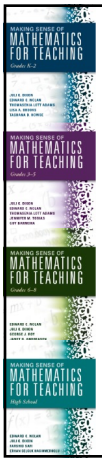
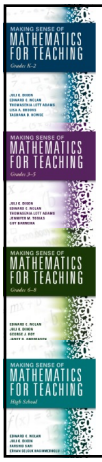


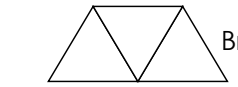
Amplifying Students' Mathematical Brilliance: Empowering Student Voice

Opening Session
Aug 9, 2023

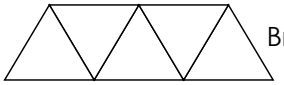
#DNAmath



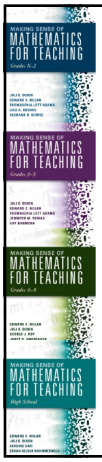
Consider Building a Bridge



Bridge of length 2



Bridge of length 3

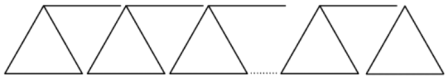


Consider Building a Bridge

How many beams are in a bridge of length 10?

How many beams are in a bridge of length 50?

How many beams are in a bridge of length n?



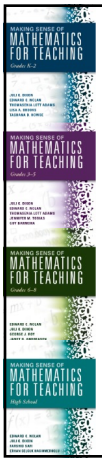
What expression might a student have based on this picture?

The TQE Process

- 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.

TQE: Reflecting on the Task

- In what mathematical content did you engage?
- In what mathematical processes did you engage?
  - What types of thinking and reasoning did the task elicit?
- In what ways did the task encourage student voice?



How would your experiences have been different if the task looked like this?

Simplify the expressions:

1. 3 + 4(n-1)
2. n + 2n + (n-1)
3. 3n + (n-1)
4. 4(n-1) + 3

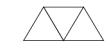
Tasks that promote **rote memorization and procedures**

Simplify the expressions:

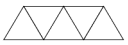
1. 3 + 4(n-1)
2. n + 2n + (n-1)
3. 3n + (n-1)
4. 4(n-1) + 3

Tasks that promote **reasoning and problem-solving**

Consider Building a Bridge



How many beams are in a bridge of length 2?



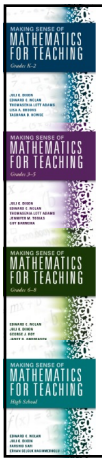
How many beams are in a bridge of lenath 3?

How many beams are in a bridge of length 10?

How many beams are in a bridge of length 50?

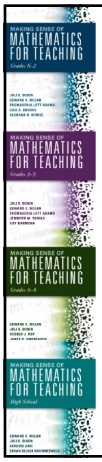
How many beams are in a bridge of length n?

(NCTM, 2014)



TQE: Reflecting on Questioning

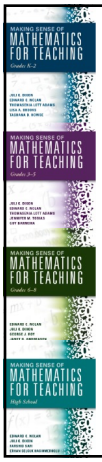
- What questions did we ask to elicit your thinking and reasoning?
- What questions did we ask to encourage discourse and "student" voice?



TQE: Reflecting on Evidence

- What evidence did we see of here that would indicate students' understanding?
- What were some indications that students needed support or enrichment?

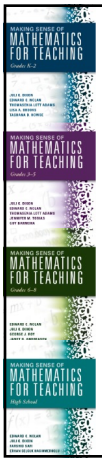
(…to be revisited tomorrow when we focus on Reflective Practice)



Connecting to Discourse

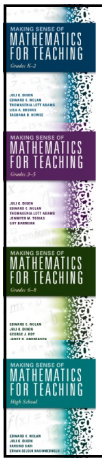
"Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments."

(National Council of Teachers of Mathematics, 2014, p. 10)



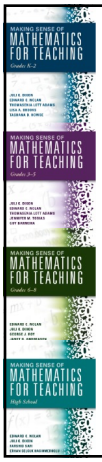
Mathematical Discourse

- Mathematical discourse is the exchange of thought within and among students and teachers in the mathematics classroom.
- How can we amplify student voice ***through*** effective facilitation of mathematics discourse?



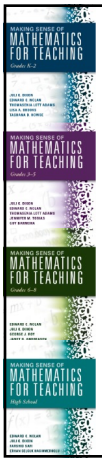
Check-in

- What's been going well about amplifying student voice through mathematics discourse?
- What's still challenging about amplifying student voice through mathematics discourse?



Card Sort #1

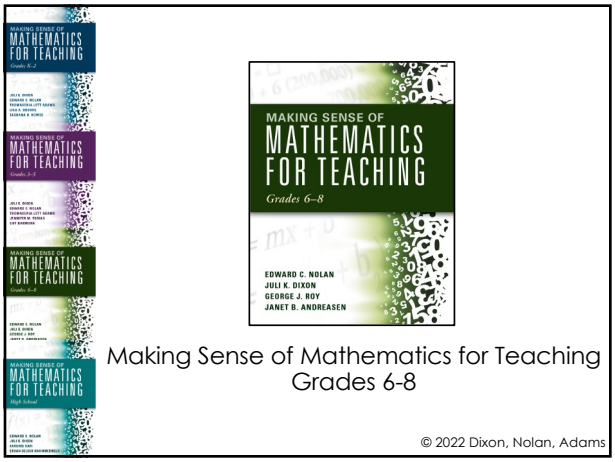
1. Distribute the cards so that everyone at the table has access to the cards.
2. Skim through the statements.
3. As a team, sort the cards in any way that makes sense to you



Reflections (Look Fors)

How did the teacher set up the lesson to support mathematical discourse?

What did you observe about the ways students engaged in mathematical discourse?



Making Sense of Mathematics for Teaching
Grades 6-8

Five Instructional Shifts

How did we see the Five Shifts in the videos?

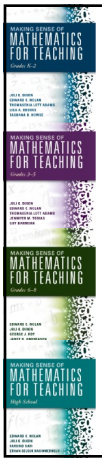
1. Students provide strategies rather than learning them from the teacher.
2. Teacher provides strategies "as if" from students.
3. Students create the context.
4. Students do the sense making.
5. Students talk to students.

(Dixon, 2019)

Discourse Norms

How did we see these norms in the videos?

- 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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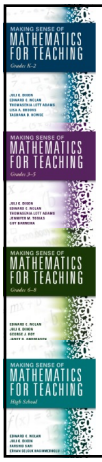
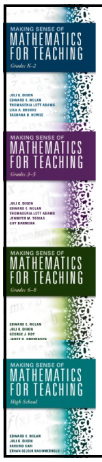


Reflections

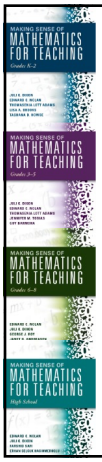
- How did the teacher set up the lesson to support mathematical discourse? What role does the TASK play in amplifying student voice?
- What did you observe about the ways students engaged in mathematical discourse? What role did the teacher's QUESTIONING play in amplifying student voice?
- What forms of EVIDENCE did the teacher gather to assess student understanding?



Engaging Students Through Mathematical Discourse

"In addition to explicitly teaching features of language (e.g., specialized mathematical language and syntax of mathematical statements) teachers are responsible for providing students with opportunities to engage in mathematical discourse across different modalities (e.g., speaking and writing)".

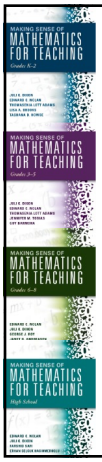
(Smith, 2021)



Teachers' Role in Promoting Mathematical Discourse

"Your approach to student talk … helps determine the type of classroom learning community you and your students develop together".

(Nolan, Dixon, Roy, & Andreasen, 2016, p. 10)



Revisit Session Goals

- Be intentional about centering student voice while facilitating mathematical discourse.
- Examine discourse norms and instructional shifts for amplifying student voice.
- Select tasks that invite each and every learner to actively engage in mathematical discourse.