

Framing Mathematics Instruction with the TQE Process

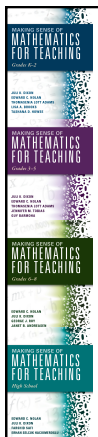
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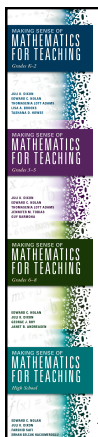
The Importance of a Good Task

PROBLEM

Write a word problem to support fraction division.

Compare your problem with the problem of someone near you.

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Goals

- Experience mathematics as a learner in order to make sense of mathematics for teaching.
- Explore the TQE Process as a framework for improving student achievement.
- Create a plan to implement the TQE Process in your school or district.

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Plan with the TQE Process in mind

- **Tasks** – connect to learning goal and help identify misconceptions.
- **Questions** – highlight mathematical practices and uncover misconceptions.
- **Evidence** – describes misconceptions and guides necessity of providing scaffolding and offering extensions.

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Classroom Norms

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

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PROBLEM

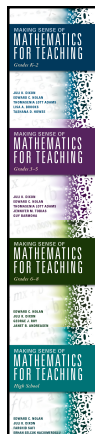
Consider this equation:

$$x^2 - 4x = 5$$

How can thinking of this as $f(x) = g(x)$ and sketching each function help to determine the number of solutions to this equation?

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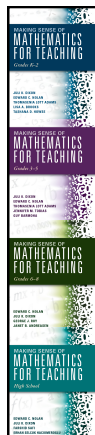
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Consider these high school students as they make sense of the same task.

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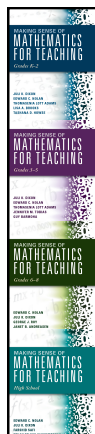
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Plan with the TQE Process in Mind



- What learning goal might be supported by this Task?
- What Questions could be asked to engage students in the Mathematical Practices?
- What Evidence of learning and misconceptions would you look for during instruction?

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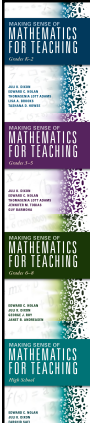
Reflection

- What did you notice about the selected task and how it was supported?
- What is important about what you noticed?
- How will you apply what you noticed?

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The Importance of a Good Task

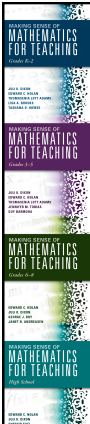
PROBLEM

Show me 24.

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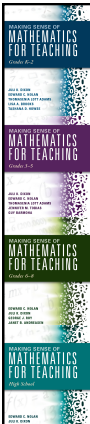


Consider this Kindergarten class as they make sense of the same task.

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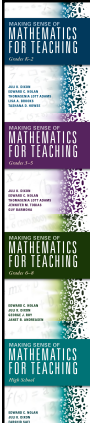
What did you notice?

What questions do you have?

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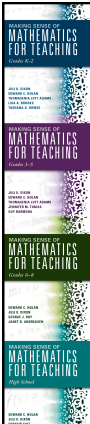


Plan with the TQE Process in mind



- Select appropriate **T**asks to support identified learning goals,
- Facilitate productive **Q**uestioning during instruction to engage students in the Mathematical Practices, and
- Collect and use student **E**vidence in the formative assessment process during instruction.

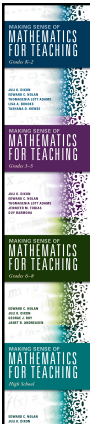
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With which practice(s) were these students engaged?

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

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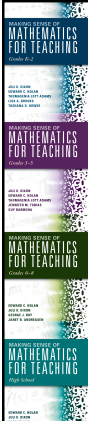
Questions to ask yourself or those you support in teaching:

Consider your current or upcoming unit:

- What are the important standards?
- Which lessons most clearly support those standards?
- What is the “focus task” for each “important” lesson?

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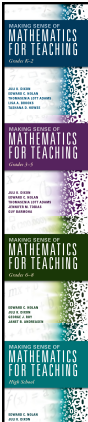
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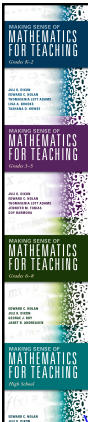


Revisit the Goals

- Experience mathematics as a learner in order to make sense of mathematics for teaching.
- Explore the TQE Process as a framework for improving student achievement.
- Create a plan to implement the TQE Process in your school or district.

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