Guiding Questions for Lesson Study

Target Pedagogy: Literacy

Reading in mathematics can take on various forms, including but not limited to tables, graphs, equations, etc. **Writing** in mathematics requires students to understand all the above forms of information, interpret the information, and express their problem solving process in written form. Effectively incorporating reading and writing activities in mathematics will both help students build up their problem solving skills and develop their oral and written abilities.

Guiding Questions

1. How/where do you see writing in this lesson?
2. How/where do you see reading in this lesson?
3. How is the organization and representation of different information in mathematics texts (e.g. “reading” a graph) explicitly taught to students?
4. How does the teacher provide feedback and facilitate self-evaluation of mathematical literacy?
5. If used, how does technology support literacy in this lesson?

Possible Lesson Features

- Students are writing (sentences) and/or modeling with mathematics
  - Example: pictures, equations, manipulatives, math journals, word problems, etc.
- Sentence frames are available.
- Models are provided for how to “read” mathematical equations
  - Example: 1/2= “one half,” not “one over two; tables; graphs; etc.
- Models are provided for the creation of tables, graphs, etc.
- Students are making meaning through a variety of forms (including graphs, texts, etc.) and applying these to articulate their problem solving process through written responses.

Next Steps

- What are three “action steps” that the teacher can take in future lessons ?
- How can the literacy instruction in this lesson generalize to other mathematical concepts and topics?

Guiding Questions for Lesson Study

Target Pedagogy: Vocabulary

Description of MALLI Pedagogy

Guiding Questions

1. How does the lesson include real objects (aka, realia) that represent new vocabulary terms or concepts?
2. How does the lesson include mathematical terms related to “everyday” meanings of similar terms (e.g., equal vs. similar, area, range, “of”)?
3. How does the lesson/environment include graphical representations of new terms or concepts so that students can recall them
   - Examples: 

4. How does the lesson invite students to use new vocabulary, either orally or written, in their own words?
5. How does the lesson make thoughtful use of an analysis of mathematics terms?
   - Examples: **amount** (verb, noun): from Old French *amont*, a compound consisting of *a* “to” and *mont* “mountain.” To amount is literally to build up a mountain of something. As a noun, an amount is the quantity

     volume (noun): from Latin *volumen* “something that is rolled up,” from the verb *volvere* “to roll.” The Indo-European root is *wel-* “to turn, to roll.” A Latin *volumen* was a roll of writing, i.e., a scroll. When books replaced scrolls as the most common way of disseminating written works, the term *volume* was carried over to books. Beginning in the 16th century, *volume* came to refer to the bulkiness of a book or the amount of space it occupies. In the 17th century *volume* was first used to mean the size or mass of an object in general, no longer necessarily a book.
6. How does technology, if any, support the vocabulary learning required in the lesson?

Possible Lesson Features

- Objects are featured in the lesson.
- Terms are described in “everyday” terms, if applicable.
- Students use new terms in their own words
- Graphic organizers or other devices assist students in recalling new terms.
- Word wall and/or sentence wall using featured vocabulary.

Next Steps

- What are three action steps the teacher can take in future lessons?
- How can the vocabulary practices in this lesson generalize to other mathematical concepts and topics?

Guiding Questions for Lesson Study

Target Pedagogy: Discourse

It is more than a conversation. **Discourse** maintains rigorous conversation and student participation. The teacher ensures that students are thinking deeply, articulating their reasoning, and listening with purpose while connecting funds of knowledge to mathematical dialogs.

Guiding Questions

1. How does the teacher connect students' funds of knowledge with the mathematical discourse? (e.g. Everyday/home language, experiences, personal mathematics strategies, errors, etc.)
2. How does the teacher encourage the expression of ideas without over-emphasizing language form?
3. How does the teacher cultivate discourse? (e.g. Model, guide, explain, provide evidence, compare ideas?
4. How does the teacher promote further discourse? (e.g. reiterate, paraphrase, build on other's ideas, ask for elaborations of explanations, etc.)
5. What type of discourse interactions are taking place? Are there a variety of discourse interactions? (e.g. teacher-student, student-student, pairs, small group, whole class, etc.)
6. How does the teacher promote active listening? (ex. Before, during and after)
7. How does the teacher provide feedback and facilitate self-evaluation of mathematical discourse?
8. If used, how does technology support discourse in this lesson?

Possible Lesson Features

- Students are proposing ideas of how to solve problems.
- Students are explaining how they solve problems.
- Students are working with each other to find solutions.
- Students are using multiple means of discourse (ex. speaking, gesturing, drawings, graphs, equations, strategies etc.)
- Students are conversing, asking questions, listening, sharing ideas without teacher directing/controlling the conversation.
- All students have the opportunity to participate in the mathematical discourse.

Next Steps

- What are three action steps the teacher can take in future lessons?
- How can the discourse practices in this lesson generalize to other mathematical concepts and topics?