Implementing the Math Practice Standards and Promoting Math Discourse

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Who are you?

- Introduce yourself to the people at your table.
  - Where are your from?
  - What is your job?
  - What do you like most about your job?

Who are we?

- Shannon Molt
  - Instructional Coach
  - Former 8th Grade Math Teacher
  - Member of our district Math Excellence Team
  - MSP Grant Participant
- Pamela Dombrowski
  - 6th/7th Grade Math Teacher
  - Member of our district Math Excellence Team
  - MSP Grant Participant
  - Taught 2nd grade through college

That's Me!!!

- I stopped at Starbucks this morning.
- I'm the person who everyone is waiting for to finish the last session.
- I'm from a state that adopted the Common Core Standards.
- I love the Common Core Math Standards.
- I teach in an AVID school.
- I teach using a conceptual/investigative approach.
- I'm a session jumper.

“Knowing mathematics, really knowing it, means understanding it.

When we memorize rules for moving symbols around on paper, we may be learning something, but we are not learning mathematics.

Knowing a subject means getting inside it and seeing how things work, how things are related to each other, and why they work like they do.”

- Making Sense, James Hiebert, et al p.2

Math Practice Standards

- Make Sense of Problems and Persevere in Solving Them
- Reason Abstractly and Quantitatively
- Construct Viable Arguments and Critique the Reasoning of Others
- Model With Mathematics
- Use Appropriate Tools Strategically
- Attend to Precision
- Look For and Make Use of Structure
- Look For and Express Regularity in Repeated Reasoning

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.

Principles to Actions: Ensuring Mathematical Success for All

Pages 29 - 35

NCTM, 2014

Facilitate Meaningful Mathematical Discourse

Teacher and Student Actions (p. 35)	
What are *teachers* doing?	What are *students* doing?
Engaging students in purposeful sharing of mathematical ideas, reasoning, and approaches, using varied representations. Selecting and sequencing student approaches and solution strategies for whole-class analysis and discussion. Facilitating discourse among students by positioning them as authors of ideas, who explain and defend their approaches. Ensuring progress toward mathematical goals by making explicit connections to student approaches and reasoning.	Presenting and explaining ideas, reasoning, and representations to one another in pair, small-group, and whole-class discourse. Listening carefully to and critiquing the reasoning of peers, using examples to support or counterexamples to refute arguments. Seeking to understand the approaches used by peers by asking clarifying questions, trying out others' strategies, and describing the approaches used by others. Identifying how different approaches to solving a task are the same and how they are different.

Promoting Discourse

- Intentional Grouping
- Purposeful Questioning

Activities to Promote Mathematical Discourse

Math Practice Standard	Connections to our CMP Moving Straight Ahead
1. Make sense of problems and persevere in solving them.	In 2.1, we had to figure out what the problem was asking us to do. We had to figure out how long the race should be between Henri and Emile so that Emile wins by just a little bit.

Activities to Promote Mathematical Discourse

Modified “Philosophical Chairs” - a technique to allow students to critically think, verbally ponder and logically write their beliefs.

Example Topics:

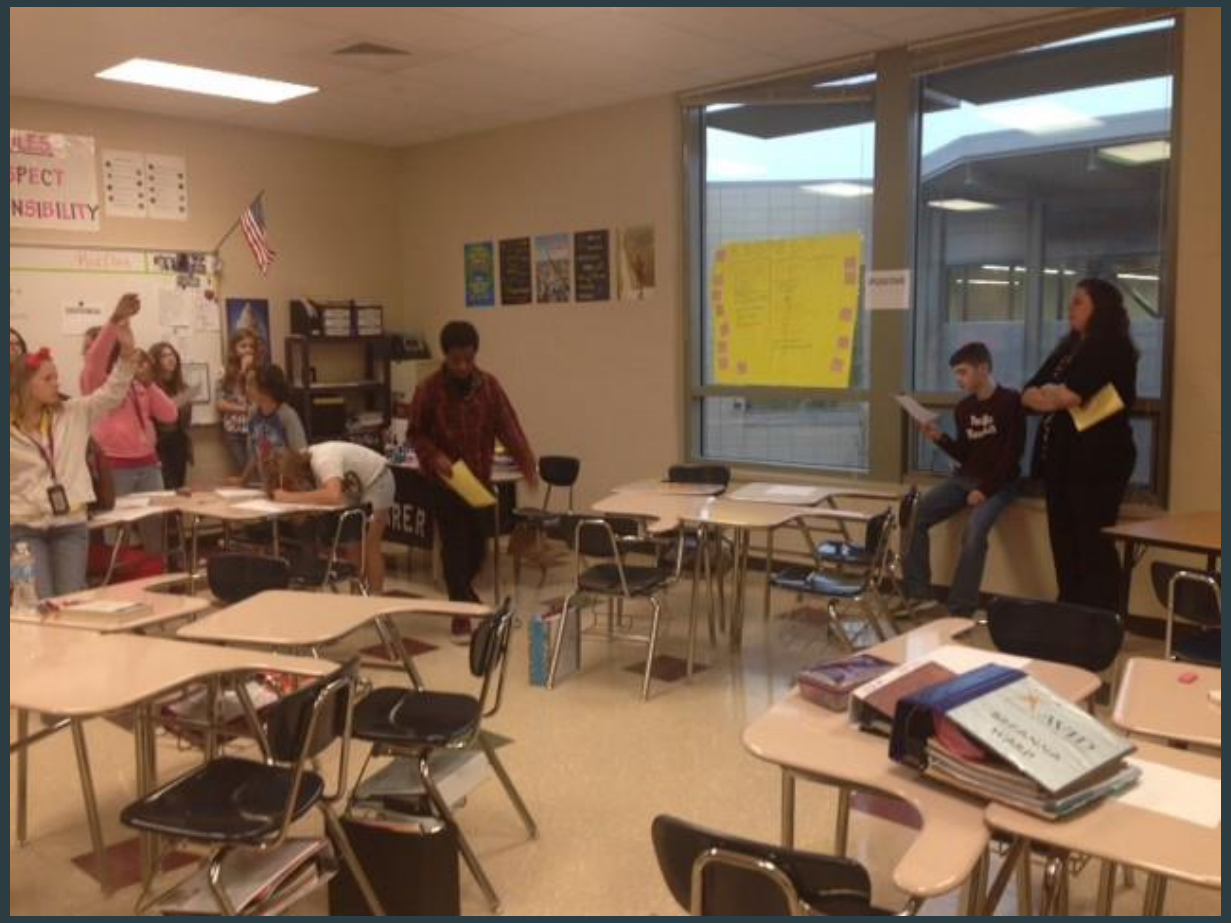
- 7th grade – Adding and Subtracting Integers
- 8th grade – Volume of Cylinders
- 6th grade - Area and Perimeter, Equivalent Fractions

Activities to Promote Mathematical Discourse

Question- Answer with **Positive/ Negative/ Depends**	**Evidence of how you *KNOW* you're correct.** **(You must have a least two complete sentences. You can also use examples and pictures with your writing)**
1. What kind of number will you get when you add two positive numbers together?	
2. What kind of number will you get when you add two negative numbers together?	

Activities to Promote Mathematical Discourse

Philosophical Chairs – 7th Grade Reflection



Activities to Promote Mathematical Discourse

Sticky Note -

- I did this as a warm up to review solving equations – it is a 3 day process – we did this in our table groups
- Day 1 – Critique – I solved a problem incorrectly and gave it to them

Table # _____ Date _____

Write one sentence on your post it note explaining **where** the mistake is and **why** it is wrong.

After our collaboration, we agree this example best represents our table.

Activities to Promote Mathematical Discourse

Sticky Note -

- I did this as a warm up to review solving equations – it is a 3 day process – we did this in our table groups
- Day 2 – Solve – Solve the problem correctly

Table # _____ Date _____

Solve the equation correctly on your post it note.
Show all of your steps.

After our collaboration, we agree this example best represents the table.

Activities to Promote Mathematical Discourse

Sticky Note -

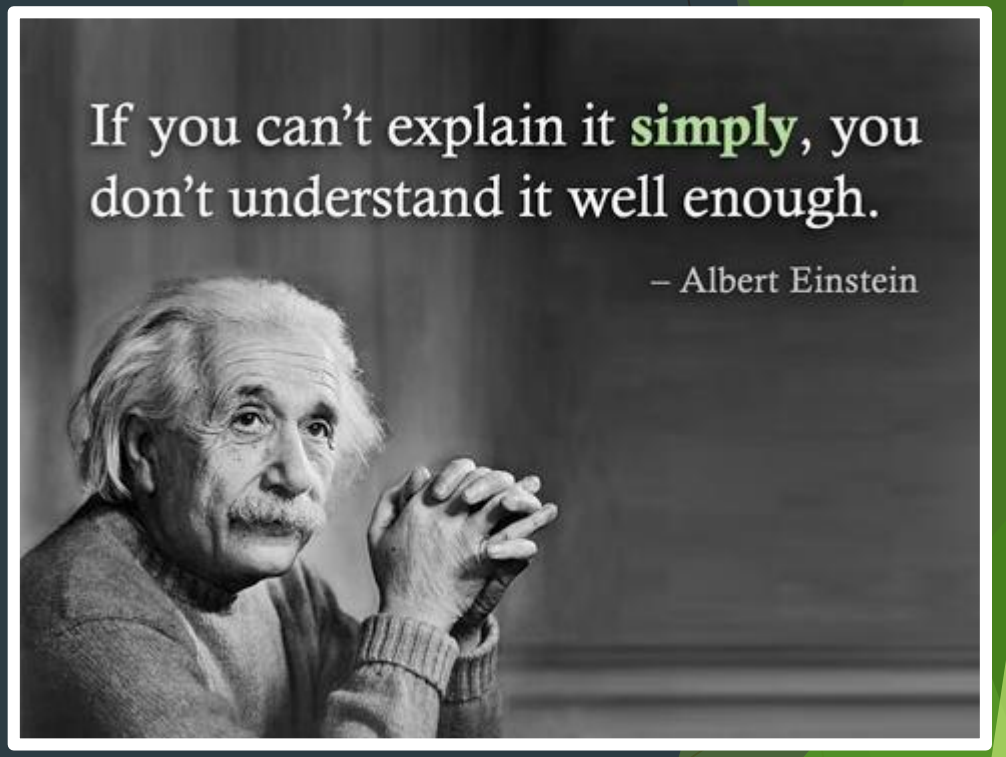
- I did this as a warm up to review solving equations – it is a 3 day process – we did this in our table groups
- Day 3 - Write a step by step procedure of how to solve the problem. Do not skip any steps.

This step allows them to practice writing a paragraph. Then they read each others and I collect and evaluate.

Activities to Promote Mathematical Discourse

Jigsaw Materials

- Handout 1: This handout includes the visuals for all four problems. Only #1s have all of the needed information for #1 included.
- Handout 2: This handout includes the visuals for all four problems. Only #2s have all of the needed information for #2 included.
- Handout 3: This handout includes the visuals for all four problems. Only #3s have all of the needed information for #3 included.
- Handout 4: This handout includes the visuals for all four problems. Only #4s have all of the needed information for #4 included.




#1
#2
#3
#4


#1
#2
#3
#4


#1
#2
#3
#4


#1
#2
#3
#4

Activities to Promote Mathematical Discourse

- Jigsaw Instructions
  - Step 1: Students get into their **NUMBER** groups and work their problem with each other. They make sure everyone in their group understands the problem and is able to explain it.
  - Step 2: Students get into their **LETTER** groups.
  - Step 3: Person #1 will lead the group by:
    - Sketching the diagram on butcher paper or a white board.
    - Questioning the group members until they solve the problem.
  - Step 4: Person #2, #3, and #4 will each lead the group through the above tasks.
  - Step 5: Students will complete an individual reflection or exit ticket.

Activities to Promote Mathematical Discourse

4 Color Card

- To make a match, you need one of each color card
- Great for review
- Ideas –Algebra – graph of equation, table, word problem, equation

  Algebra – word problem, equation, solution, equation in another form

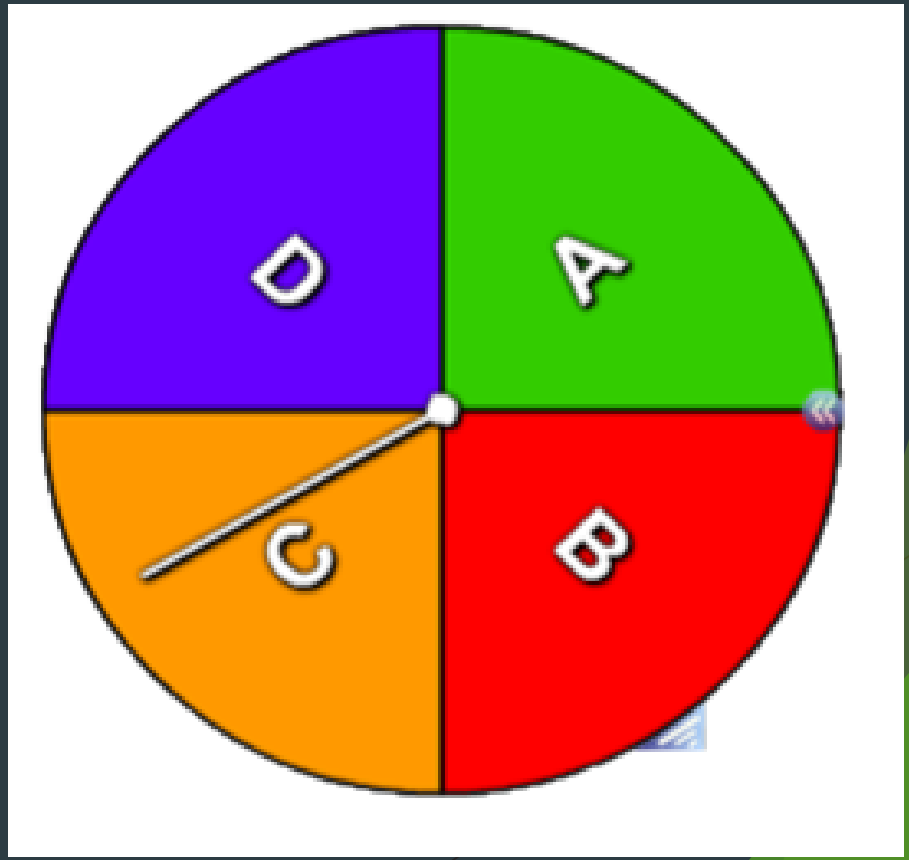
  Number Sense – fraction, decimal, percent, equivalent fraction

  Statistics – data set, mean, median ,range

Activities to Promote Mathematical Discourse

- Have a **NUMBER** for each student in each group.

- Have a **LETTER** for each group in the class.



Activities to Promote Mathematical Discourse

- Problem Solving Cards
  - Get it Together and United We Stand– by Tim Erickson
- My Favorite No
- Gallery Walks
- Different Colored Markers

Conclusion

- The strategy I'm most anxious to try is?
- The strategy I don't see connecting with my content.
- Other content.

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