

Mar 23rd, 3:00 PM

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

Eryn Michelle Stehr

Georgia Southern University, estehr@georgiasouthern.edu

Ha Nguyen

Georgia Southern University, hnguyen@georgiasouthern.edu

Jia He

Augusta University, jhe@augusta.edu

Follow this and additional works at: <https://digitalcommons.georgiasouthern.edu/stem>



Part of the [Science and Mathematics Education Commons](#)

Recommended Citation

Stehr, Eryn Michelle; Nguyen, Ha; and He, Jia, "Selecting, Sequencing, and Connecting: Using Technology to Support Area Measurement through Tasks, Strategies, and Discussion" (2018). *Interdisciplinary STEM Teaching & Learning Conference*. 25. <https://digitalcommons.georgiasouthern.edu/stem/2018/2018/25>

This event is brought to you for free and open access by the Conferences & Events at Digital Commons@Georgia Southern. It has been accepted for inclusion in Interdisciplinary STEM Teaching & Learning Conference by an authorized administrator of Digital Commons@Georgia Southern. For more information, please contact digitalcommons@georgiasouthern.edu.

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

Eryn M. Stehr

Georgia Southern University

estehr@georgiasouthern.edu

Jia He

Augusta University

jhe@augusta.edu

Ha Nguyen

Georgia Southern University

hnguyen@georgiasouthern.edu



Acknowledgements to NSF for funding *Strengthening Tomorrow's Education in Measurement* Project, with PI Dr. Jack Smith, at Michigan State University



Session Goals & Plan

Area Measurement

Why concepts of area measurement?

What is an open task?

Open Tasks

5 Practices of Productive Discussion

What are the 5 practices?

Try out the open, online task!

Online Tasks

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

Why concepts of area measurement?

From Strengthening Tomorrow's Education in Measurement:

Textbooks emphasize procedural knowledge

Students are great at procedural knowledge!

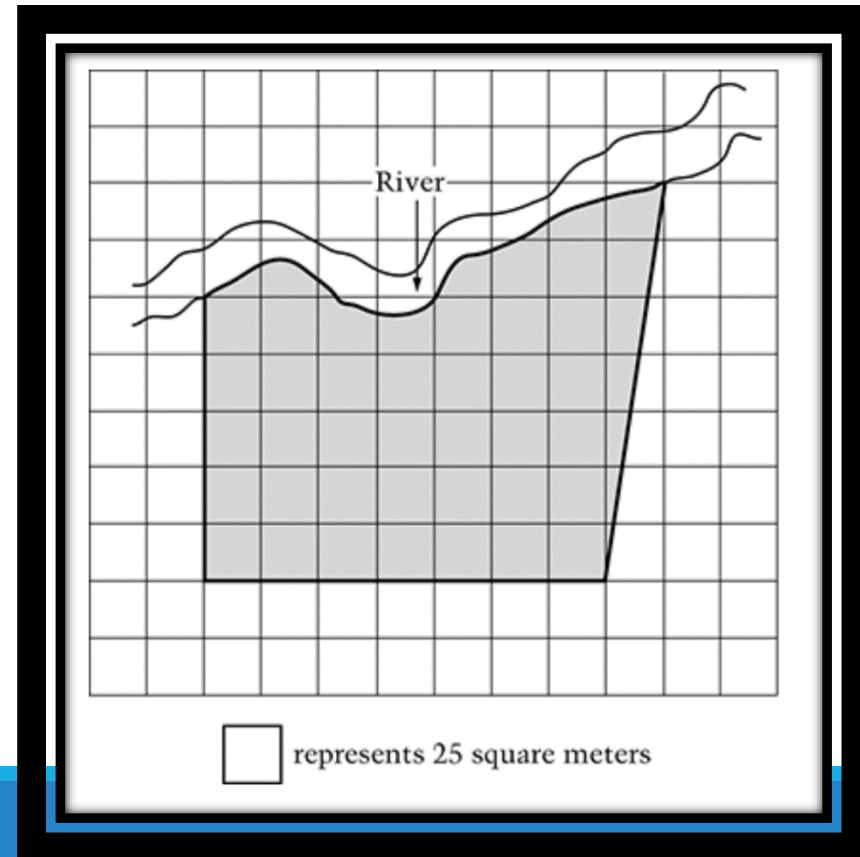
But...

- 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?

A. 750 square meters

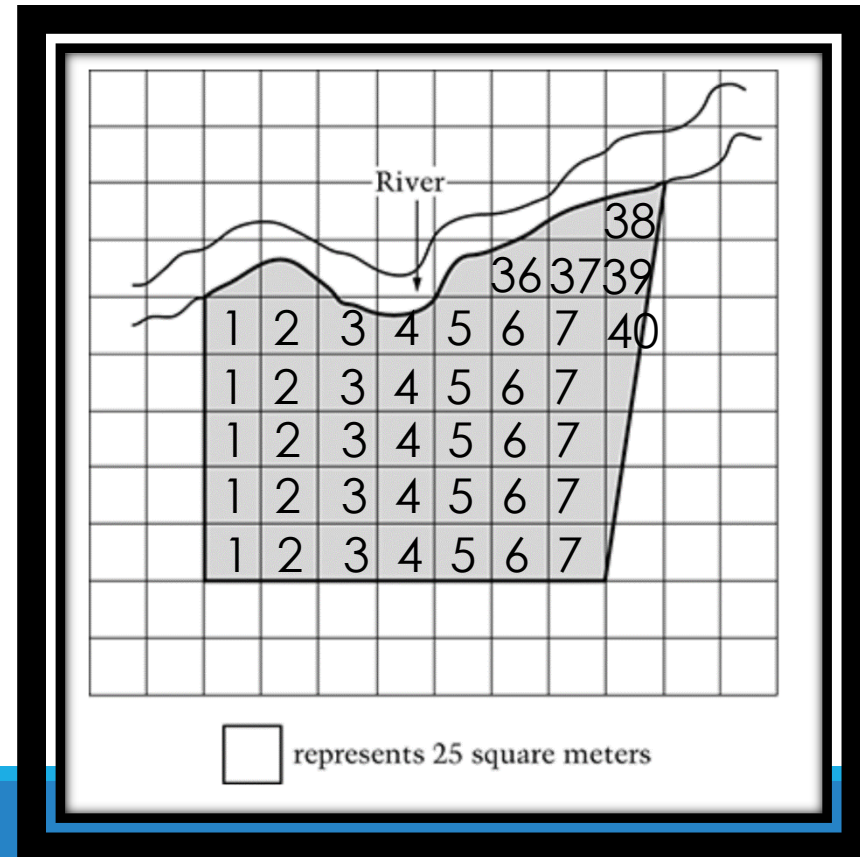
B. 850 square meters

C. 900 square meters

D. 1,050 square meters

E. 1,200 square meters

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.

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

<https://goo.gl/pQCeEc>

What is the area of the puddle?

Drag the green and purple tiles on the right to help you find the area of the puddle.

Reset

Change Puddle



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

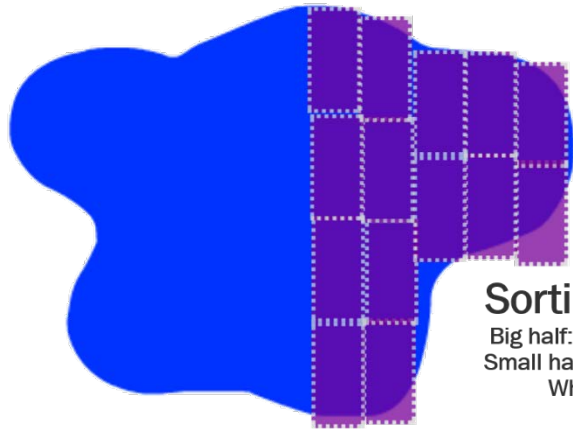
for
Orchestra
Productive
Mathemat
Discussion



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

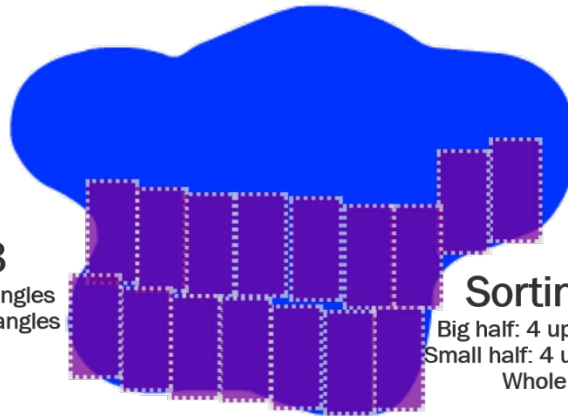
Sorting Task Image 5

Half: 14 purple means $14 \times 2 = 28$ rectangles!



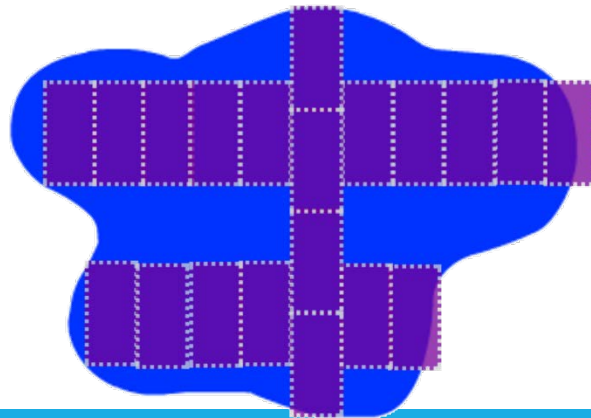
Sorting Task Image 21

Half is 16 rectangles means $16 \times 2 = 32$ rectangles



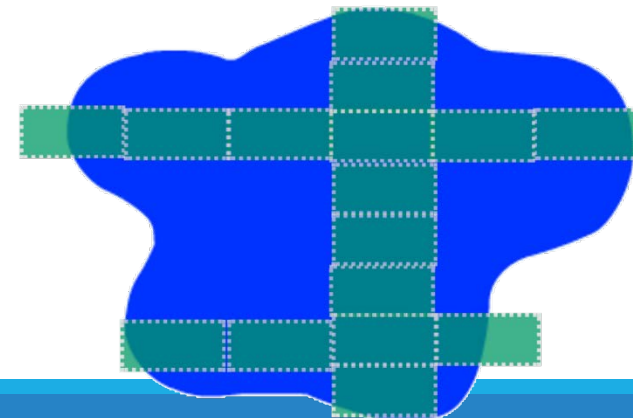
Sorting Task Image 8

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 / $5 \frac{1}{2}$ across = 22 rectangles
 Small half: 4 up / $3 \frac{1}{2}$ 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

Eryn M. Stehr

Georgia Southern University

estehr@georgiasouthern.edu

Jia He

Augusta University

jhe@augusta.edu

Ha Nguyen

Georgia Southern University

hnguyen@georgiasouthern.edu



Acknowledgements to NSF for funding *Strengthening Tomorrow's Education in Measurement* Project, with PI Dr. Jack Smith, at Michigan State University