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Selecting, Sequencing, and Connecting: Using Technology to Support Area Measurement through Tasks, Strategies, and Discussion

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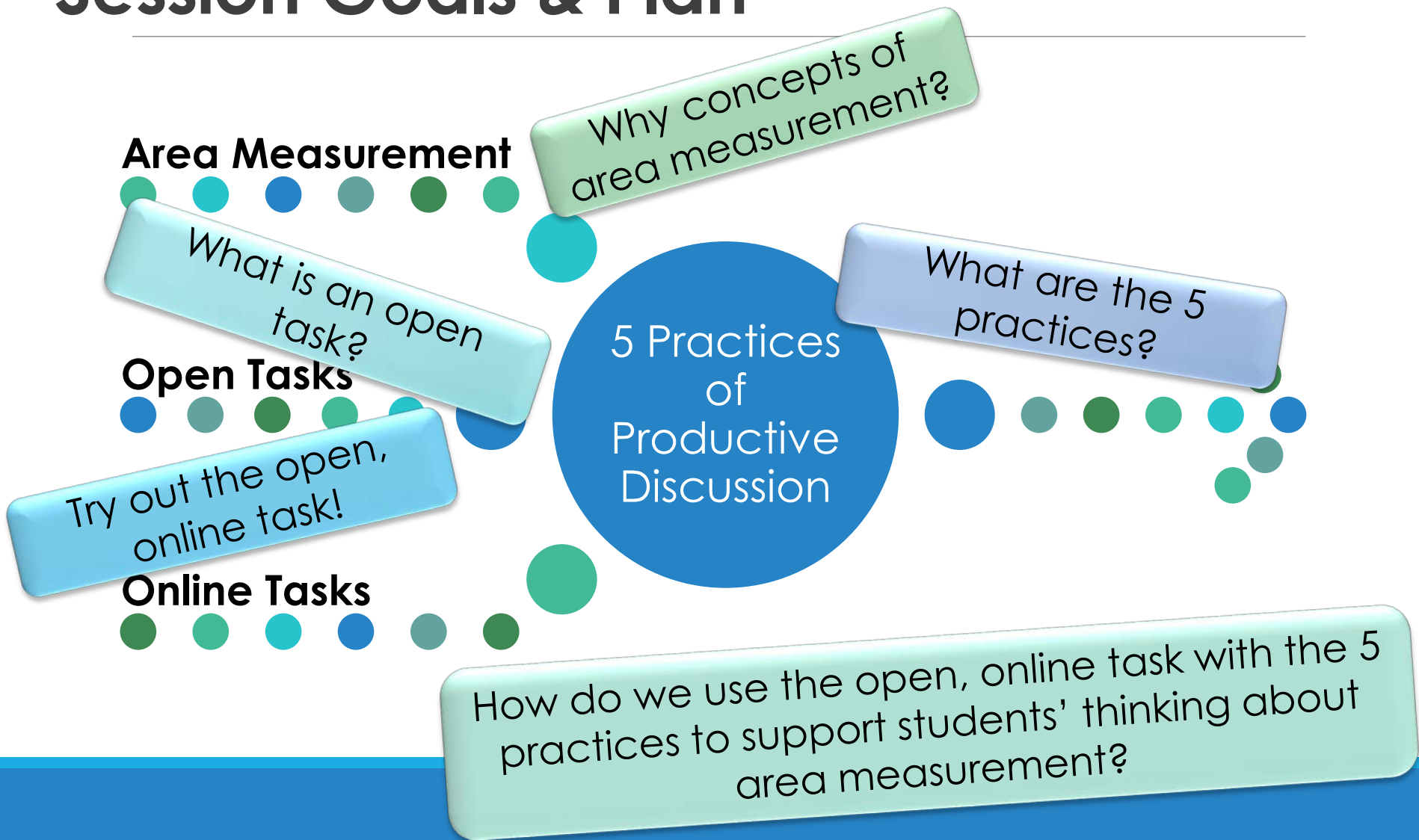
Session Goals & Plan



Why concepts of area measurement?

From Strengthening Tomorrow's Education in Measurement:

Textbooks emphasize procedural knowledge

Students are great at procedural knowledge!

But…

- Textbooks do not always emphasize conceptual knowledge for area measurement
- Students struggle with conceptual understanding (applying in the real world in meaningful ways)

For example, NAEP, 2013 – 8th Grade

On the scale drawing, the shaded area represents a piece of property along the river. Which of the following measurements is the best estimate of the area of the property?

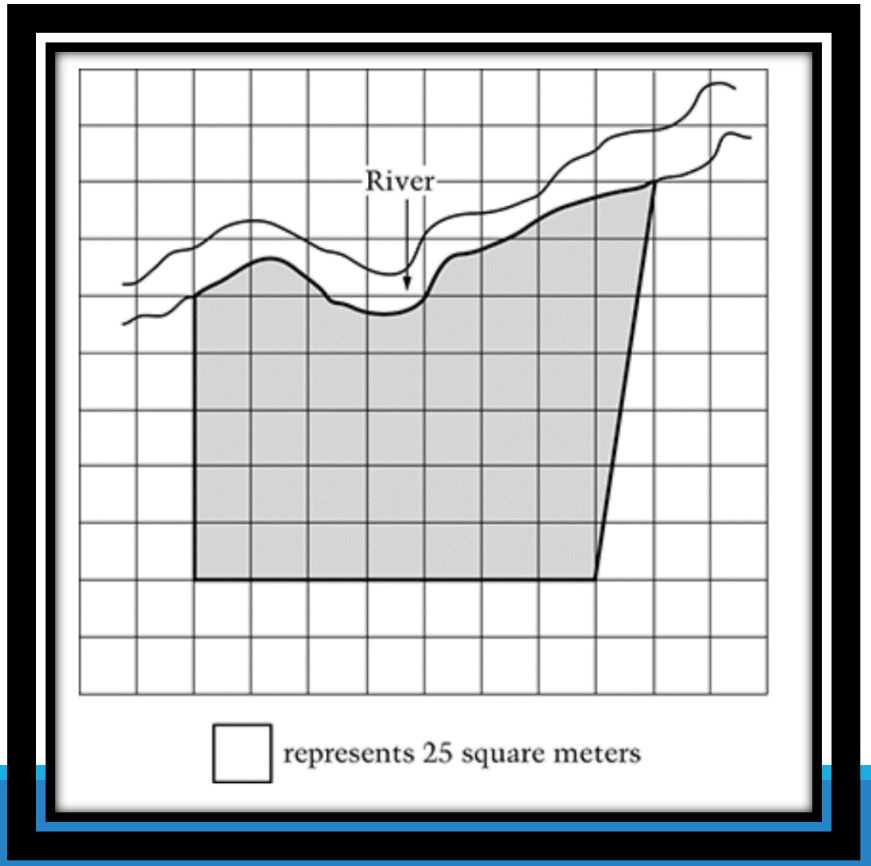
A.750 square meters

B.850 square meters

C.900 square meters

D.1,050 square meters

E.1,200 square meters



NAEP, 2013 – 8th Grade

On the scale drawing, the shaded area represents a piece of property along the river. Which of the following measurements is the best estimate of the area of the property?

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B.850 square meters

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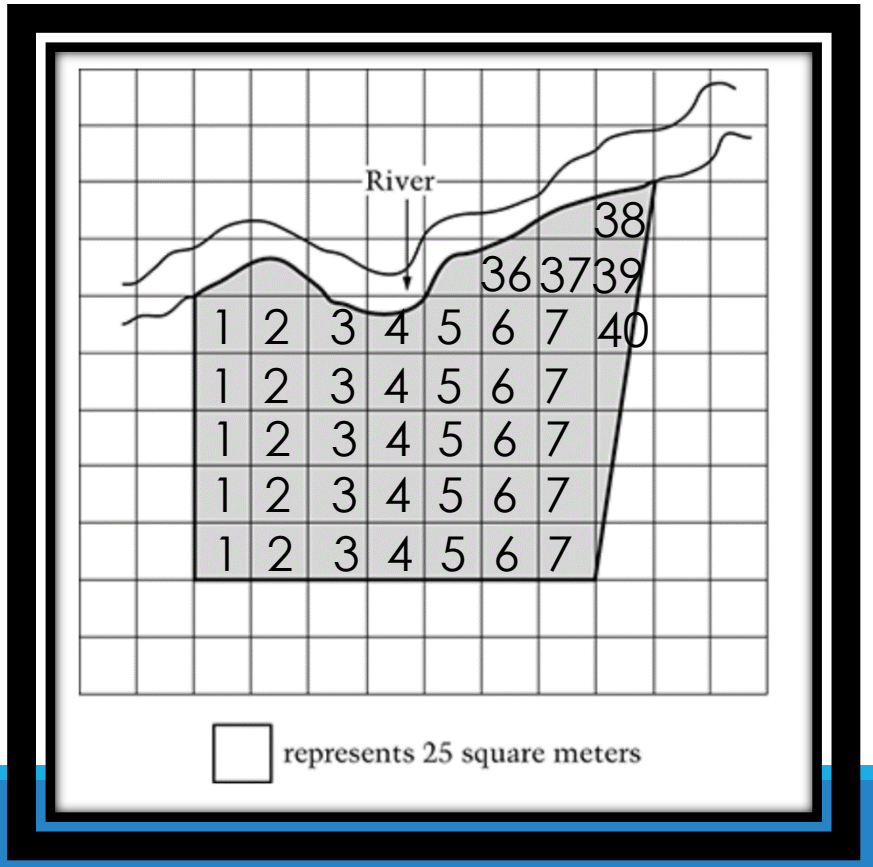
41%



What is an open task?

Multiple entry points & Multiple strategies

- Low threshold / High ceiling
- Built-in differentiation
- Open to students' knowledge & perspectives

Multiple answers & Mathematical consequences

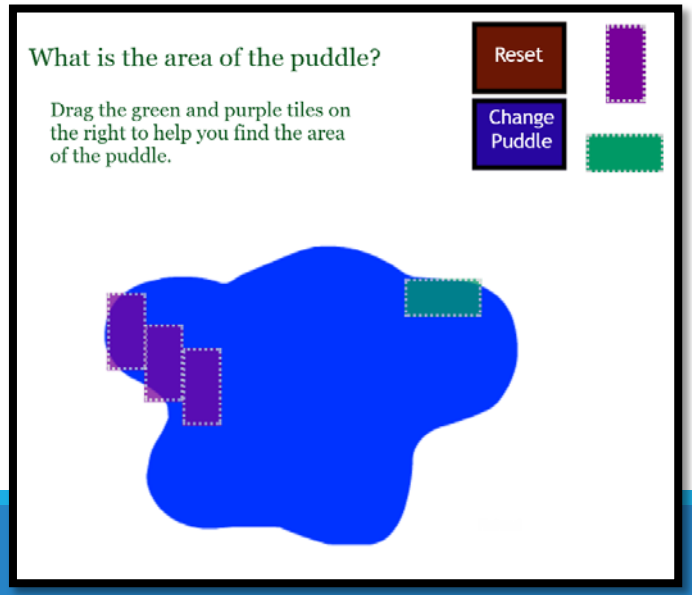
- Not all answers are valid, but
- Multiple answers can be "right" (valid)
- Confronting both valid & invalid answers allows richer discussion & deeper understanding

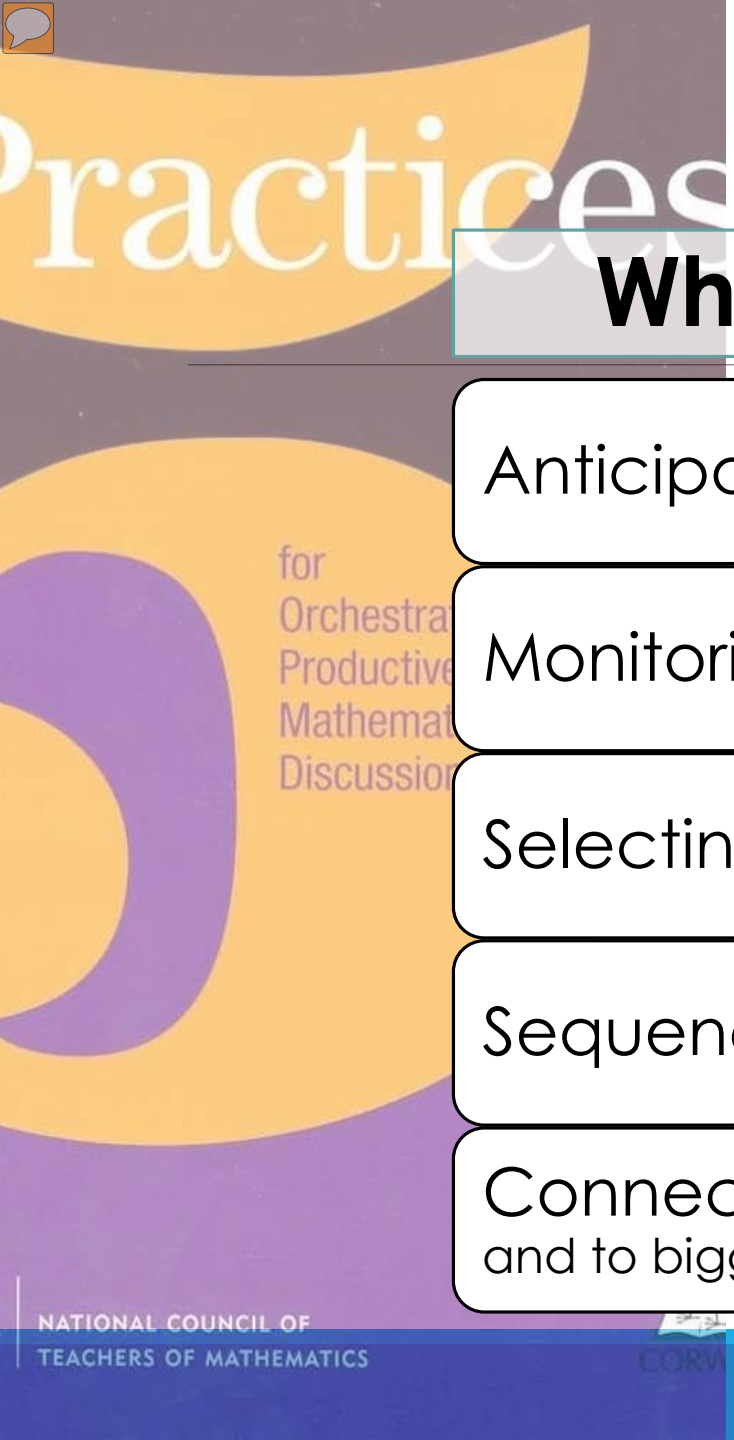
Try out the open, online task!

Work with a partner or group.

https://goo.gl/pQCeEc

- How many different strategies can you create?
- What math consequences can you notice?





What are the 5 practices?

Anticipating ...likely student responses

Monitoring ...students' actual responses

Selecting ...students who share in class discussion

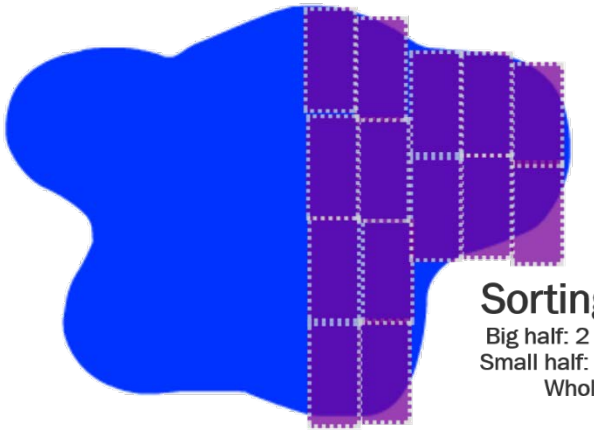
Sequencing ...student strategies strategically

Connecting ...mathematical ideas across strategies and to bigger mathematical concepts

How do we use the open, online task with the 5 practices to support students' thinking about area measurement?

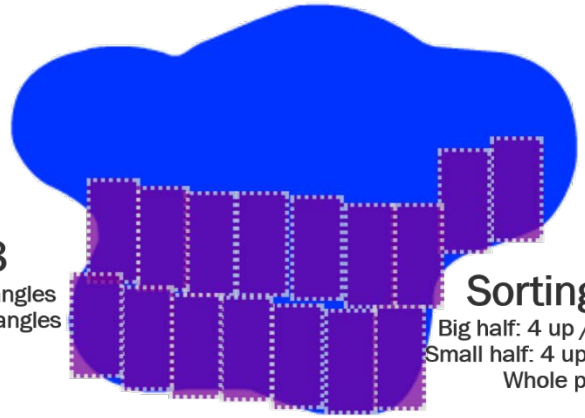
Sorting Task Image 5

Half: 14 purple means 14*2 = 28 rectangles!



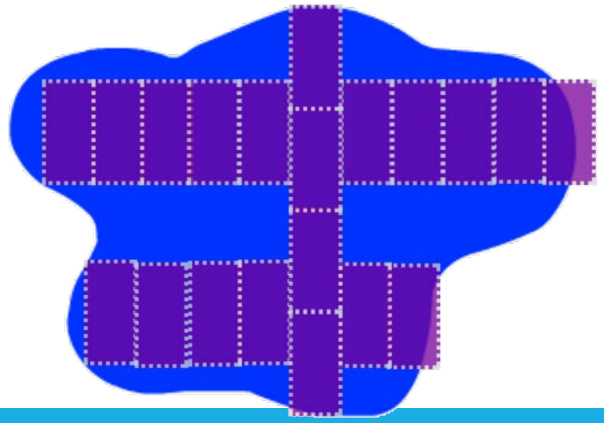
Sorting Task Image 21

Half is 16 rectangles means 16*2 = 32 rectangles



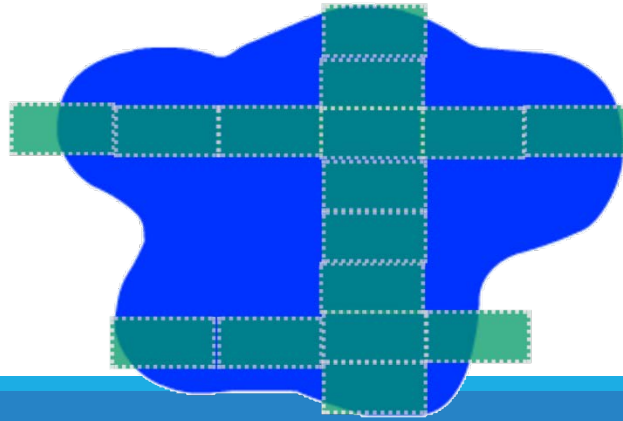
Sorting Task Image 8

Big half: 2 up / 11 across = 22 rectangles
Small half: 2 up / 7 across = 14 rectangles
Whole puddle is 36 rectangles



Sorting Task Image 7

Big half: 4 up / 5 ½ across = 22 rectangles
Small half: 4 up / 3 ½ across = 14 rectangles
Whole puddle is 36 rectangles



Find strategies to partition a shape and add areas (MGSE3.MD.7c / MGSE4.MD.8)

Let's practice using a sorting task:

On the sheet are potential learning outcomes that we can use the task to support.

Talk to your neighbor / group:

- Which look interesting for you?
- What other learning outcomes can you imagine?

Sorting Task

Choose at least 2 learning outcomes to start with.

For each learning outcome, sort the cards:

- Select 3 or 4 strategies that would support the learning outcome
- Sequence the strategies to "tell a story" supporting that learning outcome

What changes in your choices?

What strategies are missing?

Thank you for coming!

And ***thank you*** to National Science Foundation
for funding this work.

If you have any future questions

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