Using PLCs to STRENGTHEN MATH CONTENT KNOWLEDGE

Ideas shared February 15, 2013

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"Learning teams resulted in STEM teachers learning more mathematics and science and using more research-based methods for teaching them."

From Ted Britton and Kathleen Fulton (2011), *STEM Teachers in Professional Learning Communities: From Good Teachers to Great Teachin*g. Washington, DC: National Commission on Teaching and America's Future, p. 5.

How?

Set up a professional environment that encourages personal growth.

Six principles that make a learning community effective:

- **Shared values and goals**
- **Collective responsibility**
- **Authentic assessment**
- **Self-directed reflection**
- **Stable settings**
- **Strong leadership support**

From Ted Britton and Kathleen Fulton (2011), *STEM Teachers in Professional Learning Communities: From Good Teachers to Great Teaching*. Washington, DC: National Commission on Teaching and America's Future, p. 8.

First—

- **Identify a framework for the discussion of the content.**

CONSIDER A TREE

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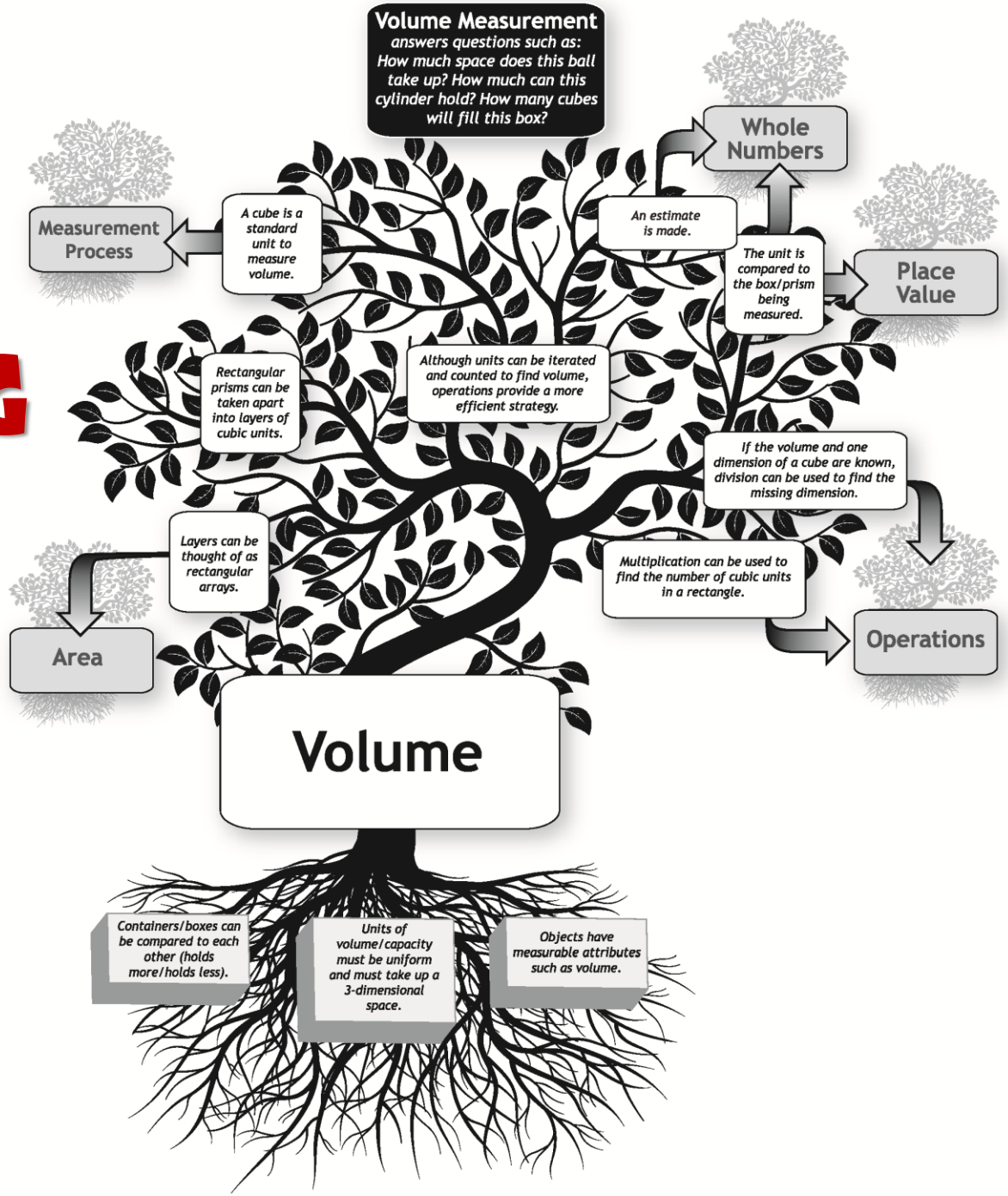
Apply the framework of the TREE to specific math content.

MEASURING VOLUME



FILL HER UP!

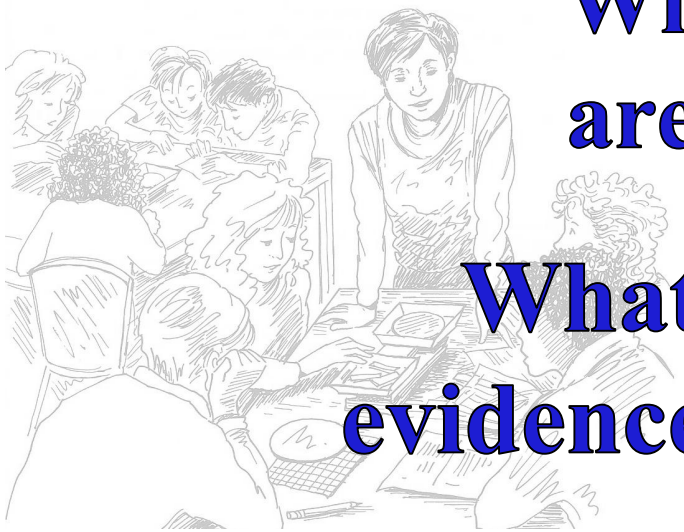
Wear your "Teacher Hat"!

What Big Ideas/Focal Points are addressed in this lesson?

MEASURING VOLUME

- Estimating
- Multiplying
- Dividing

Wear your "Teacher Hat"!



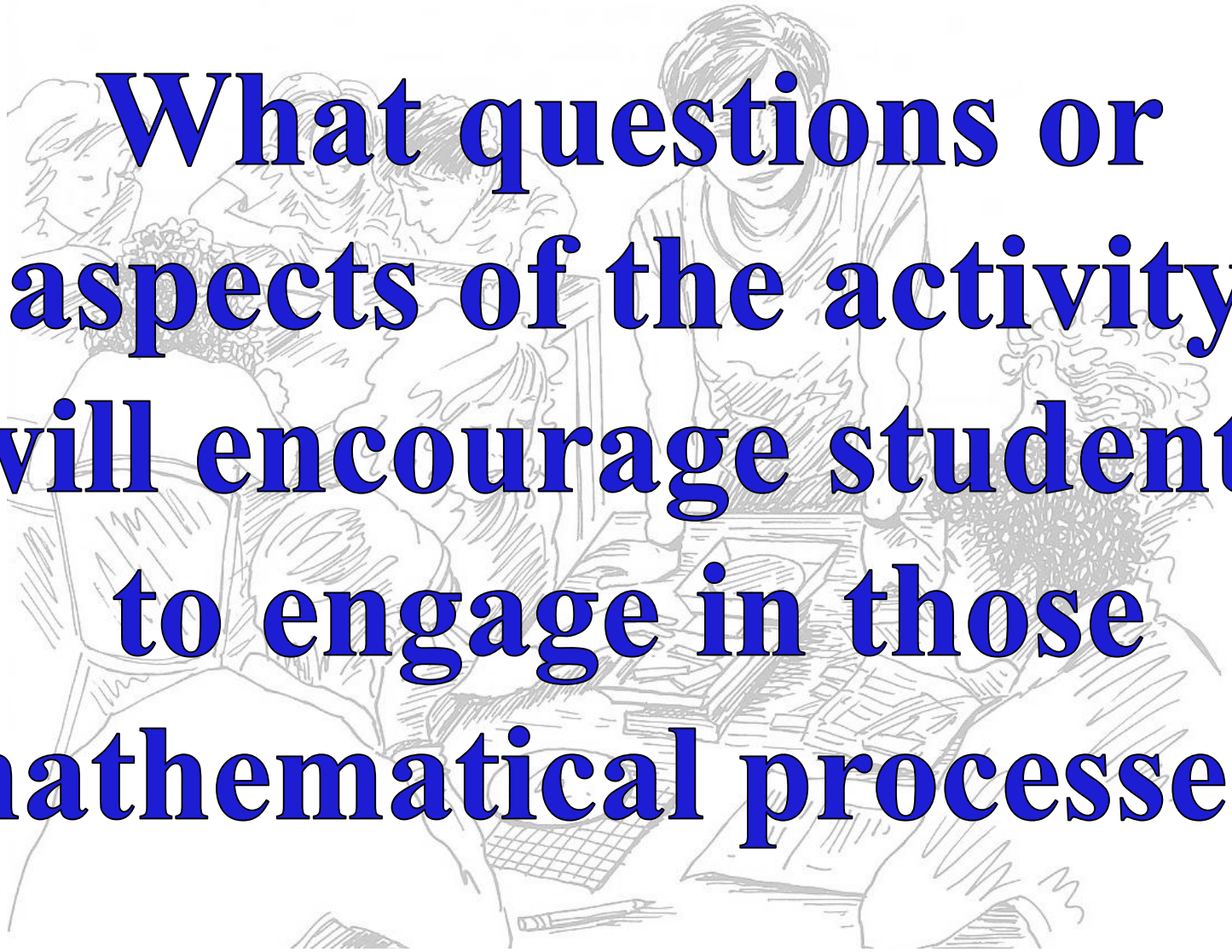
What Big Ideas/Focal Points are addressed in this lesson?

What questions will uncover evidence of understanding of—

— individual TEKS?

— connections between TEKS?

In which mathematical processes can students engage during this activity?



What questions or aspects of the activity will encourage students to engage in those mathematical processes?

Fill Her Up!

Dinah Chancellor

You need: snap cubes, cm cubes, a box

- How many snap cubes do you think it will take to fill the box? Record your guess.
- Try it to see.
- Using the cm cubes, how many do you think it will take to fill the same box?
- Record your estimate.
- Try it to see.
- How did you use the information from your first experiment to help you make a better estimate for the second experiment?

Fill Her Up!

Dinah Chancellor

Box:

Cubic unit: *(circle)* unit cubes linking cubes

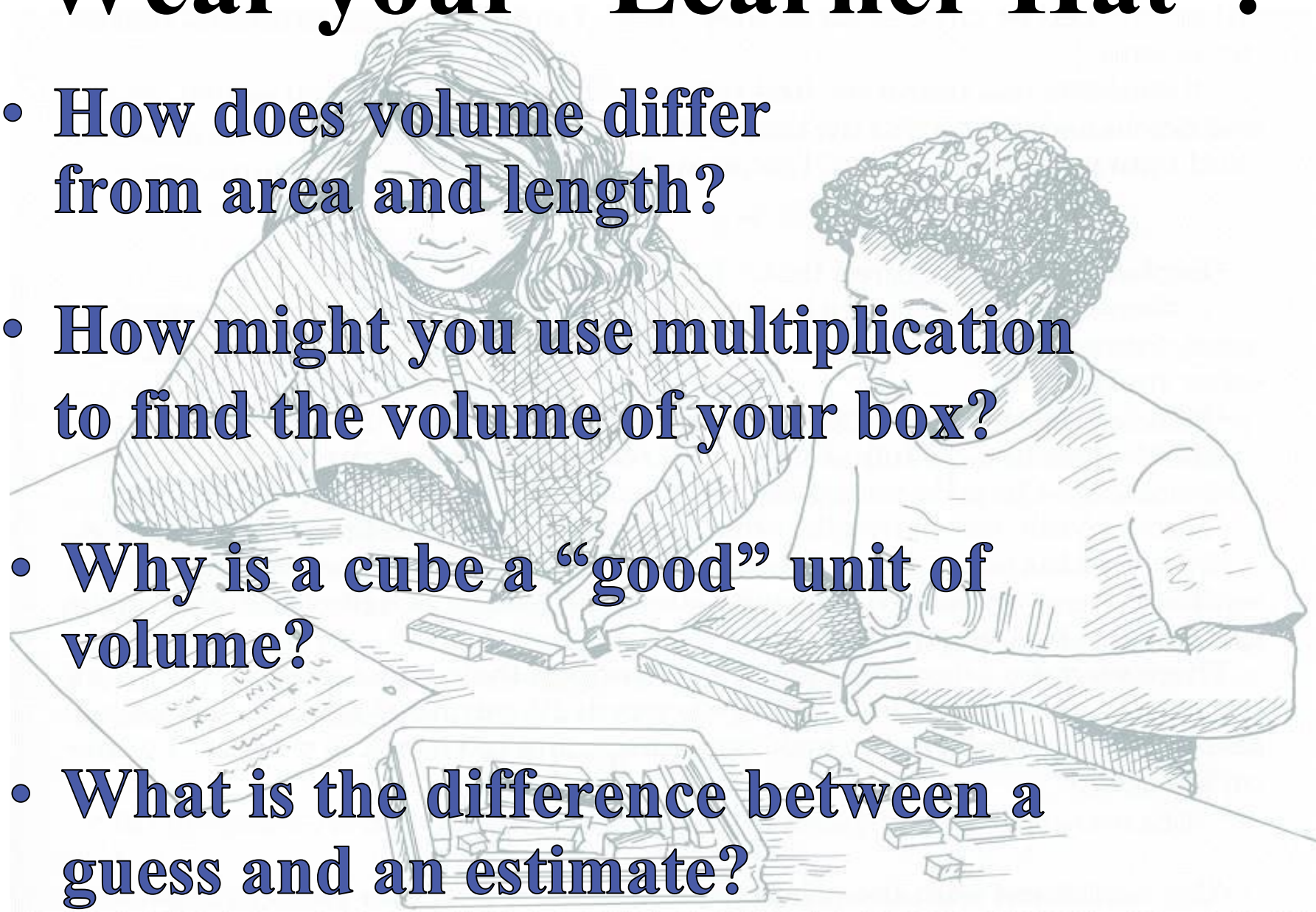
Volume (Guess): Actual Volume:

Cubic unit: *(circle)* unit cubes linking cubes

Volume (Estimate): Actual Volume:

Our discoveries about volume:

Wear your "Learner Hat"!



- How does volume differ from area and length?
- How might you use multiplication to find the volume of your box?
- Why is a cube a "good" unit of volume?
- What is the difference between a guess and an estimate?

Finally—

Reflect on teaching and learning experience by analyzing student work.

Emilia (5)

Fill Her Up!

Dinah Chancellor, 2007

Box: K

Cubic unit: *(circle)* (unit cubes) linking cubes

Volume (Guess): 65 unit3 Actual Volume: 360

Cubic unit: *(circle)* unit cubes linking cubes

Volume (Estimate): 25 Actual Volume: 48

21
22
42

Our discoveries about volume:

We used multiplication to make it quicker to count the layers, rows and columns. Everything makes a good unit but some units may not work as well as others because if you think marbels are as good as cubes but they leave spaces. Thats why cubs are better. Because a guess is just a number from thin air but a estimate is something that you think is the right awnser. Volume is something that you use to hold something length is what you measure and area is the inside of something you count.

204

226 242 32

15 x 6 = 90

16

90 x 4 = 360

Katie S (20)

Fill Her Up!

Dinah Chancellor, 2007

Box: G

Cubic unit: *(circle)* (unit cubes) linking cubes

Volume (Guess): 70 units³ Actual Volume: 450

Cubic unit: *(circle)* unit cubes (linking cubes)

Volume (Estimate): 50 Actual Volume: 75

Our discoveries about volume: We can use x and ÷ to salve the problem. A squbeis a good unit of volume to use because if will not leave spaces when you put another cube on or next to it. If you gess you don't Know eney thing and if you estimate you know something already. Area is just one layer. Volume is more than on layer. Length is how long, tall or short something is.

42
168
140
270
270
+ 90
360
+ 40
450

25
25
50
+25
75

(1) (2) (3) (4) (5) (6) (7) (8) = 450 ÷ 8 = 75

Reflect—

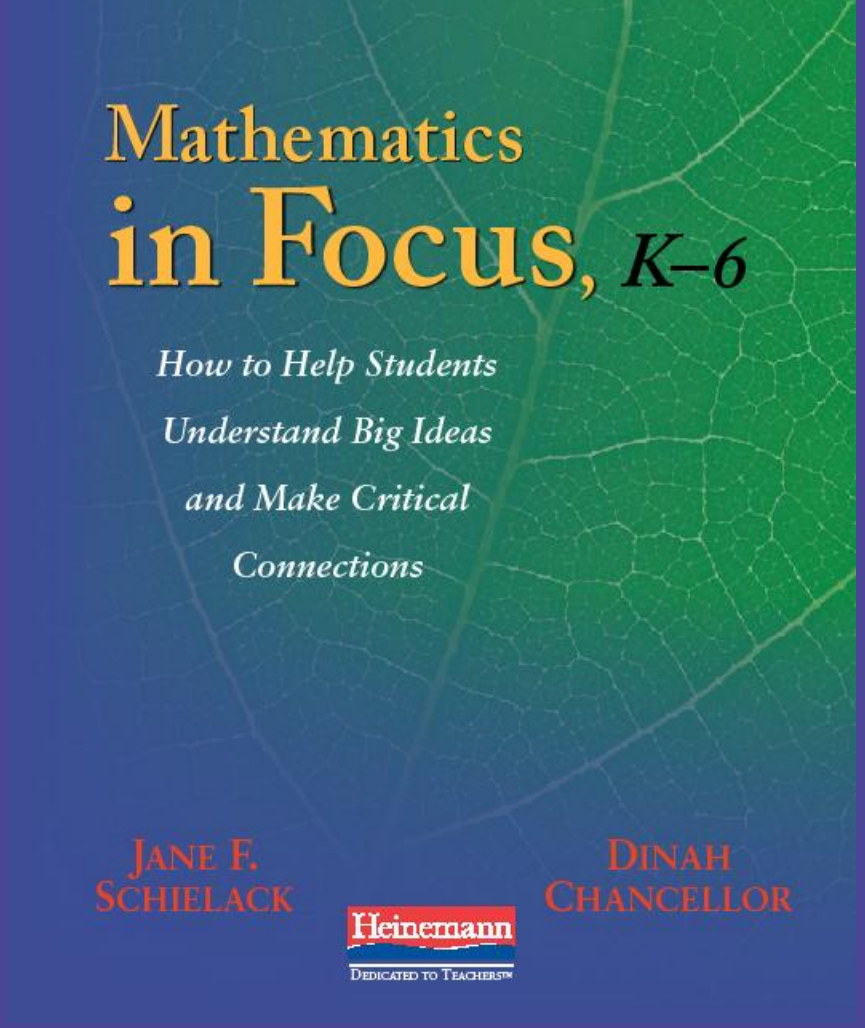
What evidence is there that students applied and improved their understanding of the big ideas?

How could you change the activity (or your questioning) to deepen their understanding even more?

Reflect—

What evidence is there that students engaged in mathematical practices during the activity?

How could you change the activity (or your questioning) to further encourage their use of mathematical practices?



Thanks for coming!

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