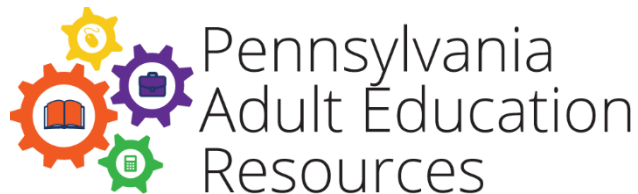


Get Students to Talk in Math Class

Maribel Ojeda

Professional Learning
Opportunities Project





Objectives

- Discover technologies and tools to engage math students in “Math Talk” in a digital or hybrid learning environment.
- Make connections between “Math Talk”, the College and Career Readiness Standards (CCRS) and the Foundation Skills Framework (FSF)



Math Talk, CCRS, and FSF



Big Picture

Why is it critical for students to be able to develop a sound argument in math (or any other subject)?

Why is it critical for students to develop the skills to critique the reasoning of others?

Why do they need to talk in Math class?



CCRS Key Shifts in Math

- Rigor
- Focus
- Coherence

Conceptual Understanding,
Procedural Skill and Fluency,
and Application



Math Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- **Construct viable arguments and critique the reasoning of others.**
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.



Breaking Down MP.3

- **Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.**

Foundation Skills Framework Connection





Changing Our Practice

What changes to instruction might support the development of the skills described?

Let students do most of the talking, critiquing and correcting.

Provide the right tasks.



Rich Math Tasks

What are the qualities of a rich math task?



- Challenges learners to wonder.
- Offers opportunities for elaborate solutions or methods.
- Accessible to all learners, at different levels.
- Requires critical thinking and reasoning.
- Asks learners to develop an argument.
- Asks learners to use tools or models.
- Encourages collaboration (sometimes).
- Provides an opportunity to apply skills.
- Potentially reveals patterns in math.



Notice and Wonder

Key Points:

Notices: These observations are free of inference and shared without discussion.

- By having to make only factual observations, the focus is entirely on the what and not necessarily on the why or how to fix it.

Wonders: *Wonder why, Wonder if, Wonder whether, and Wonder how.* They usually contain a speculative implication.



Notice and Wonder

Calculate 75% of \$20,000.

1. Solve the problem; show your work.
2. Trade with your partner. (email, screen shot, screen share, text, post it online share a google doc etc.)
3. Use Notice and Wonder statements to comment on your partner's solution (use T-chart to organize your thoughts- use a google doc).
4. Share your Notices and Wonders.



What Went Wrong?

Using Notice and Wonder statements, discuss the following student responses to “What is 0.48×921 ?”

Student 1

$1/2$ of 920 is 460.
Then I tried doing .02 times 921 but didn't get too far.

Student 2

$1/2$ of 921 is 460.5,
and I just stopped there.

Student 3

$1/2$ of 920 = 460
2% of 1000 = 20
 $460 - 20 = 440$



Justify Your Choice

Would you rather buy

18 eggs at this price

or 18 eggs at this price?



h/t @mathcoachcorner



wouldyourathermath.com



Construct an Argument

How many green marshmallows are inside the glass?

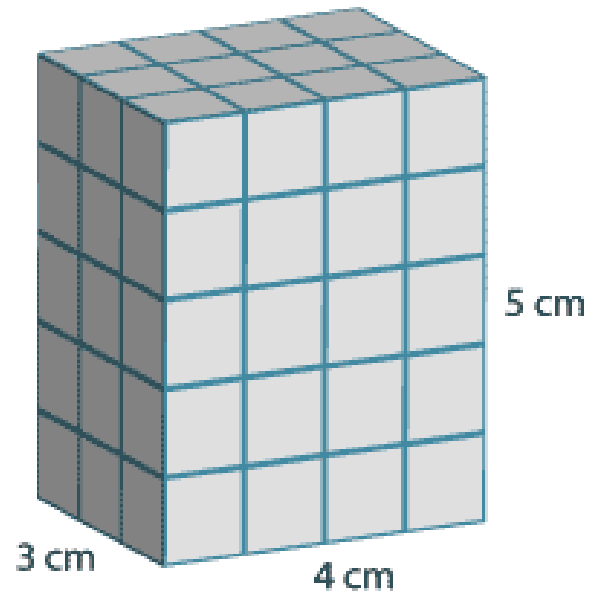
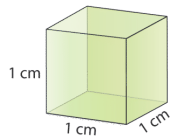






Reason and Rationalize

How many 1-cm cubes can fit in a rectangular box that is 5 by 3 by 4 cm?





Number of Cubes in First Layer

5

3

Number of Layers

4

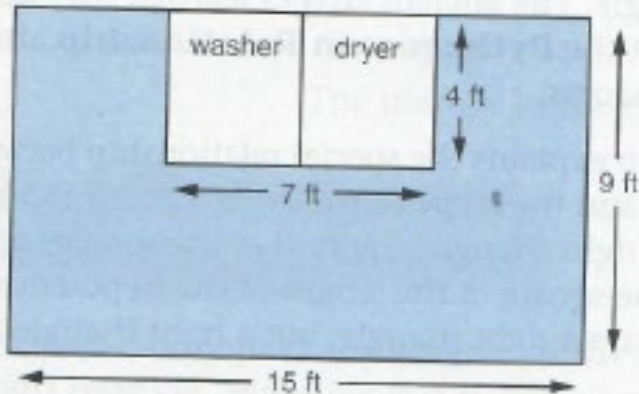
Filling



Require Math Talk

Solve.

1. Emily plans to tile her laundry room floor, except for the space underneath the washer and dryer. Each tile covers 1 square foot of space. How many tiles will Emily need to do the job?



5. Bill works two jobs. Last week, he worked 30 hours in all. If he worked two hours more at one job than he worked at the other, how many hours did he work at each job?

- (1) 9 and 11
- (2) 13 and 15
- (3) 14 and 16
- (4) 19 and 21
- (5) 24 and 26

For Numbers 4–6, write an equation to describe the problem. Use the letter x for the unknown. You do not need to solve.

4. Rochelle had 24 bags of used clothes. She gave 7 of the bags to a charity. How many bags are left?



- Instead of asking “Does this make sense” ask, “Can you put that into your own words”.
- Instead of asking for the solution, ask for the process.
- Remember wait time.
- Allow students more than one attempt at explaining.
- Connect explanations with the outcome/solutions

Questions?





Final Thoughts

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