The Mathematical Practices

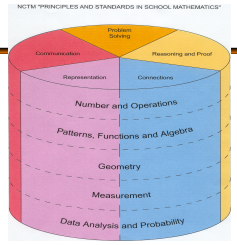
– Principles and Standards for School Mathematics

– Adding it Up: Helping Children Learn Mathematics

Principles and Standards for School Mathematics

The Process Standards:

- Problem Solving
- Reasoning and Proof
- Communication
- Connections
- Representation



Mathematical Proficiency:

Conceptual Understanding
Procedural Fluency
Strategic Competence
Adaptive Reasoning
Productive Disposition

The Mathematical Practices

– Principles and Standards for School Mathematics

– Adding it Up: Helping Children Learn Mathematics

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with Mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Unpacking the Mathematical Practices

Steps:

1. Identify the verbs in each sentence by circling them.
2. Underline the nouns
3. Make a succinct list of verbs followed by nouns

Unpacking the Mathematical Practices

Example:

1. **Make sense of problems and persevere in solving them.**

Explain (meaning of problem)

Unpacking the Mathematical Practices

Getting into groups:

a. Count off 1…2…3…-> 8.

b. Find partners. If group of 4, subdivide to two groups of 2.

c. Begin by circling the verbs and underlining the nouns.

d. Make the list on newsprint (i.e. Explain (meaning of problem)

Implementing the Mathematical Practices

Come together with your number partners to discuss:

What would the demonstration of this practice look like / sound like in the classroom?

Record your findings on the newsprint.

Implementing the Mathematical Practices

– What is the evidence of this practice in the classroom?

– Groups share their findings with the entire group.

Implementing the Mathematical Practices

Mathematical Meet and Greet

Step 1: Organize table groups.

Step 2: On paper provided, draw a large circle.

Every person at the table will make one connection with each other person at the table. When a connection is found, draw a chord on the circle representing this connection.

How many Connections?

- So…
  - What if there were 8 people at your table?
  - What if there were 15 people making connections?
  - What if 100 people making connections?

How do you know? Be ready to explain and verify your thinking.

Mathematical Meet and Greet: Closure

Think, Pair, Share:

What mathematics arose as a result of this task?

What Standards for Mathematical Practices did you personally experience during this task?

Mathematical Practices in the Classroom

Jake's video

Relevant Mathematics

Relevant Mathematics:

References the context for the lesson as part of the essential mathematics and mathematical tasks the student needs to know.

Does the lesson present important and essential mathematics?

Relevant Mathematics

With your shoulder partner:

Was the mathematics in "Mathematical Meet and Greet" relevant?

Be ready to explain your answers.

Meaningful Mathematics

Meaningful Mathematics:

References the context for the lesson as containing elements that create meaning, reasoning and sense making for the student- while also connecting to the students' prior knowledge.

Meaningful Mathematics builds new knowledge; it is generative.

Meaningful Mathematics

With your shoulder partner:

Was the mathematics in "Mathematical Meet and Greet" meaningful?

Be ready to explain your answers.

Relevant and Meaningful Mathematics

Relevant Mathematics connects to SMP # 4

- "Mathematically proficient students can apply the mathematics that they know to solve problems arising in everyday life, society and the workplace…"
- Relevant real world phenomena explored
- Technology is used to promote higher learning

Meaningful Mathematics

Meaningful Mathematics is generative.

Parts of an effective lesson contain elements that enable students to create meaning, use reasoning and exhibit sense making.

Relevant and Meaningful Mathematics

Relevant and meaning mathematics come together in effective lessons.

Stay tuned…it is time for lunch!