Facilitating Meaningful Mathematical Discourse

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THE BIG QUESTION

How do you facilitate meaningful mathematical discourse in your classroom?

D. A. Spangler & J. J. Wanko (Eds.) (2017). *Enhancing Classroom Practice with Research behind Principles to Actions.* Reston, VA: NCTM

Goals for today's session

- Introduce three key roles a teacher plays in facilitating discourse: eliciting, supporting and guiding
- "Dig in" – do a classroom math task and analyze video of students engaging in discourse about the task
- Discuss challenges and specific strategies

Establishing our terms

facilitating
meaningful
mathematical
discourse

Establishing our terms

facilitating → ~~Wh[illegible]T to [illegible]~~ → What TO do

meaningful mathematical discourse

Standards of Mathematical Practice

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.

Quick Think

What **strategies** do you already use in your classroom to facilitate meaningful mathematical discourse? Identify one or two.

Teacher's Role in Facilitating Discourse

Eliciting Student Thinking

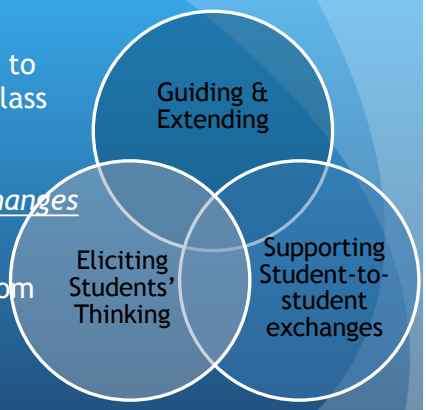
providing opportunities for students to generate ideas and share with the class

Supporting Student-to-Student Exchanges

publicizing ideas and establishing a common knowledge base to work from

Guiding and Extending the Math

Guiding the development of mathematical ideas, attending to misconceptions



Let's Dig In!

Animal Populations

OUR STRUCTURE
2 mins-
Private Think Time

4 mins-
Collaborating
(Pair-Share)

Task

Suppose P and Q give the sizes of two different animal populations, where $Q > P$. In (a)–(f), say which of the given pair of expressions is larger. Briefly explain your reasoning in terms of the two populations.

a. $P + Q$ and $2P$

b. $\frac{P}{P+Q}$ and $\frac{P+Q}{2}$

c. $(Q - P)/2$ and $Q - P/2$

d. $P + 50t$ and $Q + 50t$

e. $\frac{P}{P+Q}$ and 0.5

f. $\frac{P}{Q}$ and $\frac{Q}{P}$

https://www.illustrativemathematics.org/content-standards/tasks/436

Planning for Implementation

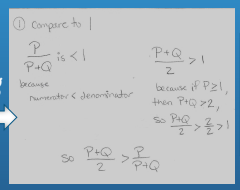
1. *What are some possible mathematical goals you might have as a teacher if you gave this task?*
2. *What kinds of student responses and reasoning do you expect?*
3. *What might be the focus of a meaningful mathematical discussion (with the whole group)?*

Planning for Implementation

1. *What are some possible mathematical goals you might have as a teacher if you gave this task?*

My learning target:
Make sense of algebraic expressions by looking at their structure

2. *What kinds of student responses and reasoning do you expect?*

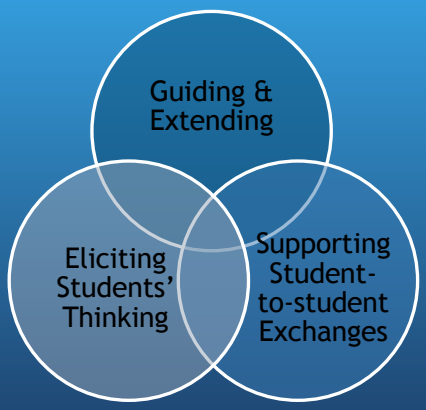


I anticipated:
- **Numerical examples**
- **Comparing to 1**

3. *What might be the focus of a meaningful mathematical discussion (with the whole group)?*

Areas to pursue/press:
- Identifying the parts of an expression and interpreting them
- Attempts at generalization

Clip #1: Teacher's Role in Facilitating Math Discourse



Think about…

- What kinds of moves do you see the teacher making? In relation to which role(s)?

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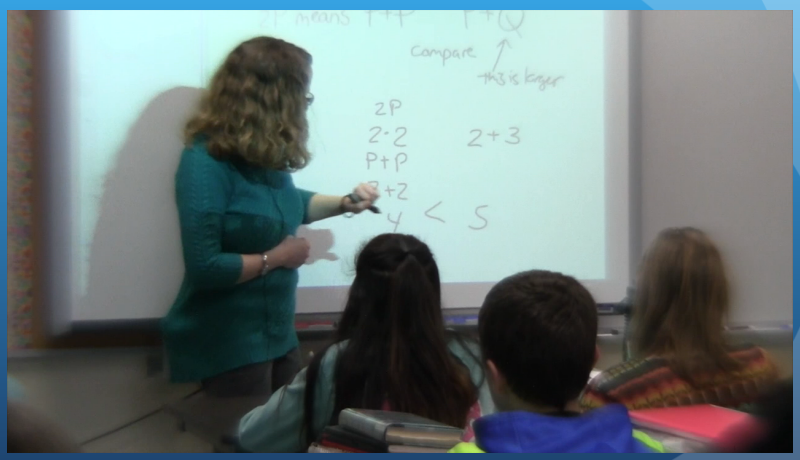
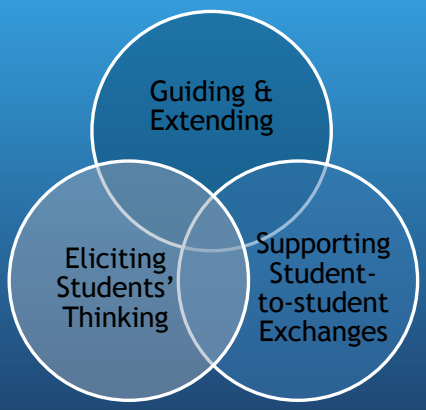


Clip #1: Teacher's Role



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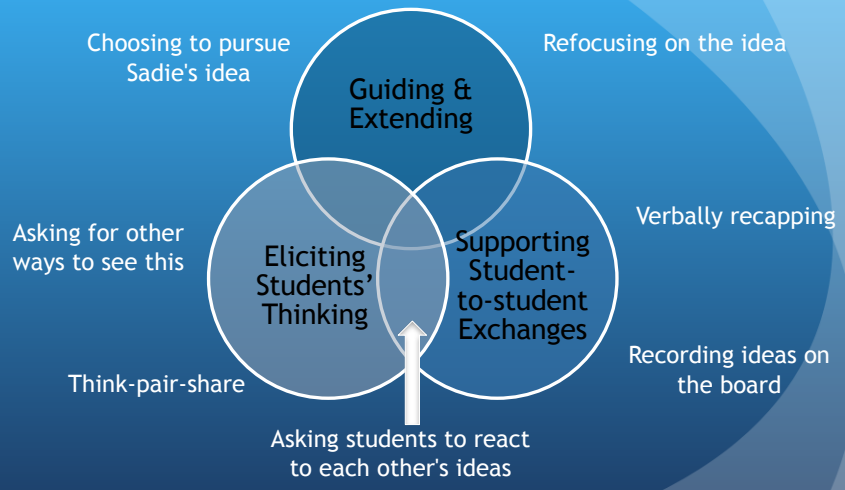
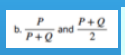
Clip #1: Teacher's Role
Sherryl's discourse moves

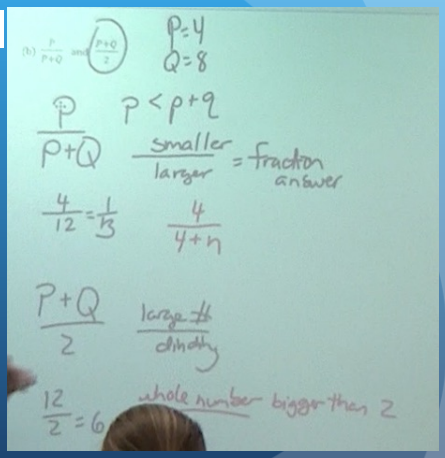


Trouble Shooting

Managing tensions and that come up when facilitating

Clip #2: The “Say What??”





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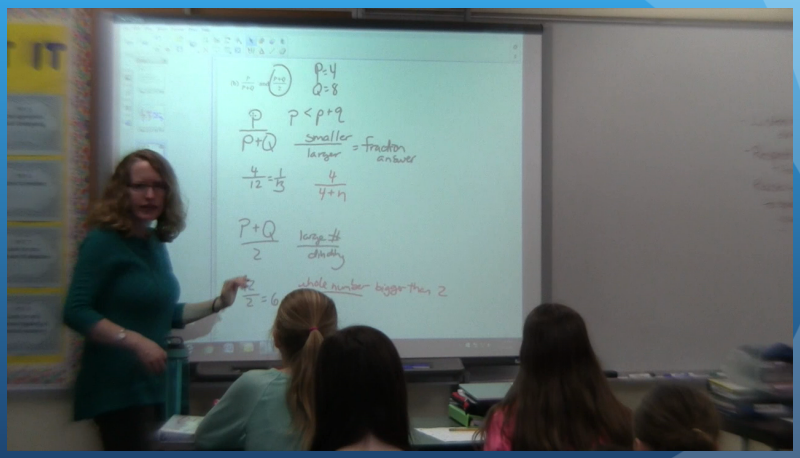
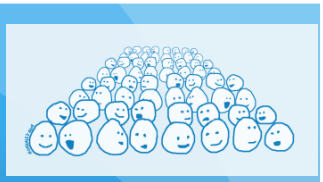
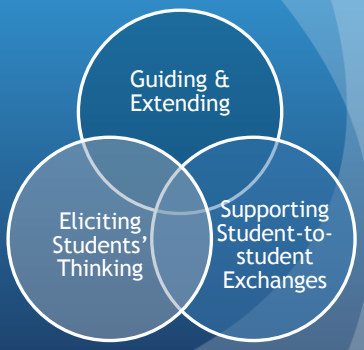


Debrief – Pair-Share



- Did you follow? What do you think the student was trying to express?
- As the teacher, what do you do now? What are some options?



Additional Challenges and Trouble Shooting

- Silence
- It's all me talking
- I have no clue… (aka The "Say What??")
- They have no clue…
- Put downs
- Students agree about a wrong answer

Questions?
Comments?
Wonderings?

Closing Comments/Recap

- Multi-faceted, active role (not absent)
- Planning is key
  - Meaningful mathematically
  - Being able to use students' ideas to help drive the lesson
- It takes time! It takes reflective persistence!

Children must be taught how to think, not what to think. *Margaret Mead*

One more resource

All have access to the book chapter

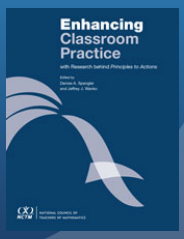
Free download from NCTM website

https://www.nctm.org/Store/Products/Enhancing-Classroom-Practice/

Click link: Read an excerpt

Who has two staples in their handout packet??

Courtesy of NCTM



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Chapter currently available as free download from NCTM website

https://www.nctm.org/Store/Products/Enhancing-Classroom-Practice/
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