Overview of Session 3

- Giving and evaluating explanations in the context of a mathematics problem
- Connecting to the Common Core State Standards
- Analyzing students' reasoning and considering teaching practices for supporting their reasoning

3.1a

The Three-Coin Problem

I have pennies, nickels, and dimes in my pocket. If I pull out 3 coins, what amounts of money might I have?

Solve this problem and record your solutions and reasoning.

3.2a

The Three-Coin Problem: Partner work

I have pennies, nickels, and dimes in my pocket. If I pull out 3 coins, what amounts of money might I have?

With a partner:
- Take turns sharing your solutions
- When listening: Be curious about how your partner found and represented solutions
- Work together to see if you can find all the amounts and justify how you know you have found them all

3.2b

The Three-Coin Problem: Discussion

I have pennies, nickels, and dimes in my pocket. If I pull out 3 coins, what amounts of money might I have?

During the discussion, consider:
- How amounts fit the conditions of the problem
- Whether each explanation convinces you that all of the amounts have been found
- The language, representations (including symbols), and logic used in each explanation

3.3a

The Three-Coin Problem:
The features of explanations

I have pennies, nickels, and dimes in my pocket. If I pull out 3 coins, what amounts of money might I have?

- What features of the explanations supported your understanding?
- What did you notice about the use of language, representations, and structure to justify or critique solutions?

3.4a

Common Core State Standards

- State-led effort to establish a shared set of standards in ELA and mathematics

- Two consortia are developing assessments

- In mathematics: focus on topics and mathematical practices

http://www.corestandards.org/

3.5a

Mathematics content

- Topic standards by grade-level organized into domains such as:
  - Counting & cardinality
  - Operations & algebraic thinking
  - Number & operations in base ten
  - Number & operations: Fractions
  - Measurement & data
  - Geometry
- Mathematical practices

3.5b

The mathematical practices (CCSS)

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

3.5c

21¢ Problem

Make 21¢ as many different ways as you can using pennies, nickels, and dimes.

3.6a

Context for the video

- Entering 5th graders (10 year-olds)
- Two week summer program (8 class session out of 10)
  - Fractions; proof and reasoning
  - Combined work on missing skills and understanding with challenge and acceleration
  - Explicit work on reasoning, using representations
- Students came with a wide range of mathematical skills and varying degrees of interest in mathematics
- Warm up problem
- Immediately before the clip, several amounts had been elicited from students and recorded on the board using students' recording methods

3.6b

Focus questions

- How are students reasoning about the problem?
- How are students supporting/explaining their approaches using words, drawings, or tools?
- What is the teacher doing to establish and maintain an environment that nurtures student reasoning practices? What else could the teacher be doing?

3.6c

Summary

In this session, you:

- Explored and evaluated different approaches to solving a mathematics problem
- Discussed features of explanations that support understanding
- Connected work in the professional development with the Common Core State Standards
- Considered students' approaches to reasoning about a mathematics problem

3.7a