Agenda

- Overview of practice of facilitating meaningful mathematical discourse
- Standing Tall math task
- Making sense of 6th grade student thinking

Standing Tall: Facilitating Meaningful Classroom Discourse in 6th Grade

Nicole Bannister, PhD
Clemson University, Assistant Professor
Department of Teaching & Learning
Department of Mathematical Sciences
nbannis@clemson.edu

Jenny Seawright, NBCT
Cherokee Trail Elementary School
6th Grade Mathematics Teacher
jseawright@acsdsc.org

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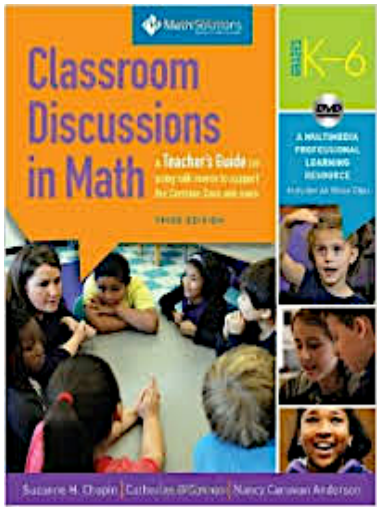
“Good” Math Talk

- What do successful academic discussions look like in your classroom? What were the characteristics of those discussions? What are students doing? What are you doing?
- What dilemmas have you faced when orchestrating successful math discussions?

Introduction to Academically Productive Talk:
Why is math talk critical to teaching and learning?

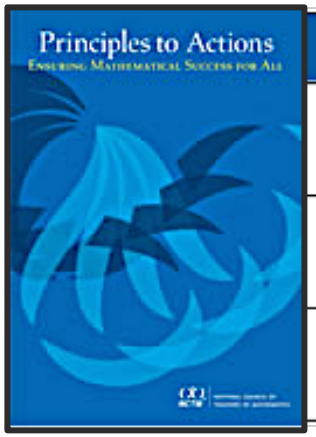
For the past two decades, the National Council of Teachers of Mathematics (NCTM) has encouraged teachers to use classroom discourse in math classes, to support both students' ability to *reason mathematically* and their ability to *communicate that reasoning*. When teachers commit themselves to *teaching for understanding*, classroom discourse and discussion are key elements in the overall picture.

Why do educators and researchers think that classroom talk has the power to improve both students' learning and ability to reason, and teachers' ability to teach? Let's look at what we consider to be five major reasons that talk is critical to teaching and learning.



Five Major Reasons That Talk Is Critical to Teaching and Learning

1. Talk can reveal understanding and misunderstanding.
2. Talk supports robust learning by boosting memory.
3. Talk supports deeper reasoning.
4. Talk supports language development.
5. Talk supports development of social skills.



Mathematics Teaching Practices

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

Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.

Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

"Big Ideas"

- What are some of the biggest math ideas that 6th graders learn throughout the school year?
- What would you expect a student to know well at the end of 6th grade in preparation for going into 7th grade?

Critical Instructional Areas Identified in the CCSS-M

6th Grade

- Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems.
- Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. … Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.

7th Grade

- Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division.
- Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

"Standardized Test Review"

- Imagine that it's the time of the school year when standardized testing is right around the corner.
- What would you expect 6th grade students to know about these ideas in preparation for these assessments? What do they need to be able to know and do?
- What instructional activities and methods would you use in your 6th classroom one week before the test?

Standing Tall
Task Written By Jenny Seawright

1. Find the mean height of your group using decimals. Show your work.
2. Look around the room and choose one person whose height you think would change the mean height of your group greatly. Send one member of your group to ask that person for his/her height. Find the mean of your group with this person's height added to your list. Show your work.
3. Compare your mean in question 1 to your mean in question 2. What is the difference? Explain how you decided whose height to add.
4. Find the median height of your group using fractions. Then add the person's height you chose from the other group and find the median height. What is the difference between the two medians? What changed more when you added the "outsider's" height, your mean or your median?
5. Look around the room and estimate the mean heights of the other groups in the room. Use grid paper to make a bar graph that compares the mean heights of all the groups.
6. Make a box and whisker plot of the data you used to find the mean in number 4.
7. I am exactly five feet tall. If I chose a student at random from this class, estimate the probability that person will be taller than me. Explain how you determined your estimate. How does the box plot help answer this question?
8. Compare and contrast the box plot in number 7 to the bar graph you made in number 8. How are they alike? How are they different? Explain the conclusions you can make about the heights of our class by looking at each type of graph.
9. How is the histogram different from the bar graph? How are they similar?
10. Compare the box and whisker plot you made to the one we made as a class. How are they similar? Different?
11. What did you learn from today's work? What did you find interesting about today's work?

“Standing Tall”

Using evidence from the video, what do you notice about students’ thinking about the mathematics?

Facilitating Meaningful Mathematics Discourse

How does "Standing Tall" help us think about what it means to facilitate meaningful mathematics discourse as a practice?

Recommended Resources for Groupwork and Math Talk

Chapin, S., O'Connor, C., and Anderson, N. (2013). Classroom Discussions In Math: A Teacher's Guide for Using Talk Moves to Support the Common Core and More, Grades K-6: A Multimedia Professional Learning Resource, 3rd Edition. Sausalito, CA: Math Solutions.

Cohen, E., and Lotan, R. (2014). Designing Groupwork: Strategies for the Heterogeneous Classroom, Third Edition. New York: Teachers College Press.

Featherstone, H., Crespo, S., Jilk, L., Oslund, J., Parks, A., and Wood, M. (2011). Smarter Together! Collaboration and Equity in the Elementary Math Classroom. Reston, VA: NCTM.

Horn, I. (2012). Strength In Numbers: Collaborative Learning in Secondary Mathematics. Reston, VA: NCTM.

Nasir, N., Cabana, C., Shreve, B., Woodbury, E., and Louie, N. (2014). Mathematics for Equity: A Framework for Successful Practice. New York: Teachers College Press.

Watanabe, M. (2012). "Heterongenius" Classrooms: Detracking Math & Science- A Look at Groupwork in Action. New York: Teachers College Press.

Thank you!

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