Reflection on 3rd grade public research lesson on May 22, 2004
at the National Teachers Academy Professional Development School

Debriefing Panel:

Dr. Takahashi, facilitator
Hurd, O'Gawa, Watanabe, McEvoy, Planning Group
Discuss, based on observation, what we think of lesson
Open door to questions and comments
Summary by Dr. Yoshida

Latina Taylor:

Wow! So many thoughts:3 goals to attain (See 3rd grade lesson plan)

1. Deepen student understanding of multiplicative reasoning
2. Verbal expression of thought process
3. Work collaboratively and learn from peers

Latina saw these things during lesson.

Kathy Fitzpatrick:

What went into planning the lesson.

- New focus: Algebraic thinking with an emphasis on patterns and relationships.
- Evolution of lesson—practice of teaching lesson to several groups to fine tune and focus on how best to meet overall goals.
- Caterpillar idea—coincides with butterfly unit.
- Scenario can be controlled—color changes allow manipulation of variables.
- Chose hexagon because relationship between other shapes is evident…can be made up of several other, smaller shapes.
- Designed to be able to see student thinking and learning.

Questions:

1. Did you anticipate all of the equations that students came up with today? (impressed with students' vocabulary) Emphasis on verbal expression vs. actual student inability to express reasoning for wrong equations.
    - Students used familiar "name-collection." They were connecting to previous knowledge on ways to make 27. (10+10+7)
    - I noticed that when explaining answers students weren't matching what they had on their paper or with what students were putting up on the board. Did we meet that part of the goal?
    - Group didn't expect students to make incorrect correlations among numbers to get the right answer, though unrelated to what they'd done.
    - Could we have followed up on misconceptions immediately with "Do you agree?" Might allow for students to self-correct and make connection to activity.
        i. One of the boys was trying to create 9 in many different ways. Clearly Name-Collection activity is effective…in this problem, however, it is

not the direction to let students go; goal of lesson should remain focus.

ii. How Can We Improve this Lesson:
    1. When is a student's knowledge being built, and when is a student fabricating tools to try to fit a "square peg into a round hole?"
    2. Great moments where kids were beginning to generalize, should be highlighted for whole class to see—we want to encourage generalizations; point out to class.
    3. If we could have asked more questions while students were working strategies—specific extension prompts—we could have encouraged students to continue thoughts. QUESTIONING!

2. You wanted to have students build their equation. Some students did "reverse engineering." 66, 11days, 6 pieces. Started building based on colors. Some students were building off of hexagon itself. Did you anticipate reverse engineering?
    - Some students started making designs with manipulatives unrelated to caterpillar activity…needed to be brought back on track.
    - Some knew how many segments they needed—by putting out 7 segments they thought they'd made their caterpillar. Visual activity. Surprised by student interpretations.
    - Build and see, or figure out, then build? Anticipation was build then see…some students figured out, then built.
    - Do students feel obliged to use blocks because they're on the table?
    - First goal—deepen students' multiplicative reasoning. 3 pieces as 1…purpose defeated or made too easy by providing enough shapes for students to create whole caterpillar?
        - Should we have provided pattern blocks on request or provided only enough to make one shape, then forced students to do "figuring" on their own, without aid of full visual picture.
        - Perhaps don't plan ahead how many of each color block is on the table.

    We thought about how to make manipulatives available—perhaps not well thought through. Important choice. Should we give pictures of hexagons? Should we only give certain colors? Previous lessons…*should we wait until students ask for pieces?*

    Yesterday I didn't give students anything. We started off predicting. The only tool was teacher caterpillar on board. Today, here is everything. They had predicted, used yellows and reds, today here is everything, let's explore and discover what will happen. Had prior experiences of determining relationships with pattern block shapes.

3. Use of manipulatives/choice. For goals of lesson, how useful were the pattern blocks? How did manipulatives help students solve problem?

    See above

4. It is important for kids to tell the story before writing it. Had you thought ahead of time about mathematical language you wanted kids to use? Briana, "The caterpillar got bigger and bigger and bigger." Some students used language that didn't

accurately explain problem. Could kids have been pushed harder to use proper mathematical explanations?

Participant questions:

Liked idea of using pattern blocks; no calculators; great risk taking by students. Idea of multiplication as repeated addition. Main mathematical idea of lesson—we saw in students solutions that there were some that didn't hit goal of lesson. Correct! Takes focus away from central idea…

Could you name equations for what they are? Does this method really help us here? Steer them back on track.

Did you anticipate what student writing would look like? *We math journal every day in this way. Students express in words on one side of the page; in pictures and equations on the graphing side. Some students can express detailed step by step thinking process and reflection.*

Student gave a lot of explanation, but not step by step or reasoning behind why?

As students were drawing in journals, I didn't notice any labelling or numbering of pieces. Was that anticipated? *Had we given enough time, students would have gone into labelling and writing equations. Time was a factor. Should we have used stamps to quicken process?*

When you got 25+2, could you have asked students to show that in the figure?

Did you spend time thinking about how long each segment of lesson should last? *We had detailed plan of minutes. Wanted to overplan…2nd question needed more time; possibly could have posed as a take-away question?*

Jasmine said that 9x3 was fastest way. What she did, however, was count 1+1+1, etc. What do you think of disconnect? *Jasmine is able; she understands. It comes from knowing your kids. Different partner today; possibly not an indication of misunderstanding. Partner needed more support; deliberately put them together.*

SOME STUDENTS DON'T NEED MANIPULATIVES!

Did you think about once you'd posed the question and had them come up with 9x3=27…what if? Let go of manipulatives before doing 2nd problem?

Did you consider keeping a numerical chart that might represent pattern of days/pieces/color? We had discussed, and have seen similar lessons that have a chart. We didn't think students would use formula. Wanted students to see a pattern and not just plug numbers in; force thinking.

Dr. Yoshida final comment:

Group 2 was using yellow hexagon as a base. They used 11 yellow hexagons then laid pieces on top. Other group made hexagons with green triangles. Seeing students using manipulatives encourages us to think about how they're thinking and solving. Spark interesting discussion about their thought processes and problem solving. Essential to understanding students and improving teaching. Very useful for students to keep math journal. I wasn't sure if it would be successful; never a bad thing to keep records and refer to what they've done before. Adds meaning to note-taking. Interesting comments about how manipulatives may limit students' thinking. Making hexagon limited solutions. Perhaps pattern block itself is limiting in some way. Used hexagon to control numbers and problem; maybe limiting some activities that students would otherwise develop. Teacher asked for fastest, easiest way…Do students really feel that multiplication is easiest? Depends on what they're most comfortable/familiar with. How can we help students to see benefits of using multiplication? What activities will best help students to recognize merits of multiplication?