Implementing the Mathematics Nevada Academic Content Standards

Talking about mathematical terminology, symbols, and definitions

Liz Carter and Shayla Taylor
Four Steps Toward Productive Talk

Helping Individual Students Clarify and Share Their Own Thoughts

Helping Students Orient to the Thinking of Others

Helping Students Deepen Their Own Reasoning

Helping Students Engage with the Reasoning of Others
Essential Questions

What strategies can we use to enhance our instruction so students learn mathematics with understanding?

What does this look and sound like?

Objective:
How to support implementing classroom discussions that build understanding of mathematical terminology, symbols, and definitions.
What is half?

60 second Stop and Jot.

Turn & Talk with your colleagues.
What is half?

What language is missing that could aid in the definition?
How do we learn mathematical terms?

Think about it. Jot down two ways to learn mathematical terms.

Read p. 217-218 from Classroom Discussions in Math

Annotate

!- That’s just what I was thinking!

?- Really?

√ - I really need to check this out!
Four Steps Toward Productive Talk

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Norms for Viewing Records of Practice

• Assume that there are many things you don’t know about students, and the shared history of the teacher and students in the video.

• Assume good intent and expertise on the part of the teacher.

• Keep focused on your observations about what student are getting out of the talk and interaction.

• Keep focused on how the classroom discourse is serving the mathematical goals of the lesson.
How might a student respond to this question?

If half an hour is 30 minutes, is half a dollar equal to 30 cents?
As you watch the video clip consider these questions:

- How are the four steps toward productive talk revealed during the small group discussion?
- How does this establish the purpose and direction for the whole class discussion?
Video

7A: Making Sense of One-Half
How did the teacher facilitate the learning using productive talk?
We have discussed words that must carry their context with them.
What are ALL the possible meanings of this symbol?
What about symbols?

In mathematics symbols are part of the academic vocabulary to be developed.
For example, research has shown that many students do not see the equal sign (=) as a statement of equivalence.

How would you facilitate a class discussion where students work through the meaning of the equal sign (=) using talk moves?
Use Appendix C: Lesson Planning Template (Classroom Discussions in Math)
To develop an understanding of mathematical terminology, symbols, and definitions, students need...
Four Suggestions for Using Whole Class Discussions Related to Mathematical Terminology, Symbols, and Definitions (p.219)

• to sort out different word meanings
• To extend students’ knowledge
• To build and monitor common understandings
• To develop the meaning of symbols
What mathematical practices are students using when engaged in productive talk about mathematical terminology, symbols, and definitions? What might this look and sound like?
IS/Coach Support

Instructional Practice Guide

• How can the instructional practice guides be used to support teachers’ instruction of mathematical terminology, symbols, and definitions?
The Core Actions should be evident in planning and observable in instruction. For each lesson, artifacts or observables might include: lesson plan, problems and exercises, tasks and assessments, teacher instruction, student discussion and behavior, and student work. When observing a portion of a lesson, some indicators may be appropriately left blank.

**CORE ACTION 1:** Ensure the work of the lesson reflects the shifts required by the CCSS for Mathematics.

<table>
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<tr>
<th>INDICATORS</th>
<th>EVIDENCE OBSERVED OR GATHERED</th>
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| A. The lesson focuses on grade-level cluster(s), grade-level content standard(s) or part(s) thereof. | 1. The lesson focuses only on mathematics outside the grade-level standards.  
3. The lesson focuses only on mathematics within the grade-level standards.       |
| B. The lesson reflects the full intent of the grade-level cluster(s), grade-level content standard(s) or part(s) thereof being addressed. | 1. The lesson superficially or only partially reflects the standard(s) being addressed.  
3. The lesson fully reflects all aspects of the standard(s) being addressed. |
| C. The lesson intentionally relates new concepts to students’ prior skills and knowledge. | 1. No connections are made to students’ prior skills and knowledge.  
3. The lesson explicitly builds on students’ prior skills and knowledge and students articulate these connections. |
| D. The lesson intentionally targets the aspect(s) of rigor (conceptual understanding, procedural skill and fluency, application) called for by the standard(s) being addressed. | 1. The lesson targets aspect(s) of rigor that are not appropriate for the standard(s) being addressed.  
3. The lesson explicitly targets aspect(s) of rigor called for by the standard(s) being addressed. |

Note the aspect(s) of rigor targeted in this lesson:
- conceptual understanding
- procedural skill and fluency
- application

Notes:
Questions?
References:

www.wcsdcandi.com

National Council of Teachers of Mathematics (NCTM).


http://www.ascd.org/publications/books/108035/chapters/Procedures-for-Classroom-Talk.aspx