Facilitating Meaningful Mathematical Discourse

Sherryl King, Ellington Public Schools, CT
Megan Staples, Neag School of Education, UConn

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THE BIG QUESTION

How do you facilitate meaningful mathematical discourse in your classroom?

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 \[\times\] 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

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

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. $Q - P$ and $Q - P/2$
- d. $P + 50r$ and $Q + 50r$
- e. $\frac{P}{P + Q}$ and $0.5$
- f. $\frac{P}{Q}$ and $\frac{Q}{P}$

OUR STRUCTURE
2 mins-
Private Think Time
4 mins-
Collaborating
(Pair-Share)
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)?**

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

I anticipated:
- Numerical examples
- Comparing to 1

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

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

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

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

Guiding & Extending
Eliciting Students’ Thinking
Supporting Student-to-student Exchanges

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

Choosing to pursue Sadie’s idea
Refocusing on the idea
Verbally recapping
Recording ideas on the board

Guiding & Extending
Eliciting Students’ Thinking
Supporting Student-to-student Exchanges

Think-pair-share
Asking for other ways to see this
Asking students to react to each other’s ideas
Trouble Shooting

Managing tensions and that come up when facilitating

Clip #2: The “Say What??”

WAIT,

SAY WHAAA...?
Clip #2: The “Say What??”

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/](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*
Sherryl King
sking@ellingtonps.net
Ellington Public Schools, CT

Megan Staples
megan.staples@uconn.edu
UConn Neag School of Education

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