

Session 10: Connecting Dimensions of Measurement

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Overview of Session 10

- Discussing the CCA: What was learned about students' thinking from teaching the measurement task
- Making connections across dimensions of measurement and between measurement systems
- Reflecting on this professional development experience
- Wrapping up

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Sharing your teaching of a measurement task

As you meet with your group, share

- the task you taught
- the dimension of measurement that was focal
- mathematical practices you saw
- learning trajectory levels you saw
- levels of the learning trajectory that were promoted (perhaps/hopefully new levels)

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Learning from practice protocol

Process for discussion

- Set norms for discussing video
- Share a short clip from the video or use notes to share about students' engagement and performance
- Discuss teaching and learning by reflecting on
  - students
  - teaching
  - note taking / sharing video

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Learning from practice protocol – Debriefing

Debrief in whole group:

- Insights gained into the learning trajectory
- The process of talking with colleagues using video and/or notes to support the discussion

What are you taking away from our work with CCAs, anecdotal notes, and sharing teaching with small groups that you can use in your teaching moving forward?

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Creating and connecting metric measurements

Connections within metric measures

- How was "meter" first defined?
- How were the other measures defined?

We will use materials to build metric units to uncover connections within the metric system.

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Metric math: Tasks

- Build a square decimeter
- Build a cubic decimeter ("box" with no top)
- Line your cube with plastic
- Fill with cold water; pour into a liter container – What do you notice?
- Fill again; weigh it in grams/kg – What do you notice?

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How do measures interact?

Adding a new dimension of length that is orthogonal (at a right angle) to those that were previously used creates a new unit of measurement

- Two length measurements at a right angle to each other create units of area
- An additional length measurement at a right angle to an area creates a unit of volume

Metric measurements of volume and mass grow out of orthogonal combinations of length measures (and water when thinking about mass)

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Measurement

Measuring consists of two aspects:

- Identifying a unit of measure and subdividing (mentally and physically) the object by that unit, and
- Iterating that unit to match the object being measured, without gaps or overlaps.

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Acting it out

- Each pair picks a card listing a task and a level on a length, area, or volume learning trajectory; one person will be the student, the other the teacher
- Gather the materials needed for the task
- **In small groups:** The pair with the card acts it out ("teacher" giving the task and the "student" showing the level of understanding); other group members will try to guess the learning trajectory level
- Move on to the next pair of people

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Debriefing

- **For "students":** What was hard to show or say at the selected level?
- **For "guessers":** What aspects of student thinking and actions "gave away" the level of the student's thinking?

How did the task make that aspect of the student's thinking visible?

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Reflecting on this professional development experience

In grade-level groups discuss:

- What are some "big ideas" in measurement that you are taking away from this PD experience?
- What are connections you are seeing in the learning trajectory levels across measurements of length, area, and volume?
- How are you thinking about students as learners of measurement?
- How are you thinking about the teaching of measurement?

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Summary - Learning trajectories approach to teaching

- Goal
- Developmental Progression
- Instruction



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Summary - Moving forward

Now that you have completed the module, capitalize on what you have learned by:

- Using "big ideas" to make connections across the measurement of length, area, and volume
- Learning about students' development of mathematical ideas in geometric measurement and in other topic areas
- Using anecdotal notes to document and make sense of what students say and do as they learn mathematics
- Designing instruction and choosing tasks that meet students where they are and help them take next steps
- Engaging with colleagues on using notetaking to better understand what students are thinking and to further improve skill in taking notes

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