


## Reinventing Mathematics Intervention: Making Time for Understanding

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



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## Why do we intervene?

What is the purpose of intervention?

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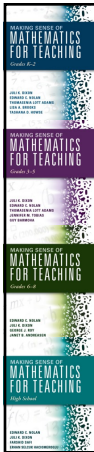
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## Session Goals

- Examine current structures for intervention.
- Explore six features for reinventing intervention.
- Share a plan to initiate the reinvention.

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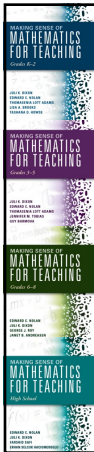
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**Why do we intervene?**

What is the purpose of intervention?

- ✓ Reteach
- ✓ Address gaps in foundational skills

Is this accomplishing your goals?  
Are students succeeding?

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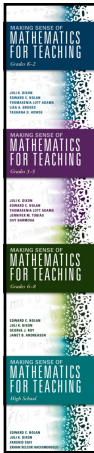
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**Why do we intervene?**

What is the purpose of intervention?

- ✓ Reteach
- ✓ Address gaps in foundational skills
- ✓ Develop conceptual understanding

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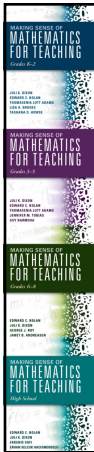
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**Why do we intervene?**

What is the purpose of intervention?

How do we make intervention purposeful?

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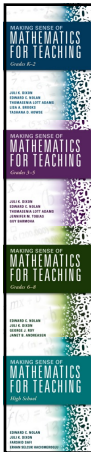
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## Six Features for Re-Inventing Intervention

1. Focus on conceptual development.
2. Connect concepts and procedures.
3. Prioritize a strategic selection of content.
4. Support discourse through engaging tasks and targeted questioning.
5. Elicit and linger on common errors.
6. Provide professional development focused on content knowledge for teaching for all interventionists.

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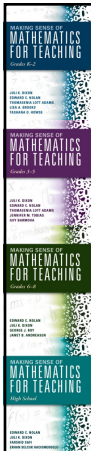
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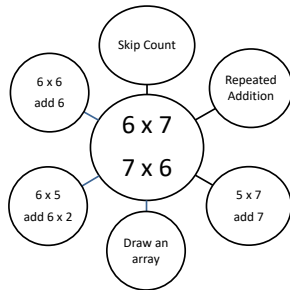
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What strategies might students use to determine the product of  $6 \times 7$  if they did not know it?



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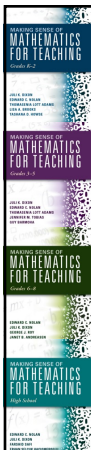
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What mathematics is involved in each strategy?

- Drawing
- Counting Strategies
- Multiplicative Reasoning

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Label each strategy as:

- Drawing,
- Counting Strategies, or
- Multiplicative Reasoning

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$6 \times 7$

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Label each strategy as:

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Grade 2

**MATHEMATICS FOR TEACHING**  
Grade 3

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Grade 4

**MATHEMATICS FOR TEACHING**  
High School

$6 \times 7 = 7 + 7 + 7 + 7 + 7 + 7$

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Label each strategy as:  
 • Drawing,  
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Label each strategy as:  
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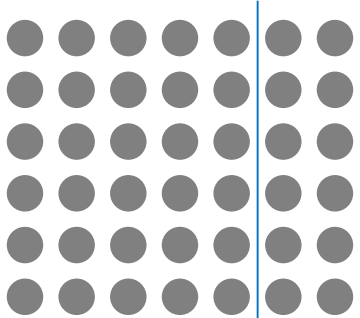
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$6 \times 7 = (6 \times 5) + (6 \times 2)$



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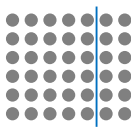
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Notice the connections between concepts and procedures.



$6 \times 7 = 6 \times (5 + 2) = (6 \times 5) + (6 \times 2)$

The distributive property of multiplication over addition.

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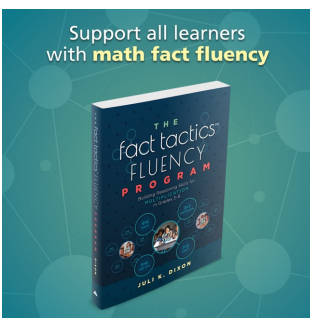

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Support all learners with **math fact fluency**

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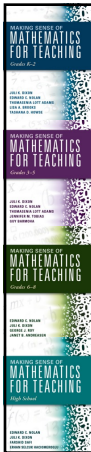
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## Six Features for Re-Inventing Intervention

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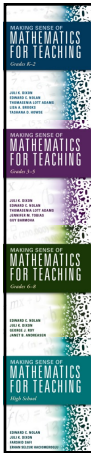
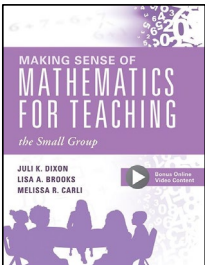
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## Making Sense of Mathematics for Teaching the Small Group

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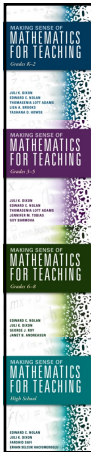
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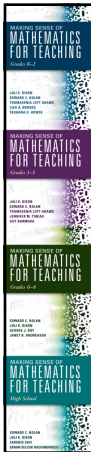
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## Purposeful Content

What content is prerequisite to making sense of basic facts?

What content is prerequisite to making sense of multidigit addition?

What content is prerequisite to making sense of multidigit multiplication and division?

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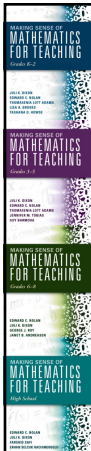
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## Purposeful Content

What do we focus on with students who are significantly far behind?

This needs to be a deep conversation.

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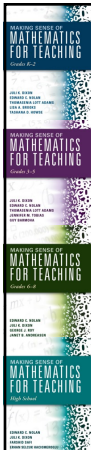
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## Purposeful Content

What do we focus on with students who are significantly far behind?

- Meaning of Operations
- Fact Strategies
- Place Value
- Multidigit Addition and Subtraction
- Estimation (with whole numbers, fractions, and decimals!)

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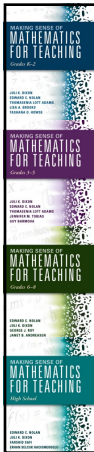
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## Priority Topics

Grades 3-5	Grades 6-7
<ul style="list-style-type: none"> <li>• Meaning of Operations</li> <li>• Fact Strategies</li> <li>• Place Value</li> <li>• Multidigit Addition and Subtraction</li> <li>• Estimation (with whole numbers, fractions, and decimals!)</li> </ul>	<ul style="list-style-type: none"> <li>• Fraction Operations</li> <li>• Equivalent Ratios</li> <li>• Integer Operations</li> <li>• Equivalent Expressions</li> </ul>

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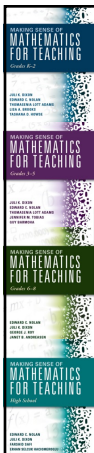
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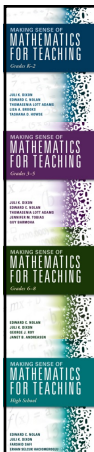
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## Purposeful Grouping

- Norms
- Teacher's and Students' Roles
- Grouping

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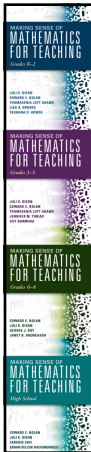
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## Discourse Norms

- 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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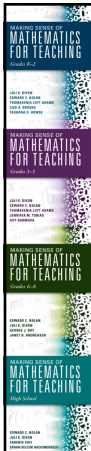
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## Plan with the TQE Process in Mind



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

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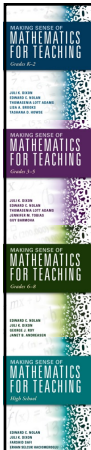
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## Purposeful Grouping

- Grouping
  - Homogeneous

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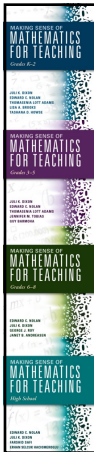
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## Purposeful Grouping

Low Performing	Low Performing
Low Performing	Low Performing

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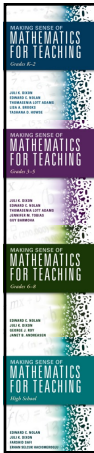
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## Purposeful Grouping

- Grouping
  - Homogeneous
  - Moderately Heterogeneous

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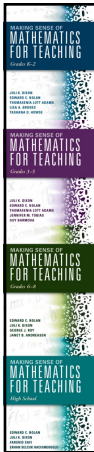
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## Purposeful Grouping

Beyond proficient	Proficient
Almost proficient	Not yet proficient

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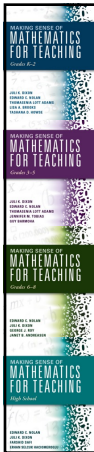
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## Purposeful Grouping

Beyond proficient	Proficient	Proficient	Almost Proficient
Proficient	Almost Proficient	Almost Proficient	Not yet proficient

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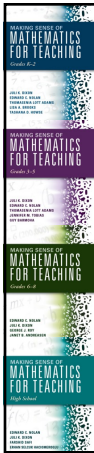
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## Purposeful Grouping

- Grouping
  - Homogeneous
  - Moderately Heterogeneous

Notice how the differences in learners leads to productive discourse.

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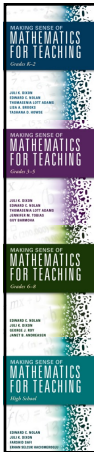
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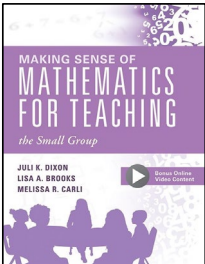

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## Making Sense of Mathematics for Teaching the Small Group

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**Plan with the TQE Process in Mind**



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

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**Choose just the right tasks you know students will get wrong.**

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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**Choose just the right tasks you know students will get wrong.**

So how much of a cookie would person A get?



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MAKING SENSE OF  
**MATHEMATICS FOR TEACHING**  
*the Small Group*

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

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MAKING SENSE OF  
**MATHEMATICS FOR TEACHING**  
Elementary

MAKING SENSE OF  
**MATHEMATICS FOR TEACHING**  
Middle

MAKING SENSE OF  
**MATHEMATICS FOR TEACHING**  
High School

## Making Sense of Mathematics for Teaching the Small Group

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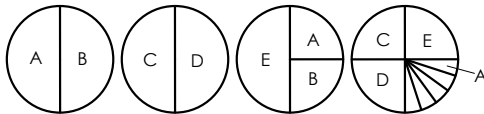
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## Eliciting Student Errors



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## Eliciting Student Errors

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

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## Eliciting Student Errors

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

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## Where do we start?

- Prioritize content.
- Begin with concepts and link to procedures.
- Provide teacher supports so that worthwhile tasks are used and supported by productive discourse.

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