

Overview of Session 4

- Scaling mathematics problems
- Engaging in a video workshop

4.1a

Comparing problems

Consider the Three-Coin Problem and the 21¢ Problem:

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

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

- What similarities and differences do you see in the problems?
- To what extent do the differences affect the difficulty of the problem and/or the reasoning required?

4.2a

Scaling problems

What is "scaling"?

Making new versions of mathematics tasks in order to:

- Provide an easier or more difficult version of a task, but with the same reasoning
- Adjust the type or extent of reasoning involved in a task

Adjust the level of difficulty, but preserve the reasoning:

- Use new contexts, numbers, representations that are more or less familiar to students or have different mathematical characteristics
- Use knowledge of student conceptions (provoking typical confusions or protecting from errors)

Adjust the type or extent of reasoning:

- Shift from specific cases to requests to generalize across cases or beyond the range of the initial problem
- Shift from constructing arguments to critiquing specific arguments
- Reformulate closed problems to ones that encourage conjectures through phrases, like "What happens if..."

4.2b

Analyzing scaled problems

To what extent are the following the same as in the original problem:

- The mathematical ideas (concepts or procedures)
- The representations used
- The contextualization of the problem
- The reasoning and strategies that students are likely to use
- The learning opportunities and goals

4.2c

Video workshop – Before viewing

Before viewing a video, the sharer will:

- Situate the viewing by providing context for the video
 - Grade
 - Task
 - Lesson goal(s) and goal that is being worked on in the clip
 - Description of what happened immediately before the clip
- Provide documents that will support understanding of what is happening in the video
 - Copies of student work, transcript, etc.
- Provide a few questions to focus the viewing

4.3a

Video workshop – While viewing

- View the video with the focus questions in mind
- Jot notes about instances in the video that relate to the focus questions

4.3b

Video workshop – After viewing

After viewing a video, consider and discuss the focus questions, making sure to:

- Connect with instances from the video that are relevant to the focus questions
- Attend closely to talk, student thinking, teacher’s moves, and comments
- Offer details from the video and provide evidence

4.3c

Debriefing video workshop

- **Understanding the process:** Set up
 - What information that was shared about the context seemed helpful in understanding the teaching?
 - What additional information would have been useful? Why would that be important?
- **Analyzing teaching and learning:** Focus questions
 - How well did the focus questions support discussion of student reasoning and teaching moves that support student reasoning seen in the video? What might help improve the focus?
- **Building productive norms:** Connection to video
 - In what ways were groups able to use specific instances in the video during the discussion? What could help us make more or better connections to the video?

4.4a

Summary

In this session, you:

- Scaled mathematics problems with a focus on mathematical reasoning
- Learned from practice through video workshop

4.5a
