2nd Grade Fluency with Flexibility Lesson Study

September 23, 2020

Research Question:

Supporting students to reason and problem-solve flexibly and adaptively

The lesson study team hypothesized that the following actions would be important elements in supporting students to reason and problem-solve flexibly and adaptively. Each hypothesis is listed below followed by the team's reflection.

Hypothesis 1 – Starting with contexts for students to develop their own strategies

By allowing students to investigate contexts and starting with their own strategies, they can develop a deep understanding of the mathematics that will be important for developing fluency with flexibility.

- By allowing students to investigate the context in pairs without an implied way of modeling the situation or solving the problem or eluding to a preferred way of thinking, example or drawn model allowed students to try different ways of modeling the situation. This should give students an opportunity to decide what their model will look like and whether they are on a productive solution pathway in their problem-solving.

- We could see that students were not all thinking about the situation on the same developmental level was important for allowing students to start from where they are.
- The social interaction that students engaged in during the investigation allowed them to eventually articulate some of their thinking and allowed them to do some of their pre-planning out loud. The social aspect allows students to reflect on others' ways of thinking and change paths during problem-solving strategies while problem-solving.
- Giving students the time to work ideas out in pairs allowed students to develop their own way of thinking. This might help students to reduce the mindset that once they get an answer they are "done".

Hypothesis 2 – Contexts function as a source for learning

Students should be offered problem situations which they can imagine. Context problems function also as a source for the learning process.

- Students began all of their thinking in a context in this lesson.
- All students were able to imagine the situation, allowing them to then start by modeling the situation.
- The contexts need to be constrained in ways that allow the most important mathematics to be developed.
- The context should allow for future thinking about the mathematics both in and outside of school.

Hypothesis 3 – Leveraging the social aspect of learning mathmematics

Students should have opportunities to share their strategies and inventions with each other. By listening to what others find out and discussing these findings, the students can get ideas for improving their strategies.

- When students have opportunities to share strategies they can see that there are a variety of ways of thinking about the same content.
- During the string, many students seemed to be using strategies that other students were using in previous problems in the string.
- It's better to be proven wrong by your peers or a model than to be told you're wrong by an authority.
- The teacher discourse moves (waiting, probing thinking, re-voicing and asking students to re-voice) support students in discussing their findings with each other.

<u>Individual take-aways</u>

- I woud like to teach a unit in my small group and/or use the strings in that setting.

- I just need to make sure that I give lots of time for student collaboration so they can have a safe place to chat and discover new ideas.
- I'd like to use more of the units.
- I'd like to try out using some of the strings.
- I'd like to think about which models are most useful and weed out those that are less necessary.