*RAMP-A

January 30/31, 2014

Today's theme: Understanding and teaching with focus and coherence

http://qamacalculator.com/

Beyond cognitive complexity: Using tasks to teach with focus and coherence

*Reconsidering Tasks

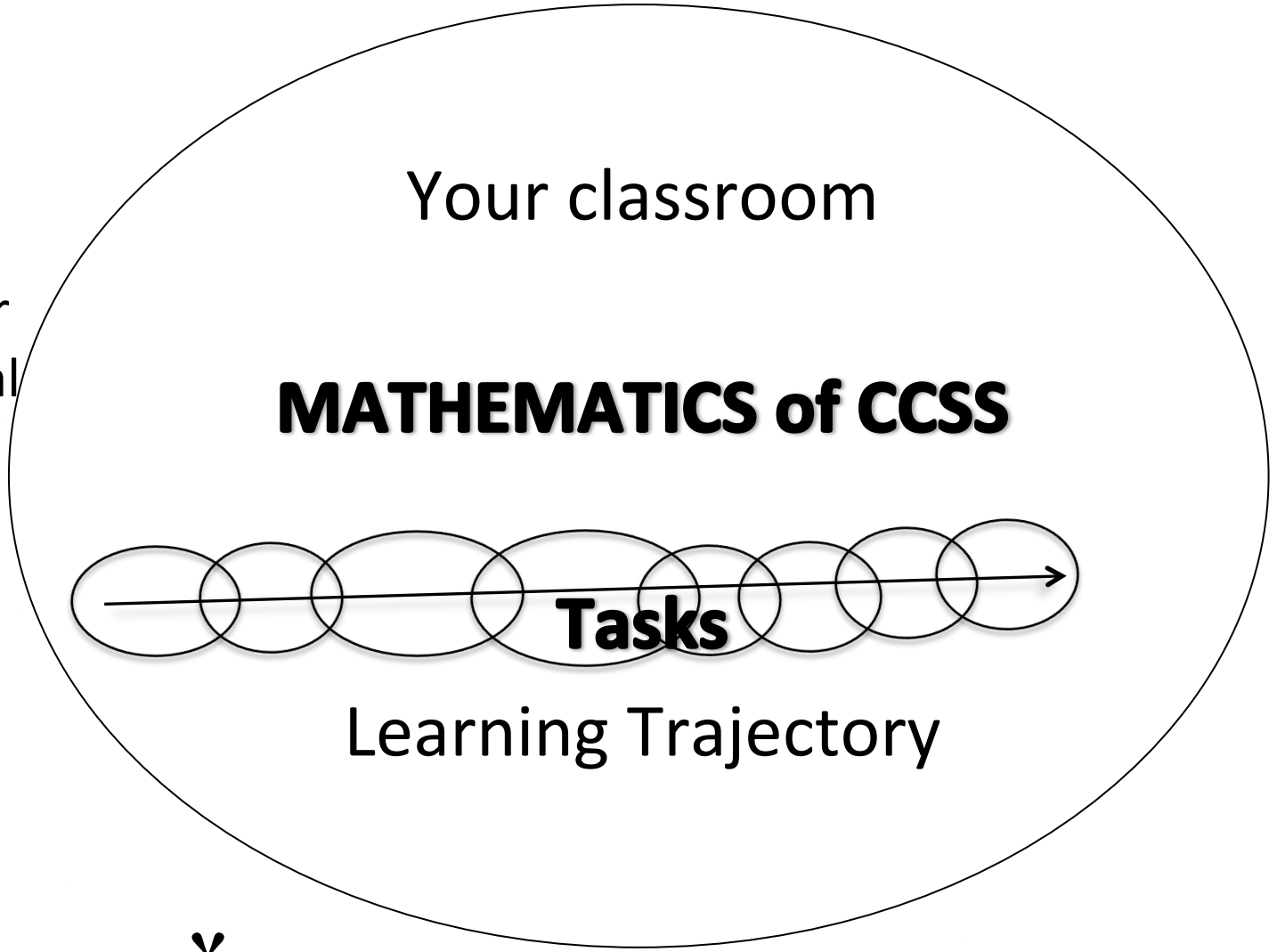
*When you met as a PLC since the November workshop, you shared tasks with cognitive complexity 2 or higher.

What difficulties can arise when you try to get students to solve a task or answer a question that requires higher-level thinking?

*Reflect on your PLC homework

Individually:
Think about your change and consider whether or not you have noticed any effect on your students that you could attribute to your change.
Share in your PLC, and be ready to share with the whole group.

Where could formative assessment, Standards for Mathematical Practices (SMP), and your change fit in this diagram?



*Structure of RAMP-A

Think alone first, then with your PLC:

Imagine a student who has learned mathematics with focus and coherence.

*Write a description of what it means to learn mathematics with *focus*.

*Write a description of what it means to learn mathematics with *coherence*.

*Question for thought:

What characteristics could tasks have that could be used for teaching with focus and coherence?

What role does implementation have?

The difference in teaching effectiveness was in the "learning opportunities teachers created for students, making explicit connections in the lesson among mathematics procedures, problems, and concepts, and finding ways to engage students in the kind of productive struggle that is required to understand these connections in a deep way" (p. 196, Richland, Stigler, & Holyoak).

For the linear function f(x)=4x+5, make a table of values and sketch its graph.

Brainstorm individually, then as a group:

*What meanings, images, ideas, facts, connections, procedures, reasoning, and ways of understanding could be used by a learner who had a deep and connected understanding when doing this task?

*A standard task

What questions and tasks related to this one could you create that could engage students in a productive struggle about the ideas?

What is the cognitive complexity of your question/task?

What SMP could students engage in while answering this question/task?

*Be ready to share your group's tasks/questions.

*Adapt or create tasks

On the Reflection sheet, under #1,

How could you use your change to improve your students' learning with focus and coherence?

*Reflection

Group 1:	**Group 5:**
A=4, B=2, C=-3	**A=2, B=4, C=-3**
Group 2:	**Group 6:**
A=2, B=3, C=-4	**A=4, B=-3, C=2**
Group 3:	**Group 7:**
A=4, B=-2, C=3	**A=3, B=2, C=-4**
Group 4:	**Group 8:**
A=3, B=4, C=-2	**A=2, B=-3, C=4**

Find your group

*Break!! Get to know each other

*Formative Assessment

*"Formative assessment is fundamentally about **teachers' awareness** in order to **respond to students' reasoning and participation**." (Coffey et al., 2011)

***Are** students reasoning?

*OR

*Are they **focused** on saying what they think the **teacher wants to hear**? Playing the "classroom game"? (Lemke, 1990)

***Who** is participating and how?

Vignette #1

- **Shortest**
  - Discussion leader, keeps group on task
- **Tallest**
  - Reads questions, records group responses.
- **Others**
  - Ensure all participate; ask probing and "devil's advocate" questions

Each subsequent vignette: Roles rotate clockwise

*Team Member Roles

*Did formative assessment (FA) occur?

*If so, did it encourage focus and/or coherence?

*What mathematical ideas were important?

*How would you get students to think about these ideas?

*What were students with wrong answers thinking?

*What opportunities for SMP were given and how?

*What could the teacher do next?

*Vignette Analysis

Characteristics of effective FA

*What trends did you see in the vignette(s)?

*What differences?

*How could the FA be improved?

*Formative Assessment (FA) Reflection

Possible goals:

*Individual student change/outcomes?

*Group mathematical understanding?

*Group sensemaking?

*Meeting content standards?

*Meeting Standards of Mathematical Practice?

*Others?

FA Goals

* Which goals might be **most important** for you?
* Can you meet **multiple** goals? If so, how?
* How would your goals affect **your approach**?
* Is there a connection between your goals and **focus and coherence**?
* Is there a connection between your goals and the **Standards for Mathematical Practice**?

* FA Goals

* Using these goals, what **new or improved ideas** do you have about using FA in your classroom?
* What would you have to **give up**?
* How would these changes affect
  * your **classroom**?
  * Your **curriculum**?
  * Your **students'** learning behaviors?

* FA Changes

* On your reflection sheet
  * What **new ideas** do you have about formative assessment?
  * How will you implement these ideas in your classroom?

* Reflection #2

*Estimate how long it took you to get here this morning (including any stops) and order yourselves from least time to greatest time.

*Regroup

The intent of my change was primarily:

1. To increase students' active learning. Explain.

2. To increase the depth and connections in students' mathematical understanding. Explain.

3. Other. Explain.

*Current Change

Lunchtime conversation! Reflect on, discuss, and refine our changes.

*In what way(s) can you refine your change to support ***all students***' increased learning with ***focus*** and ***coherence***?

*Lunch

*In the third space on your reflection sheet, write your refined change and describe ways you think it could affect students' learning.

*Regroup into your PLCs

*Reflection #3

Goals:

Teachers will reflect on expectations for a task compared with actual results.

Teachers plan ways to use student work to move students forward.

*Selecting and Facilitating

Looking at the task –

Identify the content standards in the task.

* Describe procedures appropriate for the task.
* Describe understandings students would demonstrate or develop through the task.
* Describe connections you would like to see students making through the task.

*Selecting and Facilitating

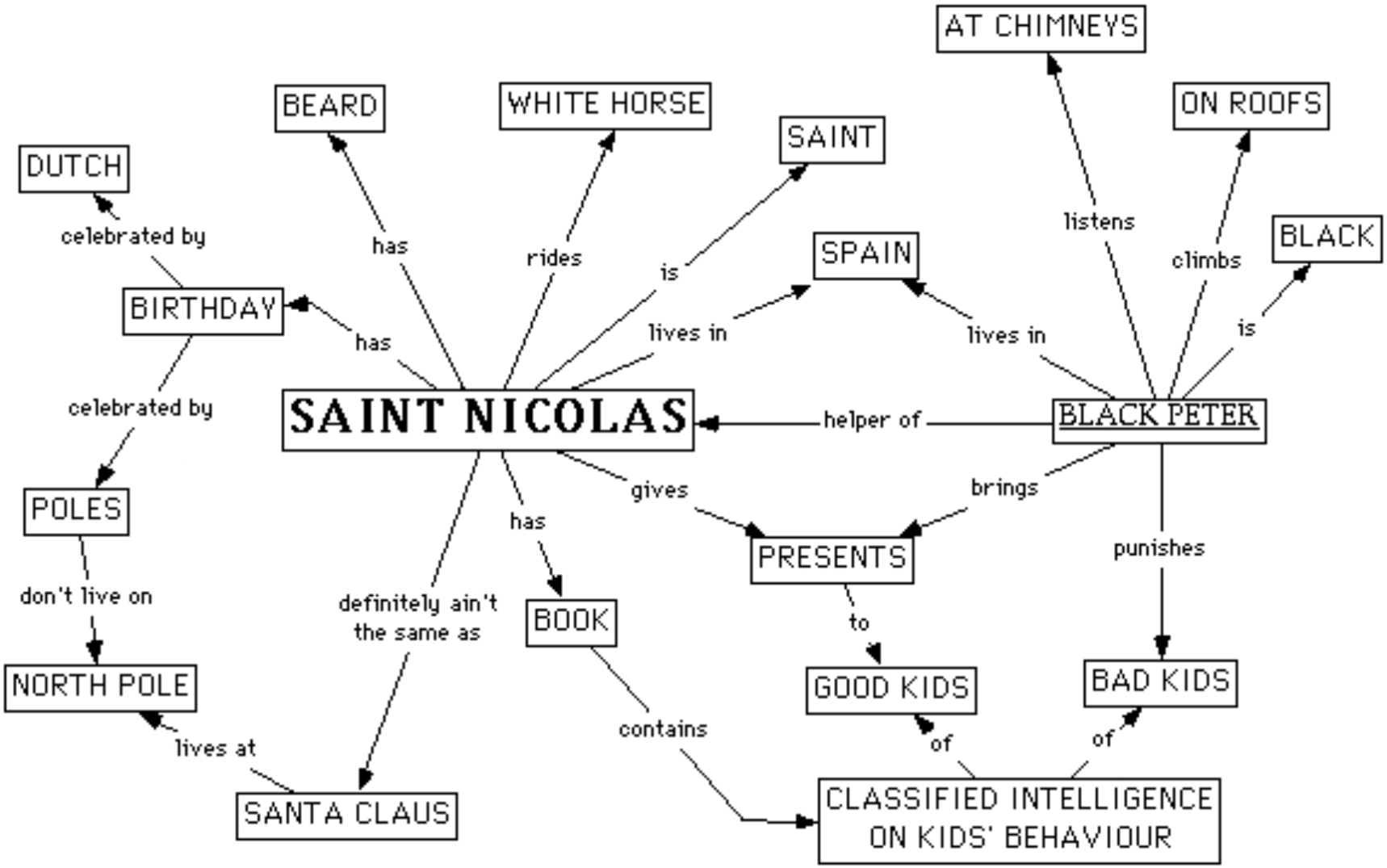
Looking at the task –

Identify the Standards for Mathematical Practice you would expect students to use as they engage in different parts of the task.

*How are the SMP's connected to the procedures and conceptual understandings you named for this task?

*Selecting and Facilitating

*Create a concept map of the knowledge that you think a student with deep, connected understanding of the mathematics in this task would have.



*Concept Mapping

*Looking at Student Work

Group student work by similarity

-What characteristics did you use for your groupings?

*Student work

Describe each group of student work

*How did students understand or make meaning of the problem?

*What procedures do students use?

*What conceptual understanding do students demonstrate?

*What misconceptions are evident?

*Small group discussion:

*What is the evidence you see of deep understanding of the concepts in the problem vs. just remembering facts?

- Choose 3-5 pieces of student work that you would use to facilitate a class discussion.
- Write questions that you would ask to bring out student awareness and understanding of
  - The important mathematical ideas of the task
  - Misconceptions they had
  - Connections they either made or missed

*Continue Your Poster…

✓The concept map

✓The selected chosen work, placed on the map where it shows understandings (or not) and connections made (or not).

✓The questions you wrote.

*Looking at Student Work

*Looking at Student Work

*Gallery Walk

✓Notice the commonalities across the tasks/posters.

✓Take note of the questions others thought to ask to help students move forward in their understanding.

✓Leave sticky notes with something you noticed or wondered.

*Describe how you currently understand what it means to learn with focus and coherence, and how teaching affects this type of learning.

*Reflection #4

*The **goal** of Learning Study is to engage in a process of inquiry within your PLC to better understand how students may develop a deep and connected understanding of a procedure or concept that you have seen them have a difficult time learning, or that you find difficult to teach.

*Looking at Student Work

*What will you take with you?

*Thank you for your thorough and candid feedback!

*Evaluations and Auf Wiedersehen