RAMP-A

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SUMMER INSTITUTE

Welcome back!

Infinitely many mathematicians walk into a bar. The first says, "I'll have a beer." The second says, "I'll have half a beer." The third says, "I'll have a quarter of a beer." The barman pulls out just two beers. The mathematicians are all like, "That's all you're giving us?

How drunk do you expect us

to get on that?" The bartender says,

"Come on guys. Know your limits."

* **Goal**: Build our capacity to create environments and lessons that develop all students' understanding of mathematics described in the CCSS with depth, by making sense, and by making connections. To do this, we strive to:

* 1) Develop our PLCs as learning communities that support our continued growth as teachers.
* 2) Practice ways of inquiry to help us understand how our students learn math (from the struggling learner to the fast learner) and how we could use that information in the planning and implementation of our lessons.
* 3) Develop ways of examining the CCSS to understand how to use its focus, coherence, rigor, and SMP.

Building a Community

* Each one of you has been given a Scavenger Hunt sheet. Find someone to sign each square on your sheet and be sure to note what square you can sign for others.
* Get more information if you can!
* You will have 10 minutes now to gather names and may continue the search during breaks and lunch.

Norms

* Norms keep a group functioning as a system instead of a collection of individuals.

Why are norms important?

The groups need "rules" to help them work together to not only deal with difficult issues in an objective and consistent way, but also to confirm what each member will do in the normal course of business to make the team succeed.

Norms

Who should set the norms?

Group norms are most powerful and effective when group members create them. This is why we are asking each PLC to set and enforce group norms.

What should be included in norms?

Your group norms should be your own. Work collaboratively to set the norms that will help your group function in a professional manner.

Norms

Why have large group norms?

* To ensure that all individuals have the opportunity to contribute and participate in the meeting;
* To increase productivity and effectiveness; and
* To facilitate the achievement of its goals.

Think about the areas outlined below. As a school PLC, identify a norm you think is most important to the large group. Write each on a sentence strip and post on the big posters on the side of the room.

Writing our Norms

* **Communication** - how do we encourage active listening?
* **Trust** – how do we show respect for each other and build an atmosphere of trust?
* **Decision Making** – how will decisions be made by the group? How will we handle disagreement?
* **Participation** – How will we support active participation by all members?
* **Expectations** – What do we expect from all members?

Reflection 1

* What do you most want your PLC to help you learn?

Equitable Environments

* Observations and Growth
* Why Equity?
  * Frequency and Commonality
* Equity vs Equality
* Personal reactions
* Uses: Classrooms and RAMP-A

"Math Leader" Profiles

* Identify a person or people who have been leaders and/or mentors in your past experience (NOT Jackie, Kris, Janet, or Hyung Sook)
* Identify the characteristics of your math leaders/ mentors:

Gender
Social class background (middle class, working class,…)
Race/ethnicity

Extrovert/introvert
Social skills
Confidence
Participation in extracurricular activities in school

Student Math Leaders

* Identify the characteristics of students you know will be successful in math class and capable of pursuing math or math-related majors and careers
  * Gender
  * Social class background (middle class, working class,…)
  * Race/ethnicity
  * Extrovert/introvert
  * Social skills
  * Confidence
  * Participation in extracurricular activities

Other Students

* Students who get good grades but won't pursue math when it is no longer required?
* Students who will struggle and probably fail?
  * Gender
  * Social class background (middle class, working class,…)
  * Race/ethnicity
  * Extrovert/introvert
  * Social skills
  * Confidence
  * Participation in extracurricular activities

Group Discussion

* Compare your characteristics lists to those of your group
  * Common themes?
  * Differences?

The Issues: Stereotypes and Well-Meaning Efforts

* Teacher-student interactions
  * Pygmalion in the Classroom study
    * Cultural Capital
    * Gender studies
    * "Fast kids, Slow kids, Lazy kids"
    * Student responses: Stereotype threat
  * Well-meaning efforts
    * Caring that restricts growth: rescuing, misuse of scaffolding, differentiation
    * Efficiency issues, unstructured discussions
* Student-student interactions
  * Social status in the classroom
* Connections to RAMP-A

Engaging All Students: The Value of Speaking

* Your strategies?
  * Group formation
    * Group assignments and changes
      * Power in pairs, not singletons
    * Training and roles
  * Social status issues: Assign competence
  * Including all students
    * Think-pair-share approach
    * "Random" selection of students to respond– keep a record
    * Report on partner/group discussion
  * Universal Design for Learning (UDL)
    * Multiple means of representation, action/expression, engagement

Reflection 2

* What steps do you think you could take to increase **all** students' active participation in your class?

Break!

Goal: Teaching with Depth and Connections

* A-CED: Create equations that describe numbers or relationships.
* SMP 1: Make sense of problems and persevere in solving them,
* SMP 2: Reason abstractly and quantitatively,
* SMP 3: Construct viable arguments and critique the reasoning of others,
* SMP 7: Look for and make use of structure.

The Relationship

distance =rate*time (when rate is constant) is introduced in 6th grade CCSS.

* *Discuss at your tables what it would mean for students to have a deep understanding of this relationship before the end of Algebra 1.*

Discuss at your table:

* *What ideas do you have for ways to help students gain deeper understandings of this relationship?*

* *In what ways do you ask students to use that understanding to strengthen it?*

Problem

We can use the following problem as a way for us to think more deeply about the relationship:

* A man is crossing a train trestle on foot. When he is 4/7 of the way across he sees a train coming toward him head-on. He realizes he has just enough time either to run toward the train and get off the trestle or run away from the train and get off the trestle. If the man can run 20 kilometers per hour, how fast is the train going?

Anticipating

* On your posters, use the top half of the poster to create as many representations of this problem as make sense to your group. Include ways you think your students might approach it if asked to represent it.

Move Clockwise One Poster

Examine it:

* What do you understand about each representation?
* *What does each representation tell you about the students' prior knowledge?*
* How does each representation illustrate the quantities and their relationships?

Write Relationships

* What relationships are not shown in the representations?
* Write as many relationships as you can on the bottom half of the poster.
* Circle the ones you think are most important.
* **Write a statement that describes what you think is problematic about this task for students.**

Move Clockwise One Poster

* ***Monitoring*** means that you are walking around listening to students, asking and answering questions in ways that focus their attention on the ***concepts***, not guiding them to a particular solution strategy.
* The goal in our questioning is to ***focus*** students' attention on important concepts, not to ***funnel*** them towards a particular solution strategy or the right answer.

Brainstorm

* Brainstorm questions for the students who created the representations and relationships on the poster.
* Decide as a group whether each question would help students use or develop a deeper understanding **(U)** of the relationships between distance, rates, and time, or whether they would funnel students towards a correct solution without supporting their deeper understanding **(F)** or neither **(N)**.

Discuss Your Questions

* In what ways do your U questions engage students' intuitions and prior understandings, and in what ways do you ask students to extend their intuitions and prior understandings?
* Anticipate how students might respond to each of the U questions.

Write a lesson purpose statement in student-friendly language; be sure to include the SMP you expect students to use and the conceptual goal of the lesson. Attach to the poster.

Lunch!

Read and Discuss

Read: **Metaphors for Learning** (Annie Murphy Paul)

Discuss (practicing your norms)

What metaphors do you have for how your students learn?

How would an observer see your metaphor in your classroom?

Read and Discuss

* Read and discuss: **Why Feeling Confused Will Help You Learn Better** (Annie Murphy Paul)

* How could you use confusion to support your students' learning? What difficulties do you anticipate?
* How does confusion fit into your metaphor?

Trestles

* As we enter into the next part of the Trestles activity, feel free to solve the problem and discuss any other insights that occur from knowing the solution, or to revise your purpose statement.

Trestles

* ***Selecting*** involves choosing student work that could be used to help ALL students in the classroom better understand the concepts.
* ***Sequencing*** involves deciding which order you will have students present their solutions.
* ***Connecting*** involves deciding what and how you will focus students' attention on the important ideas within and among the presentations.
* The goal of planning these three aspects of a lesson is to plan for whole group discourse that helps all learners make sense of the ideas, gain depth of understanding and make connections.

Gallery Walk

* Walk around and look at the other posters and the questions and purposes attached.
* **Select** three students' work that could be used in a whole class discussion to help students understand the purpose your group wrote.
* How would you **sequence** the three students' work, and what questions would you ask to help ALL students understand and make **connections**? Give rationale for your decisions.

Consider

* Consider how you will make connections among all the representations and to the key ideas.
* How do we see structure in each of the solutions?
* Which ones are most accessible to your lowest students?
* How is each student going to make sense of the structure?

Reflection

* What was the most challenging aspect of using this process to plan a lesson?

Creating and Sharing Examples

Think alone by yourself for a moment, then discuss at your tables your current understandings of the following CCSS Algebra 1 standard in the Reasoning with Equations and Inequalities domain:

* A-REI.3: Solve linear equations and inequalities in one variable, and give examples showing how extraneous solutions may arise.

Creating and Sharing Examples

Use the information and questions on the handout to understand and discuss the connections intended in the CCSS related to this standard.

How could you teach for these connections coherently next year?

What Strategies for Solving?

$$a)\ 2-(3x+4)=-3(x+1)+x$$

$$b)\ 5-2x=3x-5(x-1)$$

$$c)\ x+5(3-x)=3-2(2x+3)$$

Create Examples

* Work in groups of 3 to create three equations in one variable, creating one of each type of equation. Write one equation on each card and its solution on the back, showing as many ways of solving as you can.

Criteria for equations: Equations should not be too simple nor too complicated:

Make sure there is an x and at least two terms on both sides of the equation, and the distributive property is needed at least once, but so that most teachers in this room could solve it in their heads.

Trade Examples

* Each person in the group takes one of the examples and meets with another person (not in their group) in the room. Trade cards and solve each others' example without looking at the back. Discuss with each other the reasoning, solution methods, and connections you would hope to hear from your students. Keep each others' cards, rather than taking your own back.
* Meet with another person and go through the same process with your newly acquired card.
* Meet with another person and go through the same process with your newly acquired card.

Reflecting on Equations

* What connections can be made within your curriculum next year that will support students learning this standard with coherence?

How were each of these SMP involved in this activity?

* SMP 3: Construct viable arguments and critique the reasoning of others.
* SMP 5: Use appropriate tools strategically.
* SMP 7: Look for and make use of structure.

Celebrations!

* What did you find out in your Scavenger Hunt?

* What do we need to celebrate?