Today's Theme:
Empowering students as owners of their own learning

RAMP-A
October 25, 2013

Goals:

- Do a rich task and examine ways to support students' growth in the standards for mathematical practices,
- Analyze our students' work and create shorter tasks that target the standards for mathematical practices,
- Brainstorm changes we would like to see in our students' efforts to learn and consider ways we can affect their efforts,
- Practice new ways of getting students to ask questions, and
- Design activities for making what students know visible and for helping students critique their own and others' work .

Getting Into Groups

- Each person choose one card from on your table.
- Pack and stack!
- Find other people to create 4 of a kind.

Group Process and Collaboration

Requirements of Participants

- Know our intentions – use to guide actions
- Maintain productive ways of listening, responding, and inquiring
- Know when to be assertive (refocus, stay on task), when to integrate (attempt to understand others viewpoints)
- Know and support the group purpose, process, development

What Does That Mean?

- Spirit of inquiry – listening more than telling, requires group members' skills
- None of us has the answer… all of us might!
- Leave it all out there – commitment to respect
- Right to receive, responsibility to give

Rich Task: A Comparison Number Game

Goals :

Part 1: Solve and discuss the task in a way that helps us become more aware of the meanings of the SMP.

Part 2: Examine student work on the task to consider how we could support increased understanding and use of the SMP.

A Comparison Number Game

Two kids are playing a game. They each choose a number. They subtract the square of their number from nine times their number, then compare results. Whoever has the largest result wins. Describe a winning strategy and why it works.

Use Handout 1 to describe the thought processes you use while solving the problem.

Examine Your Thought Processes

Individually compare your work and thought processes to the SMP

- Which ones did you use?
- How did you use them?

Make four Practice Cards

At your tables, agree on 4 SMP you used frequently and write one name of an SMP on each card, color-coding.

For example:

- Yellow: Making sense
- Blue: Make a conjecture
- Green: Reason quantitatively
- Red: Express regularity in repeated reasoning

Noticing Others' SMP Use

- As one person SLOWLY explains his or her solution to the rest of the group, others should identify the SMP s/he uses by placing the cards that describe the SMP in front of them.
- Discuss: What did you notice about the solver's use of SMP?

Part 2: Advancing Students' Use of SMP

Analyze student work as it relates to the Standards for Mathematical Practices (SMP)

- Choose 3 or 4 students' work and identify two SMP that you think students could have used in each work.
- Describe the student's current level of using the particular SMP.
- Write questions you could ask students to help them use the particular SMP at a more advanced level as you envision the use of SMP at that level.

Be Ready To Share:

- What SMP potential did you see in each students' work?
- How did noticing potential in each student's work help you devise questions for that student?
- How might supporting more advanced levels of SMP use help students better understand the content?

Reflection

- What ideas do you have about how you could use the SMP to help students develop deeper understandings of math concepts and procedures?

Thank You!

Break!

- Put your PLC notes in the box at the sign-in table.
- Reconvene in 10 minutes in your PLCs and have your student work from the Formative Assessment ready to look at.

Analyzing Student Work: Goals

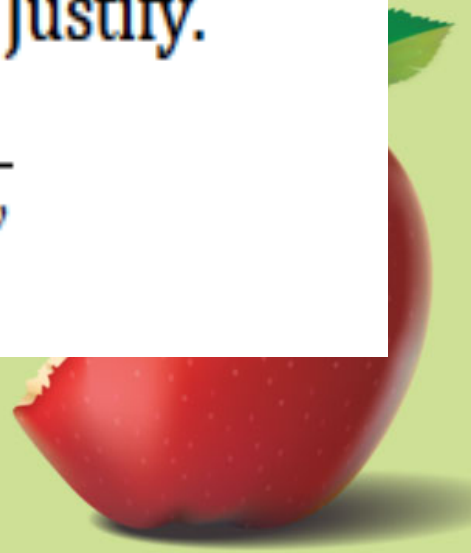
- Analyze student work on your formative assessment task and refine your concept progression.
- Evaluate your task in light of the information you were able to gain and how it informed your instruction.
- Create and practice a new task that supports student learning of the target through an SMP.

Review the purpose of your task

My Example:

Which of the following equations are equivalent to $\frac{P}{r}=\frac{t}{v}$, when none of the variables represents zero? Justify.

a) $\frac{2P}{2r}=\frac{t}{v}$ b) $\frac{2P}{r}=\frac{2t}{v}$ c) $\frac{P+4}{r+4}=\frac{t+4}{v+4}$ d) $r=\frac{t}{Pv}$



Discuss in your PLC

- Review the concept(s) you were targeting when developing this formative assessment question.
- Where did the concept(s) fit in your Concept Progression?

Examine Student Work: Protocol

- Choose 10 students' work randomly (and only one problem if your FA had many)
- Label each student's work with A, B, C,…J
- Each person ***individually*** examines each piece of work and records a hypothesis of what students could have been thinking and what ***evidence*** you have for your hypothesis.

In Example

Analyzing Student Work

Examine each student's work and record your hypothesis of what students could have been thinking and what ***evidence*** you have for your hypothesis.

Student	What they could have been thinking	Evidence
A	-don't understand that left side of equation is still the same value -don't understand 'equivalent equations'	(a) "both sides not multiplied by same thing"
B	-don't understand multiplication of a fraction by a whole number -confusing equivalent equations + expressions	(b) only multiplied tops, but must multiply both top and bottom
C	-lack of precise thinking about properties of equations -lack understanding of proportions	(c) yes, did same thing to both sides
D	-confusing factors and terms -lack understanding of 'canceling'	(c) yes, we can cancel the 4's
E	-some understanding of equivalent equations, but	(c) yes, when I put 5

As a PLC

- Compare, discuss and sort into piles of similar student thinking. Describe each pile.
- Look through other student work and see if they all fit in the piles as described or if there are ideas that did not arise in the first ten papers.
- Refine your piles and descriptions of your piles.

Inferences: What ideas arise from the student work?

- What type of thinking is needed for students to be able to determine when equations are equivalent and justify it mathematically? They need to:
  - Know the meaning of equivalent equations and be able to use this to justify,
  - Distinguish equivalent equations from equivalent expressions,
  - Understand what an equation is,
  - Understand and articulate precisely what operations on equations will maintain equivalence

- Describe several inferences you can make about what students need to learn. That is, what concepts and procedures should be targeted based on students' current conceptions? Are these on your Concept Progression? How are the ideas related to your Concept Progression?

Evaluate your task

- How well did your task elicit information about student understanding?
- What was the cognitive complexity of the task? How did the cognitive complexity relate to SMP?
- How well did it align with the standards?
- Did it provide new information that gave you new insight to inform instruction?

Informing instruction: SMP Practice

SMP Practice: A short task that allows us to practice highlighting, noticing, and advancing an SMP while advancing students' understanding of our target.

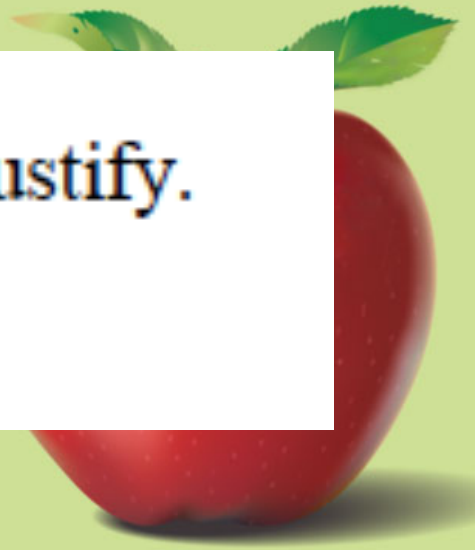
- What is the most common SMP used by students for this task (whether weakly or strongly used)?
- Or, if none used, what SMP(s) might help students better learn this target?

Example SMP Practice

- We discuss the need to be precise in our thinking and communicating in mathematics and what that looks like, reading SMP 6.
- First week:

Are the two equations equivalent? Justify.

$3x - 4y = 1$ and $6x - 8y = 2$



Continue Practicing

Second week:

Are the two equations equivalent? Justify.

$9x^2 + 16 = 25$ and $3x + 4 = 5$

Third week:

Are the two equations equivalent? Justify.

$y = \frac{2}{3}x + 2$ and $2x - 3y = -6$

Fourth week:

Are the two equations equivalent? Justify.

$6 = \frac{2}{3}(x - 5)$ and $6 = \frac{2}{3}x - \frac{10}{3}$

Create your own **SMP Practice Task**

Target:

- The math you decided your students need to better understand, and,
- At least one SMP that could help students advance this understanding.

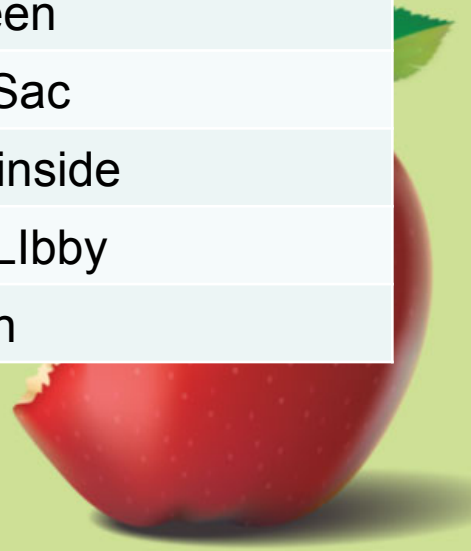
Lunch with Administrators:
(Next slide has room assignments)

- Create your **SMP Practice task**(s) and leave a copy with us.
- Discuss with your administrator what you understand about formative assessment and its role in your teaching and students' learning. Describe the formative assessment strategies that have been used or described this morning.

Lunch and Break-Out Sessions

Your PLC will be in the following group for lunch and the afternoon sessions:

Group A: Conference Room	Group B: Classroom 1	Group C: Classroom 2
Shadle	Gonzaga	Salk
Ferris	East Valley	Shaw/Garry
Rogers	West Valley	Evergreen
Cheney	Mt. Spokane	Chase/Sac
LC	Republic	Mountainside
U-Hi	Mead	Glover/LIbby
Barker	Central Valley	Bowdish



Ideals and Goals

- Based on the SMP, imagine the **ideal student** in the ideal classroom – what would that look like?
- Define **2-3 changes** you would like to see in what your **students do to learn** that would bring them closer to this ideal.
- How could you measure these changes?

Strategies

- What changes could you make **in your teaching** to prompt these student changes?
- Identify one change you could initiate on Monday.
- Identify how you will gather **evidence** on the effect of your change on your students.
- Be prepared to share results in November.

Make a Metaphor

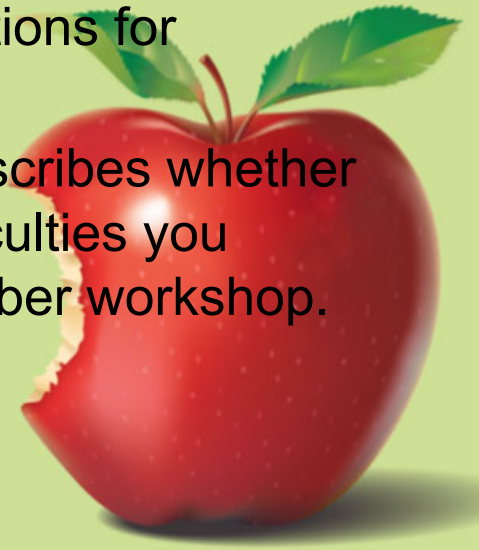
- Create a metaphor for your learning today.

Today's learning is like _____ for me because _____.

Be specific and bring the big ideas from today into one package. Cite evidence to support your thinking.

Homework

- (PLC) Choose a lesson that targets ideas in your concept progression and use formative assessment ideas your team created in the October workshop to collect student work related to your concept progression. Meet in your PLC to discuss each teacher's results and ways you responded to students' development of the ideas. Record, and bring to the November workshop:
  - Your description of student thinking and evidence from their work.
  - Your inferences about their work, and the implications for instruction.
- (Individual) Bring a reflection on your change that describes whether or not it affected students the way you intended, difficulties you encountered. You will be sharing these in the November workshop.



Evaluations

- These are brief, but please feel free to add any thoughts you have.
- We use your thoughts and ideas for future planning!
- We appreciate your efforts and insights!