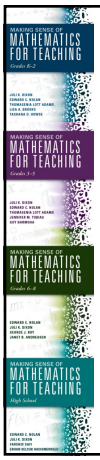


Making Sense of Mathematics for Teaching the Small Group



Eliciting Student Errors





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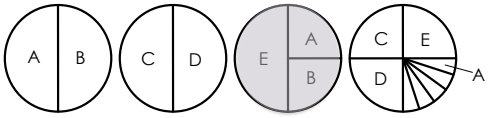
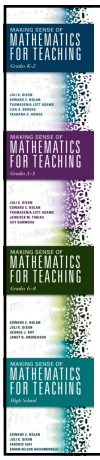


What was the thinking behind the common error of $\frac{1}{3}$?



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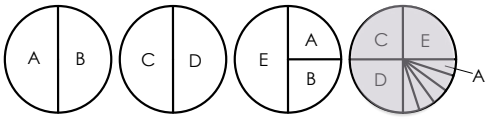

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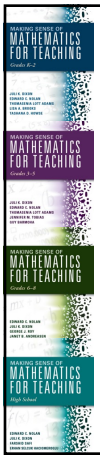

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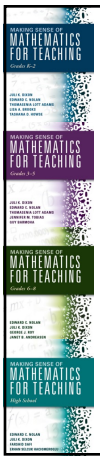
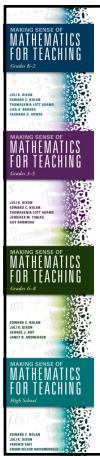


Shift 5: Students talk to students

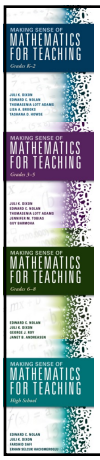
Teachers set the stage for students to talk to students.

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



Discourse Norms

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

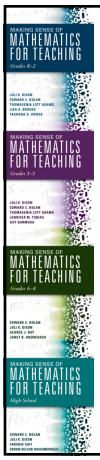


Consider this task:

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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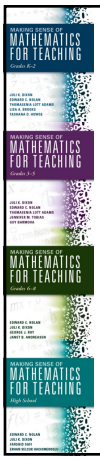

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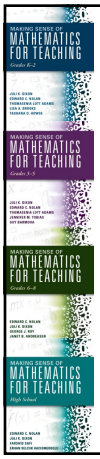

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