**Based on the findings of the interviews, the goals for students and the information gained from the reading and discussion the following Research Lesson was designed:**

More/Less Unit

Unit Goals:

* Understand grouping by tens and ones
* Articulate completely why numbers are bigger
* Numbers are made up of small numbers (quantities)
* Persevere when solving problems

Lesson Goal:

* Students will have the opportunity to practice articulating why numbers are bigger or smaller
* practice applying > < = symbols

Materials:

* counters, enough to fill bags
* bags, 1 per pair
* more/less cards, 1 per pair
* worksheet, 1 per pair

Lesson Sequence:

(3-18 Comparing Handfuls, Kathy Richardson p. 168)

* Demo
  + Explain rules/expectations
  + Model 1-2 rounds
    - Procedures
    - Conversation
    - Recording
      * 1. quantities such as **7 and 12**
        + strategies:

number line

seeing 7 in 11

* + - * 2. quantities such as **22 and 13**
        + strategies:

using 100s chart

* Distribute bags and worksheet

* Play game
  + Level 1: The students take turns grabbing one handful of counters from the bag and count. Students compare numbers and decide who had more and who has less. They place the corresponding more/less cards next to their counters.
  + Level 2: When ready, students are given a worksheet to record their results to describe how the handfuls compare.

* Closing
  + Write problem on board.
  + Students share responses with partner.
  + Then, whole groups share.
    - 1. 19 > 21

My brother did this problem yesterday and said 19 is greater than 21 because there is a 9 in 19. Do you agree? Discuss with your partner.

* + - 2. 24 < 42

My sister did this problem yesterday and said 24 is less than 42. Do you agree? Discuss with your partner.

Points to notice (anticipating student responses):

· Students may be focused on taking the most counters from the bag

· Students may have difficulty counting if they take too many

· Students may know which student has more but struggle with explaining why using mathematical vocabulary

Data collection ideas:

* How do students organize their counters when counting?
* Can (how do they) they articulate why one number is larger/greater?

Before the lesson was conducted the teachers rehearsed the lesson with each other and anticipated what students may do. In this way they could refine the lesson and be prepared for how to respond to student misconceptions or insights that should be highlighted during the lesson.

In the lesson debriefing, teachers were asked to keep their comments focused on the data collection questions. The focus of the debrief was on the mathematical goals, any other issues that emerged were tabled until the lesson objectives could be addressed. The Norms generated by the group were also reviewed before the debriefing session, to ensure that an open, productive discussion could evolve.

From observing the research lesson teachers saw that some students had difficulty counting into new tens, eg. “28, 29, 90, 91”. Students did not organize their tiles into groups of ten as we anticipated, but began lining them up to keep track of which they counted, after several rounds. Students could recognize which quantities were larger but did not explain why using comparisons or place value concepts. Teachers saw the power of giving students opportunities to converse with one another about their ideas and to find the language to represent their thinking.

These observations impacted the lessons teachers planned as a follow up.