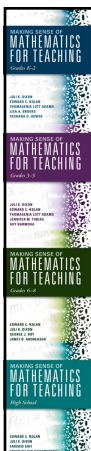


Fighting Fixed Mindsets: Instructional Shifts to Engage Learners

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

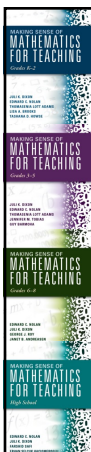
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Divide this:

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

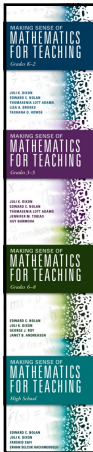
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Goals for this Session

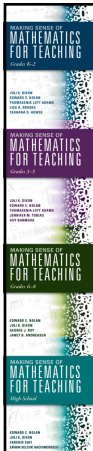
- Make sense of five instructional shifts to promote student engagement.
- Create a shared image of classrooms where teachers are actively fighting fixed mindsets.
- Explore strategies to support learners who struggle with unfinished learning as well as those who don't.

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Where do we learn to divide?

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Where do we learn to divide?

Grade 2

- Work with equal groups.

Grade 3

- Represent and solve problems involving division.
- Develop understanding of fractions as numbers.

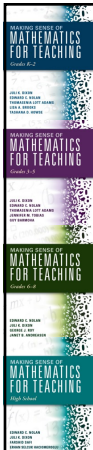
Grade 5

- Apply and extend previous understandings of division to divide fractions.

Grade 6

- Fluently divide fractions.

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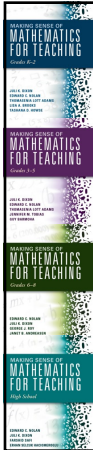


Where do we learn to divide?

In grade 3 – but not with fractions.

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

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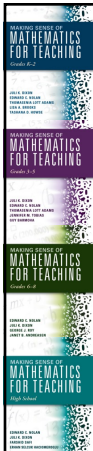
Where do we learn to divide?

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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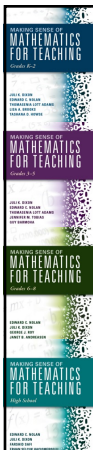


Cultivating Perseverance

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



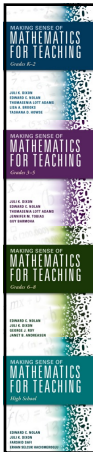
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Five Instructional Shifts

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.

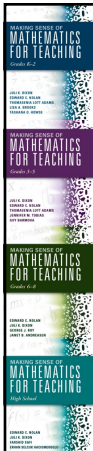
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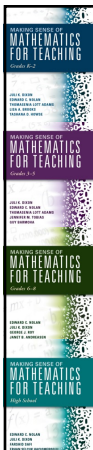
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Shift 1: Teachers use engaging and multifaceted tasks

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.

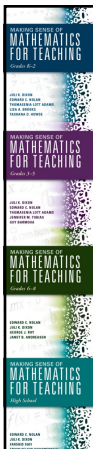
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The importance of a good task.

PROBLEM

Douglas ordered 5 small pizzas during the great pizza sale. He ate $\frac{1}{8}$ of one pizza and wants to freeze the remaining $4\frac{5}{8}$ pizzas. Douglas decides to freeze the remaining pizza in serving-size bags. A serving of pizza is $\frac{2}{8}$ of a pizza. How many servings can he make if he uses up all the pizza?

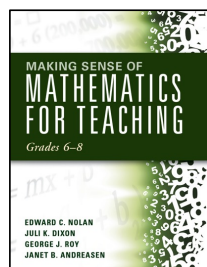
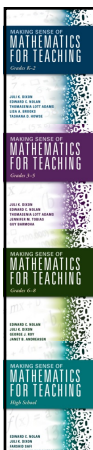
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Discourse Norms

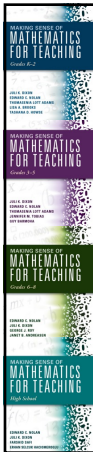
- Provide explanations and justifications with solutions.
- Make sense of others' solutions.
- Communicate when you don't understand or don't agree.

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Making Sense of Mathematics
for Teaching Grades 6-8

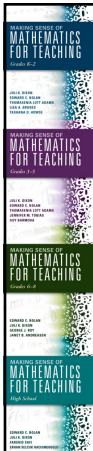
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Five Instructional Shifts

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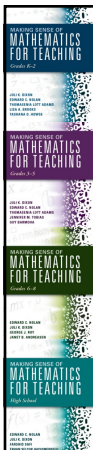
Shift 2: Students provide the strategies

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!



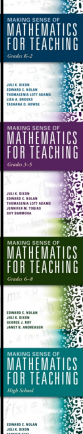
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Shift 2: Students provide the strategies

The learning goal should determine the structure of the lesson.

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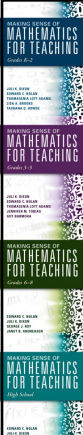


Plan with the TQE Process in Mind



- **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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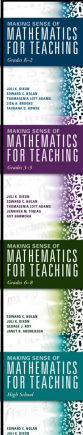


Shift 2: Students provide the strategies

Teachers set the stage for students to provide the strategies.

What does this look like in grade 1?

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Shift 2: Students provide the strategies


Learning Goal for Grade 1:

Use strategies to add and subtract within 20 when the problem is presented in context.

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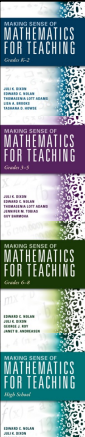


Plan with the TQE Process in Mind



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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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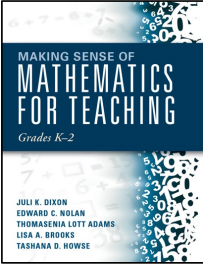

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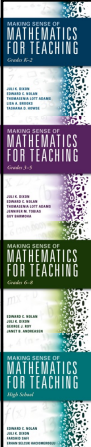
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Making Sense of Mathematics for Teaching Grades K-2

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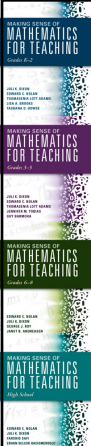


Plan with the TQE Process in Mind



- **Tasks** connect to learning goals and help identify student errors.
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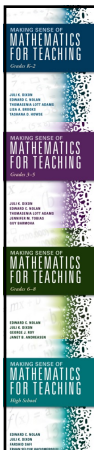
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Five Instructional Shifts

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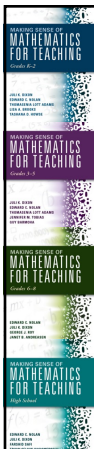
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Shift 3: Teachers provide strategies “as if” from students

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

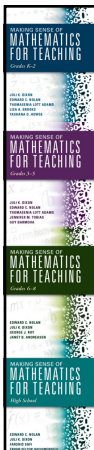
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Shift 4: Students do the sense making

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

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

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Plan with the TQE Process in Mind

- **Tasks** connect to learning goals and help identify student errors.
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Shift 4: Students do the sense making

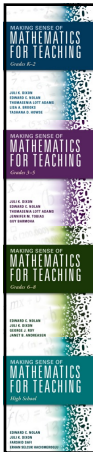
Brandon shared 4 cookies equally between himself and his 4 friends. He started by giving each person (including himself) a half of a cookie. What could he have done next?

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What happens when you don't use academic vocabulary?

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

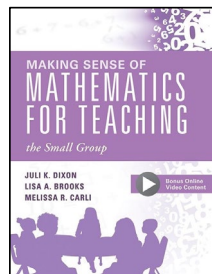
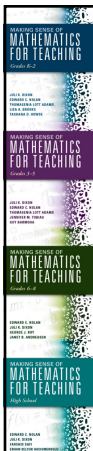
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Academic vocabulary is still important – when you introduce it is what needs to be adjusted.

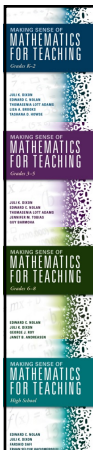
Introduce academic vocabulary only after students have the opportunity to explore the concept.

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Making Sense of Mathematics for Teaching the Small Group

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Plan with the TQE Process in Mind



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Eliciting Student Errors

[illegible]

Eliciting Student Errors

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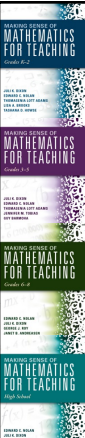
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A B C D E A B C E D B

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

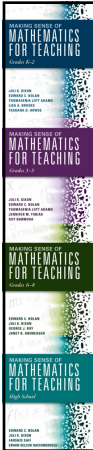
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Shift 5: Students talk to students

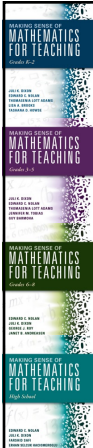
Teachers set the stage for students to talk to students.

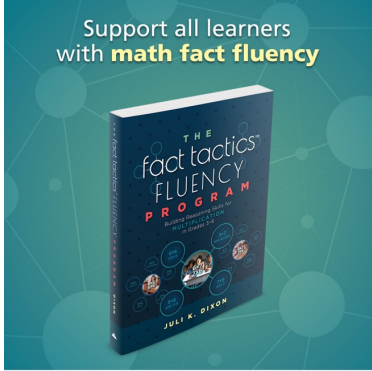
This occurs when the teacher is an active facilitator of instruction.

This takes planning.

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Support all learners with **math fact fluency**

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