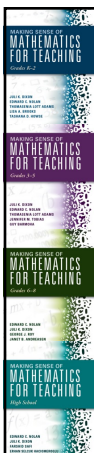


Supporting the Journey: Using Questioning to Make the Most of Concrete, Representational, and Abstract Experiences

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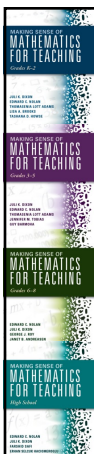
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Goals for this Session

- Explore how concrete, representational, and abstract explorations influence sense making.
- Examine the role of questioning in supporting students to transition between types of experiences.
- Discuss how each type of experience supports the process of making mathematics learning visible.

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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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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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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?

Please use fraction tiles or drawings to solve. Do not use an algorithm.

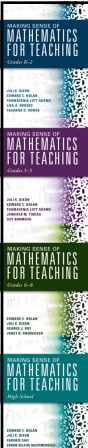
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Cultivating Perseverance

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



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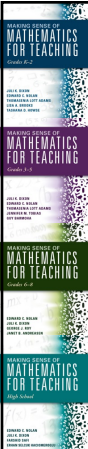


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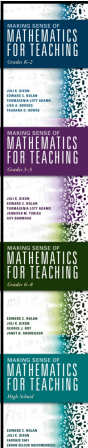


I saw someone do this....



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

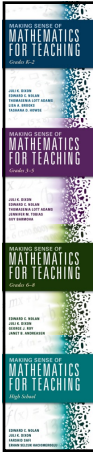
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I saw another student do this....



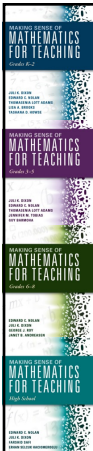
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HMH

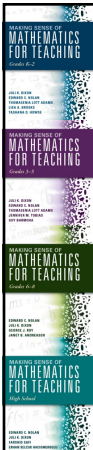


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What if our goal is to make sense of the algorithm?

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What if our goal is to make sense of the algorithm?

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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Plan with the TQE Process in Mind

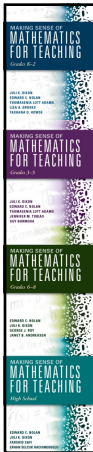


- **Tasks** connect to learning goals and help identify student errors.
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How much of the total water will each friend get if 4 friends share the water?

How much of the total water will each friend get if 4 friends share the water?



How much of the total water will each friend get if 4 friends share the water?

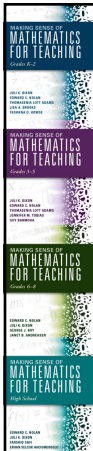
$$3\frac{1}{3} \div 4 \quad \text{or} \quad \frac{1}{4} \times 3\frac{1}{3}$$

$$\frac{1}{4} \times \frac{10}{3} = ?$$

$$\frac{1}{4} \times \frac{20}{6} = \frac{5}{6}$$

Making sense of algorithms is not minor!!

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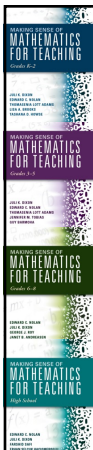


How much of the total water will each friend get if 4 friends share the water?

$$3\frac{1}{3} \div 4 \quad \text{or} \quad \frac{1}{4} \times 3\frac{1}{3}$$

Abstract experiences support sense making when we reconnect back to concrete or representational thinking.

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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.

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