Welcome!

RAMP-A
May 1 & 2, 2015

Theme: *Reflecting on our students' learning to guide our teaching.*

Goals for the two days

- Take DTAMS for the last time ☺.
- Present lesson studies and discuss what we learned.
- Consider expectations for students' learning of expressions, equations, and functions.
- Discuss our continued learning after the project ends.
- Do a rich math task.
- Examine and discuss a Lesson Sketch.

Where are you in:

* understanding the content standards, clusters, domains, and conceptual categories of the CCSS?
* understanding the SMP and how they support students' learning?
* understanding how to apply the coherence, rigor, and focus of the CCSS in your teaching?
* being able to learn from your colleagues and also support their learning?

* What changes have you made in your teaching?
* What would you still like to learn?

* Reflect on the project goals

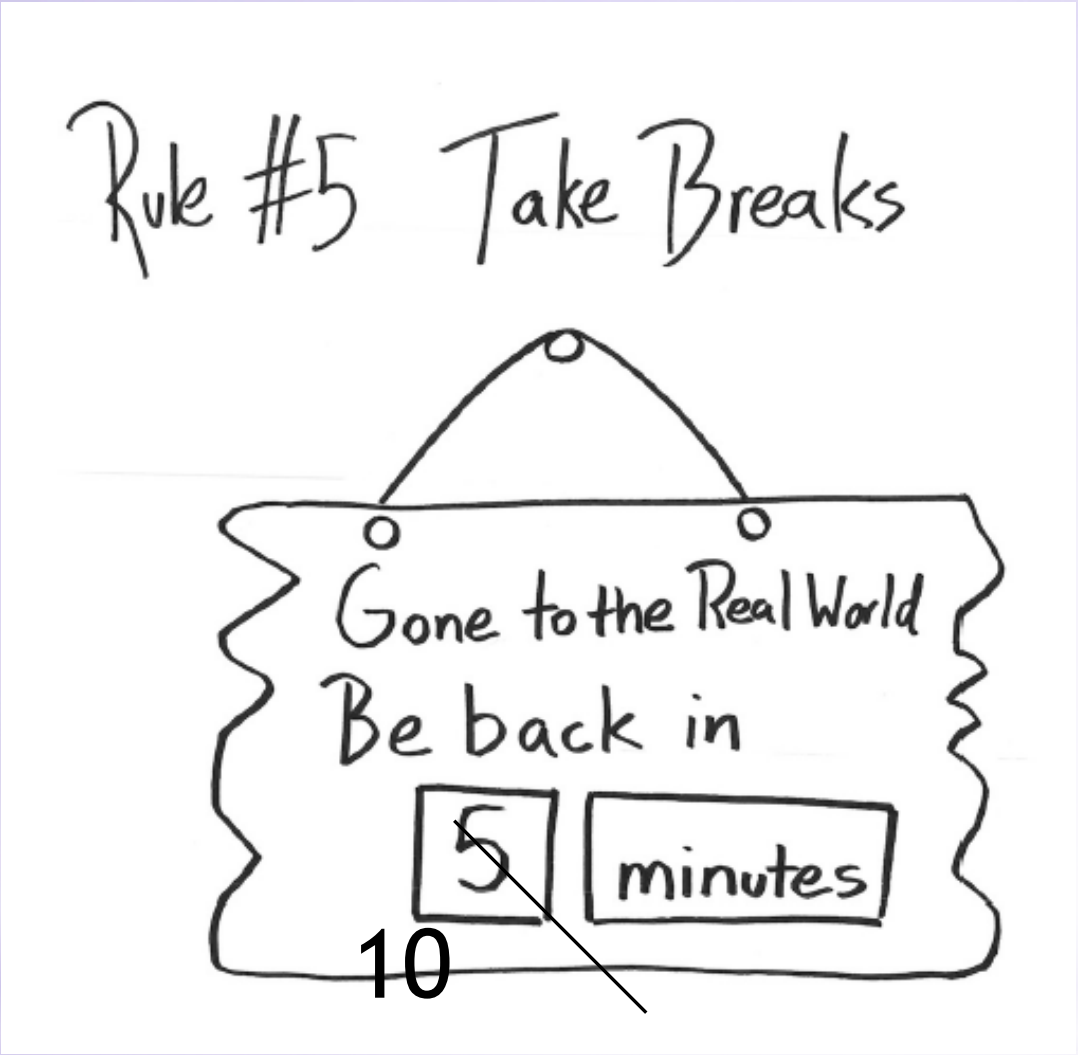
"Highly effective teachers become master teachers over time by continually improving their mathematical knowledge for teaching, mathematical pedagogical skills, and knowledge of students as learners of mathematics." (Principles to Action, p. 103)

What learning should you focus on?

"Effective mathematics teaching results from purposeful planning. Highly effective teachers collaborate to design detailed mathematics lessons and then reflect on the effectiveness of those plans for student learning, in a cycle of continuous improvement." (Principles to Action, p. 103)

How did your lesson study process support your learning?

*DTAMS



Door prizes:
If you have not yet won an SMP poster, put your name on a slip of paper and put it in the basket near the snacks.

*Break

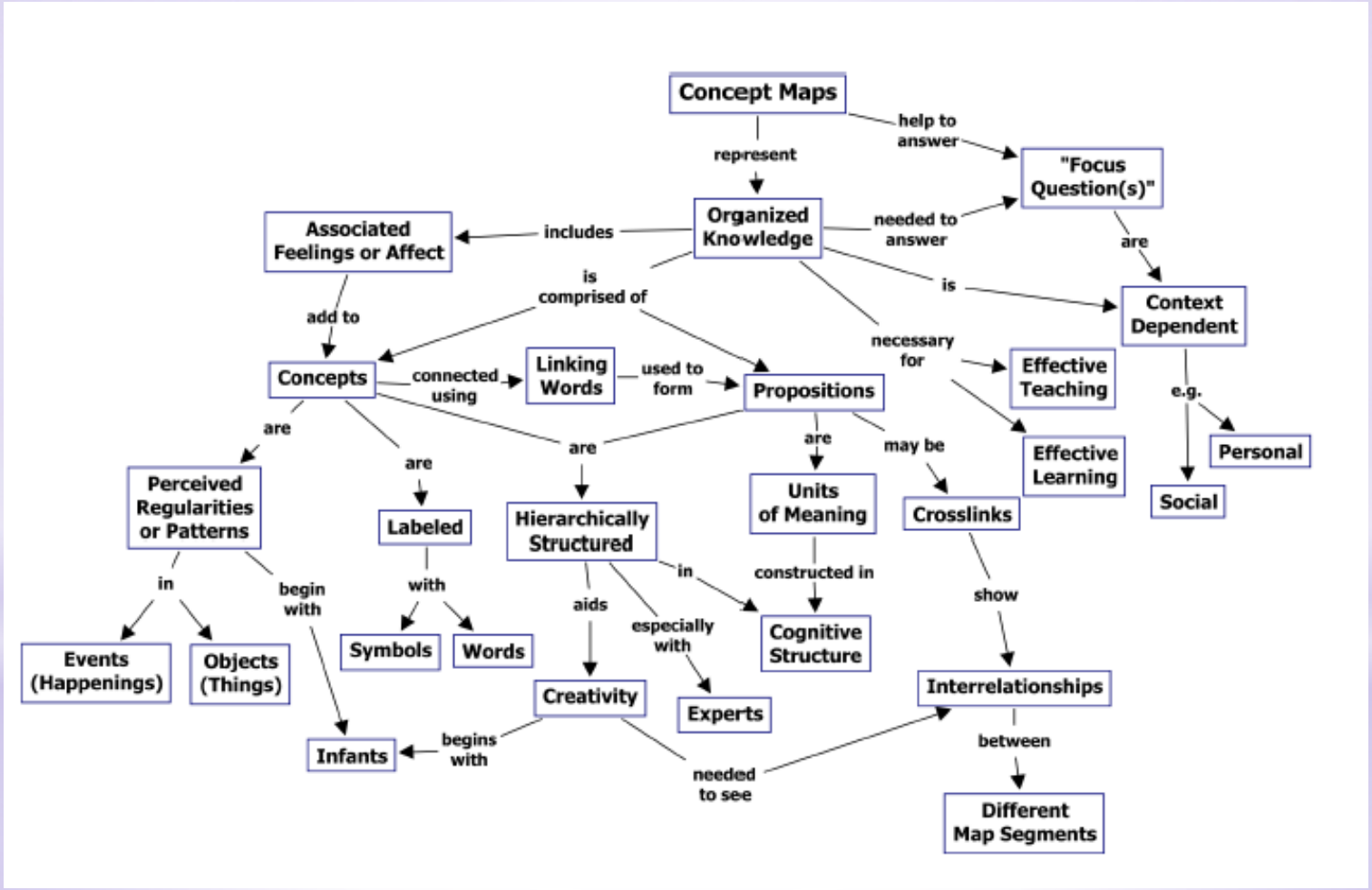
Lesson Study Presentations

- What do you want to learn from others' presentations?
- Read the protocol and discuss what you think the purposes of the questions are. What questions would you add?

9:30-10:45: 15 min Present +10 min Q's

- **Room 1**
  - Char Montgomery, Terrie McCormick, and Cheryl Dubois
  - Cheney
  - Mt. Spokane
- **Room 2**
  - Horizon
  - Rogers
  - Gonzaga Prep
- **Room 3**
  - West Valley
  - Ferris + Pam Meyer and Gabe Piper
  - University High

Concept Map: Equations, Expressions, and Functions



"The separation between Algebra and Functions in the standards is intended to specify the difference as mathematical concepts between expressions and equations on the one hand and functions on the other."

(p. 3, Algebra Progressions)

* **Directions:** Create a Concept Map that shows characteristics of the concepts of quadratic expressions, equations, and functions, and relationships and distinctions among the concepts.

* How does your concept map:
  * Distinguish vocabulary that indicate what we will do with the object such as solve, transform, change the form of, graph, build a table,… (What vocabulary is used when discussing just one of the concepts? Two? All three?)
  * Include the properties that we can use with the object?
  * Address structure sense?
  * Address algebraic thinking such as generalizing, use of multiple representations, doing and undoing, building rules to represent relationships?
  * Distinguish among and clarify the number of and forms of solutions?

Reflection 1

* What new insights do you have on teaching connections or distinctions among quadratic equations, expressions, and functions?

Sustaining Our Learning

"This will be a working lunch. We'll need a Wi-Fi accessible table."

Culture: Ongoing Transition

- We **can't** rely on:
  - Our PLC staying together or continuing to teach the same courses
  - Our own course assignments to stay the same
  - Administrators staying the same

Constants

- We **can** rely on:
  - ***intentional and reflective teaching*** and curricular design
  - ***Ambitious teaching***
    - ***Every student*** matters and participates
    - Focus on student ***reasoning***
    - Daily ***assessment that informs instruction***
  - ***Mathematical Practices***
  - ***Peer collaboration*** for teachers and for students

Identifying Your Learning

- What have you ***learned*** in RAMP-A and with your PLC?
- What have you learned about collaboration?
- How have your ***beliefs*** changed?
- What ***new goals*** do you have for your teaching and student learning?
- What ***instructional improvements*** have you made?
- What ***ideas/strategies*** do you want to pursue, but haven't gotten to yet?

Choosing & Maintaining Reflective Practice

* How can you ***observe*** your own practice and your students' learning?
* How can you create and maintain a routine of ***observing, reflecting on, and improving*** your practice and student learning?
* How can you continually ***refresh*** your thinking about your practice?

Choosing & Maintaining Peer Collaborations

* How can you
  * ***Identify*** someone for peer collaboration?
  * ***Initiate*** collaboration?
  * ***Maintain*** collaboration?
  * ***Expand*** collaboration?
  * ***Share*** your challenges and successes?

* This sheet will be returned to you in June.

* Report

* Recall protocol

* More Presentations

12:45-1:45: 15 min Present +10 min Q's

- **Room 1**
  - Mead
  - Central Valley
- **Room 2**
  - Lewis & Clark
  - Shadle Park

Inquiry means you continue to ask…

What new questions and wonderings arose for you from your own lesson study?

What new questions and wonderings arose for you from the lesson study presentations you observed?

*Discuss what you learned

Reflection on Lesson Study process

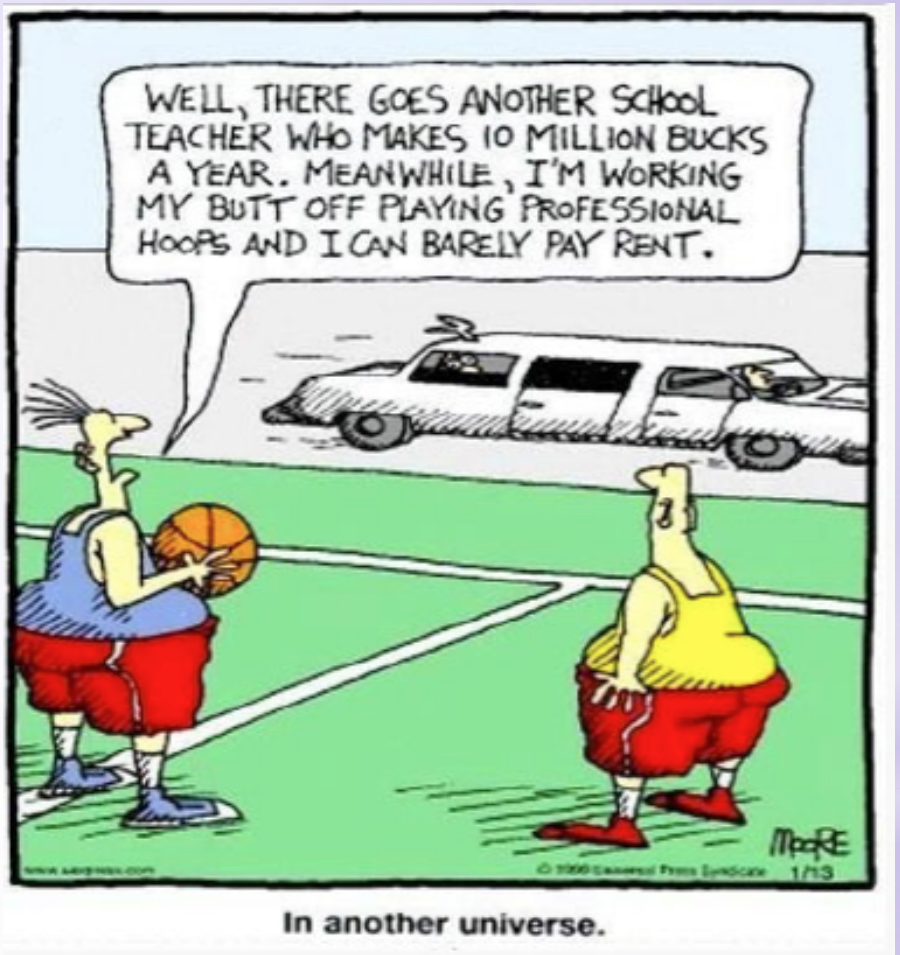
* Reflection 2:

In what ways could you improve your implementation of the lesson study process to improve your opportunities to learn?

* What is up for tomorrow?
  * A Rich Math Task with many solutions.
  * Observing and improving on a lesson.

* Evaluation of the day

Welcome!



RAMP-A: Saturday

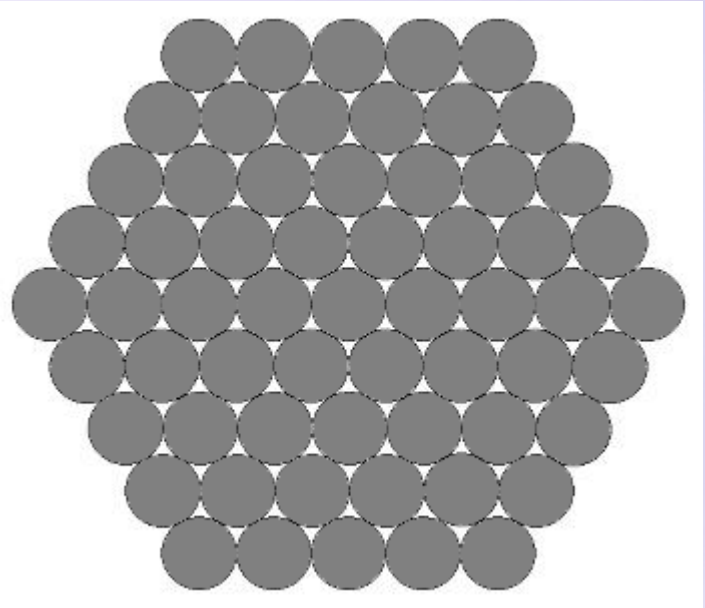
May 2, 2015

Theme: *Reflecting on our students' learning to guide our teaching.*

Wireless:
Username: RAMP-A
Password: s9w9X7H2

*I Was Driving Down the Road One Day…

Cables can be made stronger by compacting them together in a hexagonal formation.
Here is a 'size 3' cable.



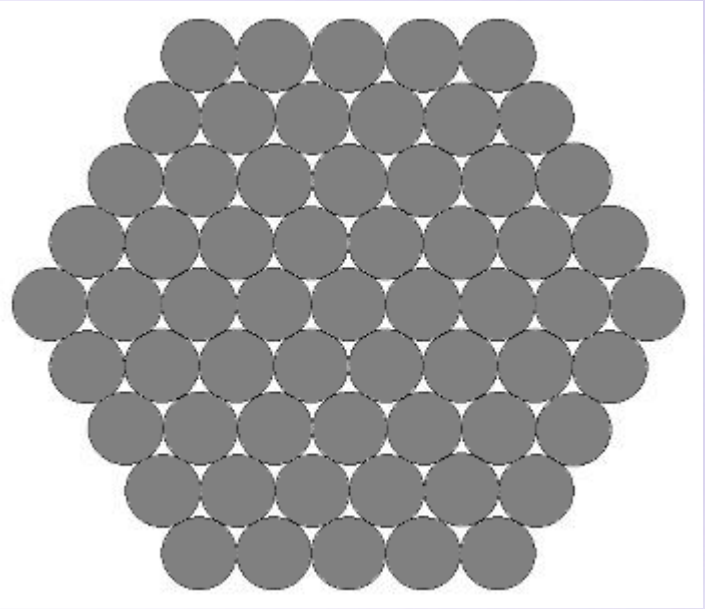
*How Many Cables?

How Many Cables?

How many strands are needed for a size 10 cable?

How many for a size n cable?

Can you justify your answer?



How Many Cables?

* How might students have counted differently than you?
* How would this affect the way their rules look?
* Look at some student work.


SOMETIMES HIS BRAIN OVERHEATS AND HE NEEDS TO COOL DOWN WITH A LITTLE BUBBLE TIME.
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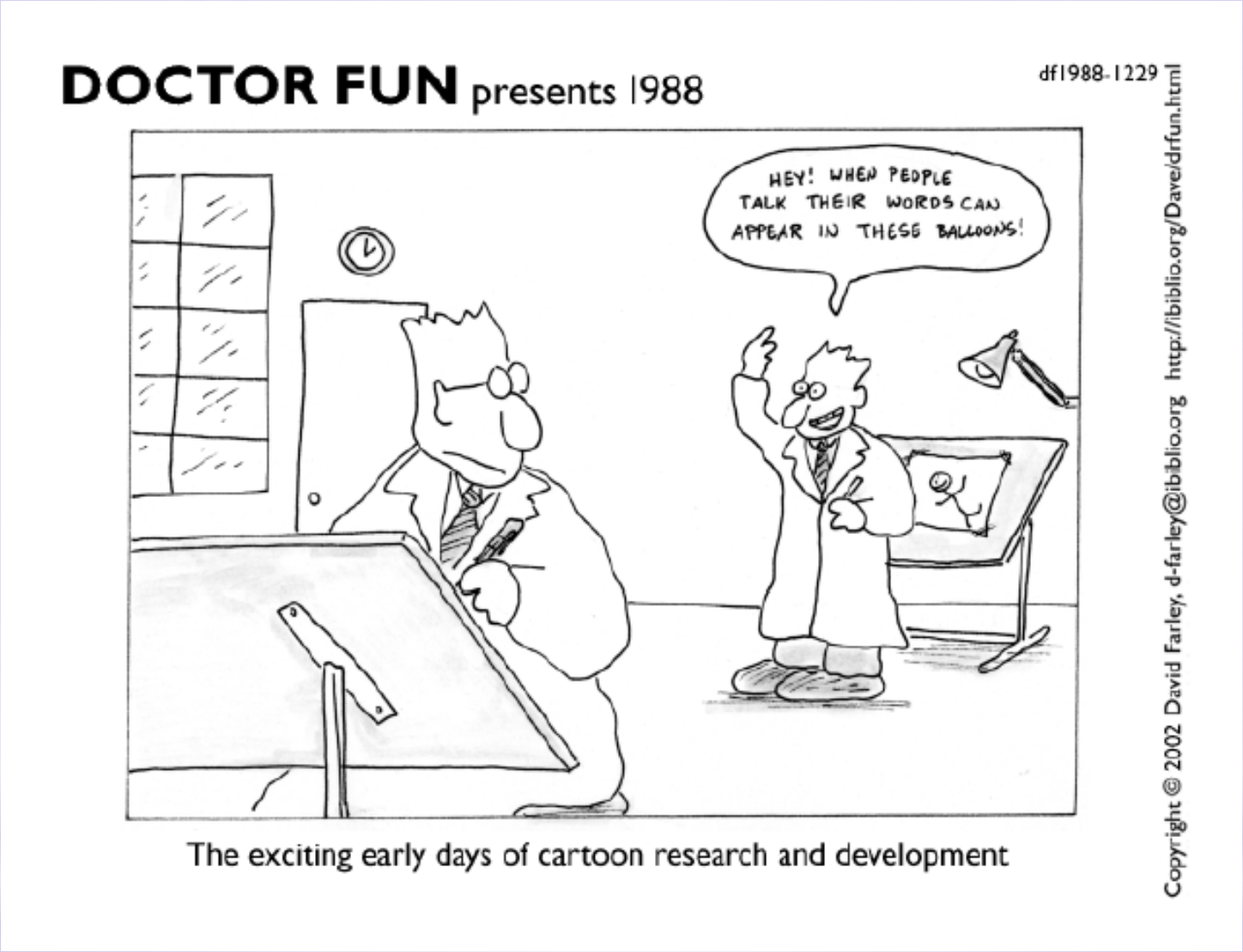
*Break

Critical Thinking Inventory



*Lesson Sketch

We need volunteers to read the lines of the teacher and 4 students.

*Volunteer 1: Teacher (has a tan dress and legs)

*Volunteer 2: Student with dark green shirt (Alpha)

*Volunteer 3: Student with dark blue shirt in the back row (Beta)

*Volunteer 4: Student with brown shirt sitting next to Beta (Delta)

*Volunteer 5: Gamma

Watch the first time, taking brief notes on what you notice, are interested in, or and are concerned about.

Share in your PLCs:

Discuss what you noticed, what you were interested in or concerned about.

Watch it a second time:

* New volunteers?

* Square 3: Alpha
* Square 6: Beta
* Square 7: Delta
* Square 13: Gamma
* Square 22: Sigma

Discuss

Choose one of the students: Alpha, Beta, Delta, Gamma, or Sigma, and discuss:

* What could be the student's current reasoning, and what evidence do you have?
* What past math experiences might this student have had and what connections might be from those experiences?
* Suggest some possible teacher moves that could help the student make conceptual connections. What do you think those moves would accomplish?

Sequencing and Connecting

* We want to consider how to use individual student's solutions such as these in a class to support ***all*** students' deeper understanding.
* Work in your groups to consider all five students and their work: Alpha, Beta, Delta, Gamma, and Sigma. Which ones would you select to present their work, and how could you sequence their solutions so that when they showed their solutions, with the help of your questioning, ***all*** students in the class could make connections and distinctions among the important ideas?
* What questions would you ask the class to help them make these connections?

Evaluations and Homework