Classroom Strategies

Mathematical Discussions 1

Why do we want our students to engage in mathematical discussions?

- Asking students to verbally express their thoughts demands that they clarify their own ideas.
- Teachers are better able to pinpoint student misunderstanding when they listen to student discourse.
- A student's own listening to a peer's understanding enhances student learning.

What are some ways I can promote mathematical discussions in my classroom?

Revoicing

- Example: "So, you're saying that we can't add fractions unless the denominators are the same? Do I understand you correctly?"
- Why this is helpful:
  - ➢ Before teachers can change student understanding, they must have a clear idea of what their students currently believe.
  - ➢ Careful management of mathematical discussions in the classroom gives students time to listen to, think about, and practice with academic language. Such practices are essential to our special needs students.

Asking Student to Restate Someone Else's Reasoning

- Example: "Billy, can you tell me what Sally just said but use your own words?"
- Why this is helpful:
  - ➢ Students will work to make themselves clear and comprehensible when they know that other students will examine and evaluate what is said in their classroom in a supportive yet critical way.
  - ➢ This strategy not only gives students a second chance to decode the input but it also gives them an opportunity to test their own understanding of what was said by comparing their thoughts to how other listeners interpreted the original speaker.

(adapted from: *Classroom Discussions: Using Math Talk to Help Students Learn* by Chapin, O'Connor, and Anderson © 2003)

Mathematical Discussions 2

More strategies that promote mathematical discussions in the classroom.

Wait Time

- Example: The teacher waits at least 10 seconds before calling on a student and also allows more wait time after calling on a student.
- Why this is helpful:
  - ➢ Wait Time sends the message that everyone is expected (and allowed!) to formulate an answer to the question. It is all too easy to fall into the trap of calling on the 3 or 4 quickest students.
  - ➢ Providing Wait Time after students have been called on provides time for them to organize their thoughts before responding.
  - ➢ When we say, "Jessica, what is six plus seven?", we are telling the rest of the class, "No one except Jessica has to think about this answer." On the other hand, when we say, "What is six plus seven?" and then wait, we are letting all students know that they should be thinking about the question and mentally preparing a response.
  - ➢ Building a classroom culture that provides Wait Time will produce higher quality classroom discussions.

Asking Students to Apply Their Own Reasoning to Someone Else's Reasoning

- Example: "Do you agree or disagree? Why?"
- Why this is helpful:
  - ➢ Generalizing about the approaches to solving problems helps students see the similarities and differences among problems, helping them to stop viewing every problem as a brand new task.
  - ➢ Justifying one's own claims requires one to test those assertions, often leading to 'what if' type questions. Students develop metacognitive strategies to evaluate their procedures and solutions.

(adapted from: *Classroom Discussions: Using Math Talk to Help Students Learn* by Chapin, O'Connor, and Anderson © 2003)

Mathematical Discussions 3

More strategies that promote mathematical discussions in the classroom.

Say More

- Example: "Say more about that."
- Why this is helpful:
  - ➢ Like Revoicing, it "slows the conversation" to give everyone a chance to think more deeply and asks the speaker to think again about what she just said.
  - ➢ This strategy helps teachers to resist the urge to jump in and complete the thought for the student. It is a nice neutral way to probe for more information.

Say Something

- Example: After one person responds to a query or explains a solution, students know that the next person called upon is expected to say something appropriate (i.e., intelligent and reasonable) about it.
- Why this is helpful:
  - ➢ This strategy builds on the strategy of applying your reasoning to another person's reasoning.
  - ➢ Many students wait for the instructor to prompt for a response. In this strategy, students are expected to initiate an appropriate comment themselves.

Using Sentence Starters

- Examples: The "next person called upon" has to choose one of the sentence starters to begin his or her comment. Do *not* restrict "the next person called upon" to volunteers!

I agree with that because...	*I notice that...*
I disagree...	*I see a connection to...*
I have a question about that because...	*I wonder if this is the (same/different) as...*

Mathematical Discussions 3 (continued)

- Why this is helpful:
  - ➢ Sentence starters feel forced at the beginning, but they are very effective for getting students to adopt "talk habits" that deepen the discussion.
  - ➢ Since **everyone** is using the same formulaic language (in the beginning), it actually makes people less self-conscious about participating. The process is an equalizer.
  - ➢ It also facilitates what can be the hardest part—getting started with a question or comment—and feels less risky. It builds confidence and desensitizes students to the "fear of looking dumb" along with building their knowledge.