

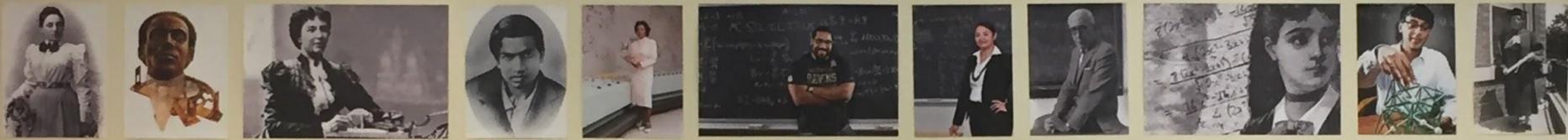
Reflecting on Practice: Getting Started

Week 1, Day 1
2019



**Welcome to day one
in Peg's high school
geometry class.
Take your seat but
don't get comfy...yet!**





Ask, Don't Tell:
Ask a good question, and everyone starts thinking, answer it, and everyone stops.

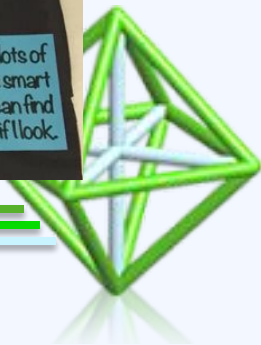
So put at least as much effort into asking good questions, as you put into answering them!

| | | |
|--|---|---|
| Ask interesting questions, like Fermat Make insightful connections, like Wiles | Represent ideas clearly, like Poincaré Develop logical explanations, like Cantor | Solve practical problems, like Bankeker Record your thinking in organized ways, like Euclid |
| Extend ideas, like Euler Use multiple strategies to make sense of one big idea, like Riemann | Some of the Many Ways to Be Mathematically Smart... | Visualize shapes in many dimensions, like Mirzakhani Experiment with new approaches, like Leibniz & Newton |
| Predict and make conjectures, like Archimedes Break complex problems into cases, like Germain | Collaborate to help others develop their ideas, like Erdős & Tao Work systematically, like Gauss | Explain sophisticated ideas using simple language, like Cheng Play productively, like Conway |

curiosity
creativity
courage
compassion
commitment



| | | | | | |
|--|---|--|---|--|--|
| This is too hard. | This is so easy. | This makes my head hurt. | This is good enough. | I can't make this any better. | I give up. |
| What exactly doesn't make sense yet? | My effort making sense of earlier work is helping me succeed now. | I can feel my brain getting stronger. | Is this really my best work? | It's almost always possible to improve. | Being strategic can help me to keep making progress. |
| I make mistakes. | I am not fast at getting answers. | I can't do this in my head. | I don't know the right way to start. | I can't tell if my answers are right. | I am not smart in math. |
| Mistakes are essential tools that support my learning. | The quality of my answers is more important than their speed. | Mental math is only one of the tools I can use to get an answer. | Noticing and wondering is one way to start any problem. | Estimating can help me check if my answers are reasonable. | There are lots of ways to be smart in math. I can find mine if I look. |



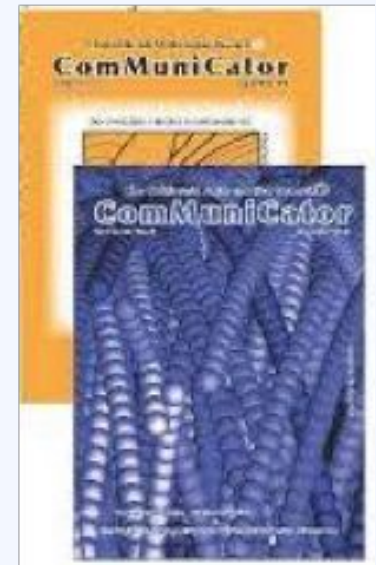
Randomized Seating



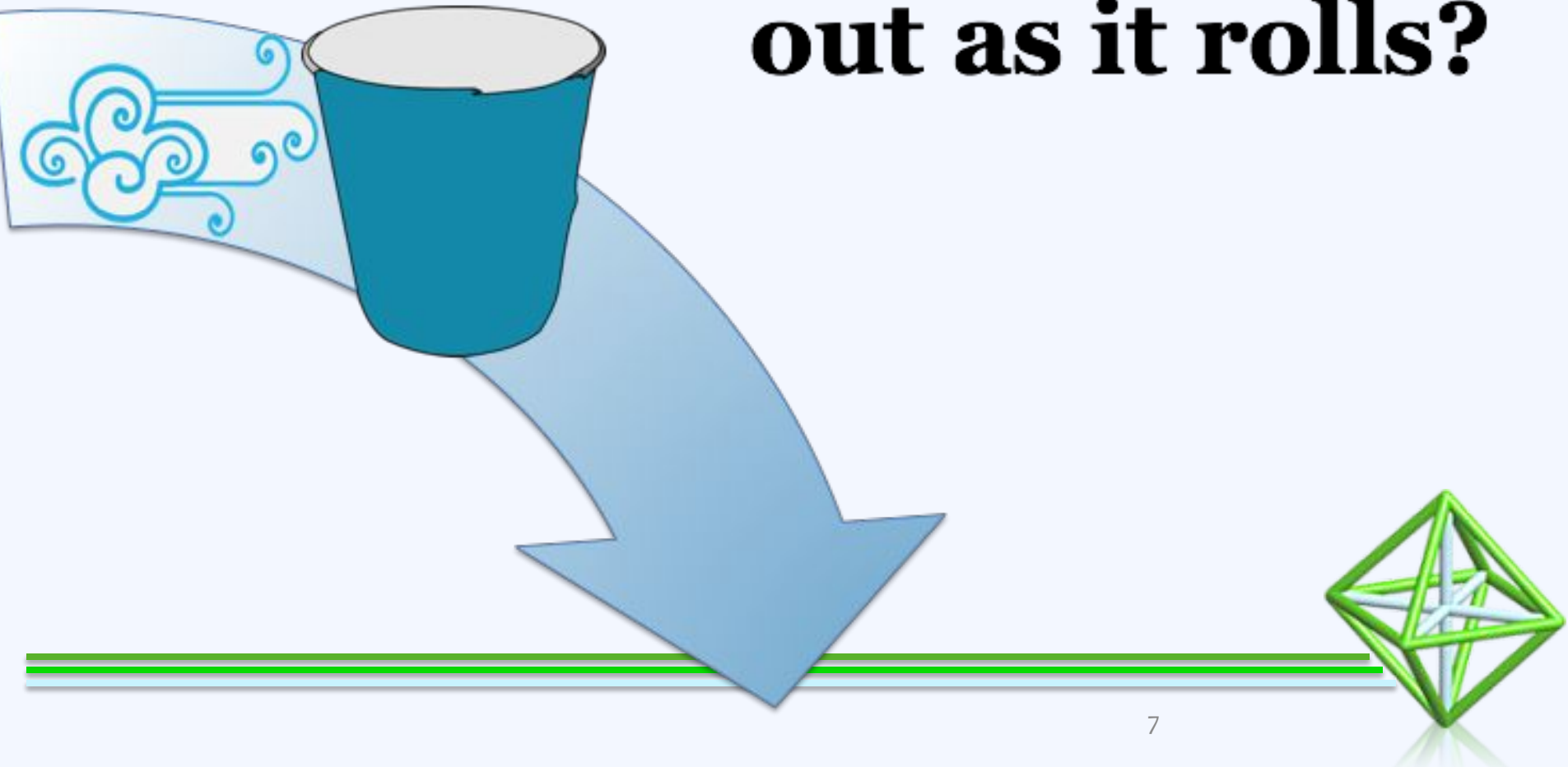
A problem to play with...



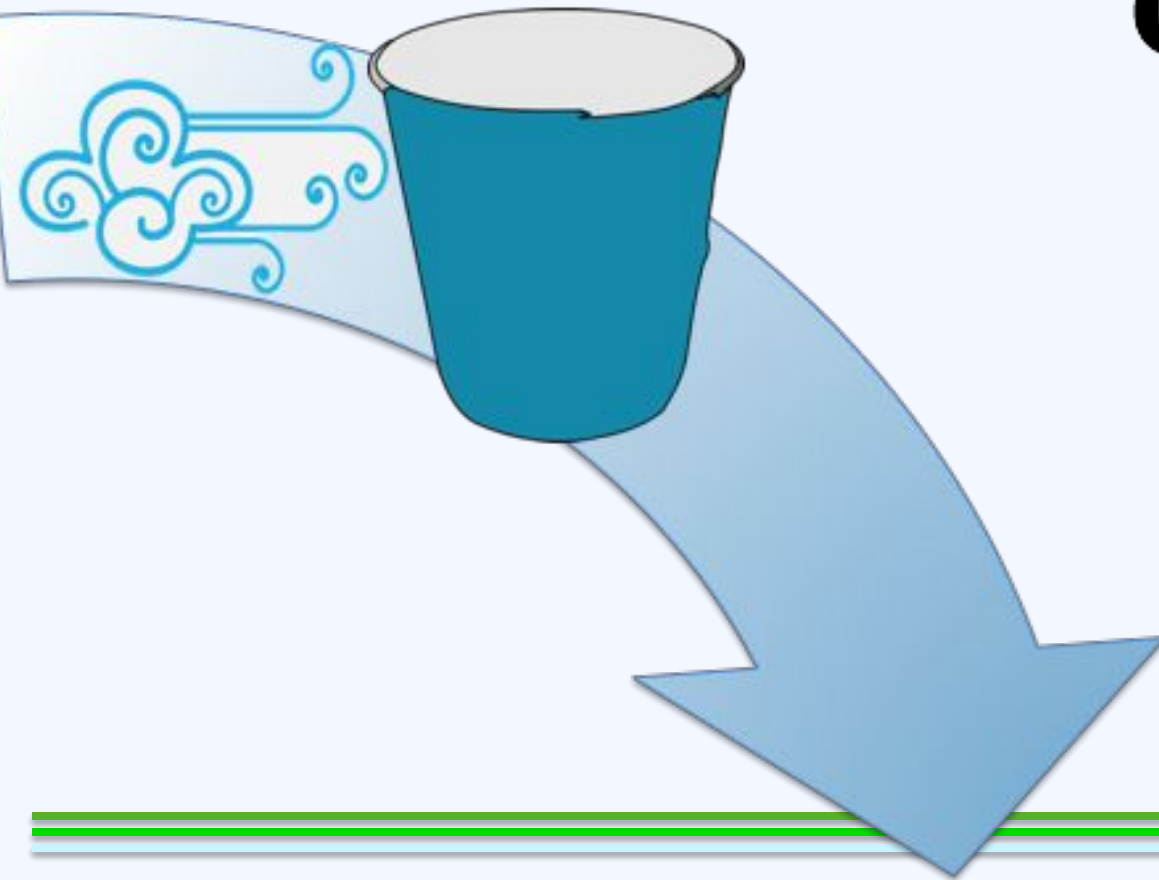
Origins of this scenario



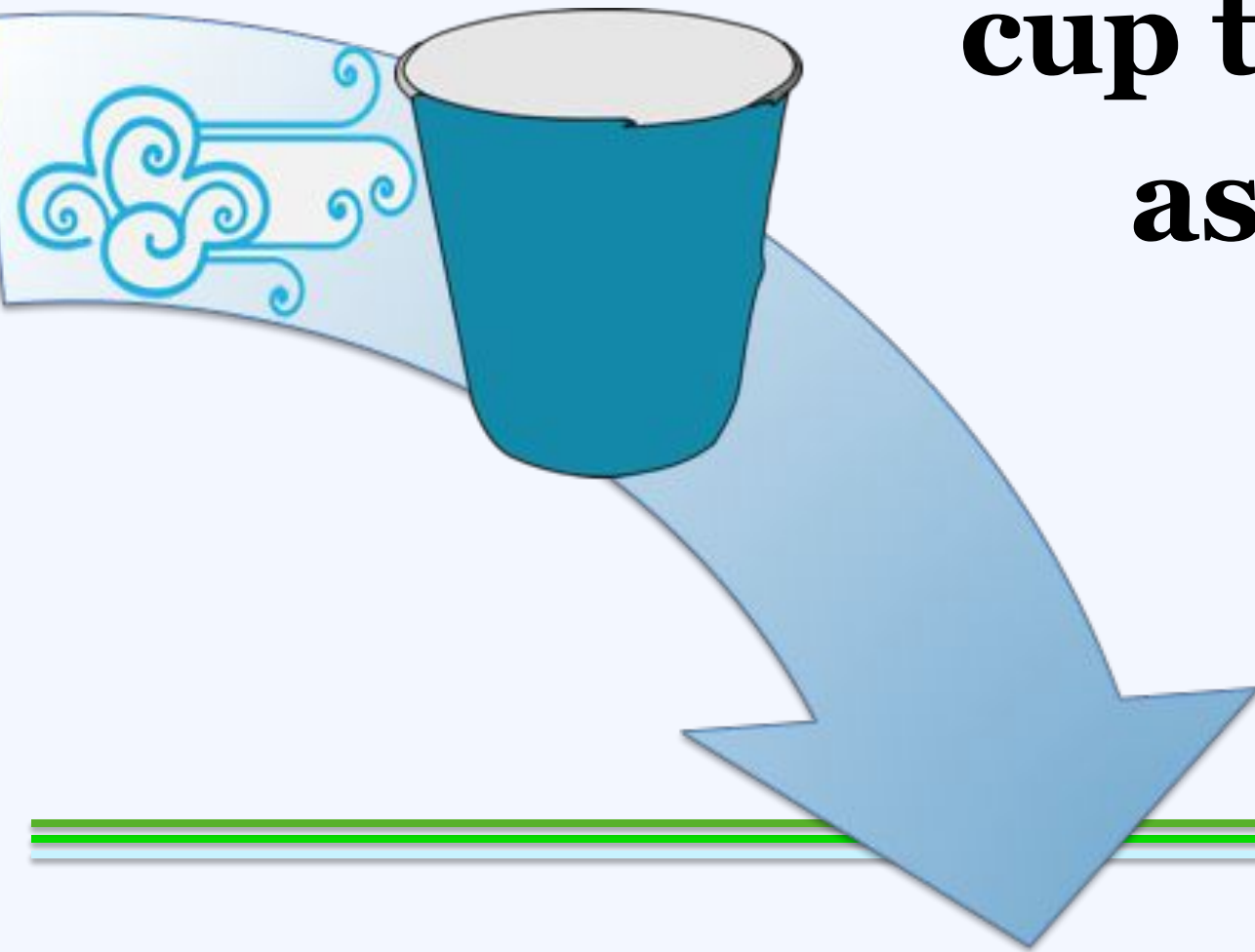
**What's the shape
that the cup traces
out as it rolls?**

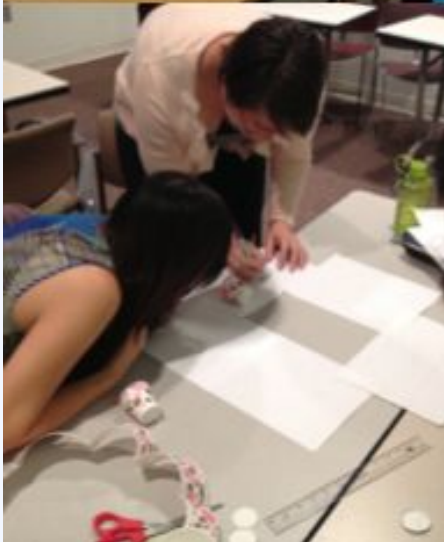


**Convince yourself.
Convince a friend.
Convince a
skeptic!**



**Strategies used to respond to
“what’s the shape that the
cup traces out
as it rolls?”**





What's the shape that the cup traces out as it rolls?

Possible strategies:

- Cut and tape cups together
- Cut one cup and trace it repeatedly
- Draw the path as the cup rolls
- Build a “wreath” of intact cups
- Wrap the cup with paper, building the cone that contains the frustum
- Consider the limiting cases of the cone & the cylinder
- Attach a string and use it to define a radius as the cup rolls



Day 1: What's the shape that the cup traces out as it rolls?

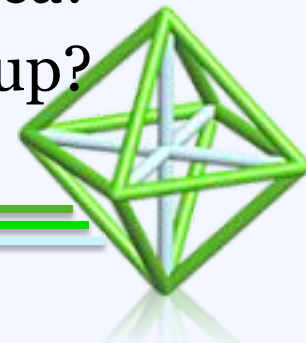
Day 35: How could you locate the center of the shape that the cup traces out?

Day 70: How could you determine the area of the shape that the cup traces out?

Day 105: How could you use the dimensions of the cup to determine the area of the shape that it traces out?

Day 140: How could a cup be built from a single piece of $8\frac{1}{2}$ " by 11" paper that would trace out the largest possible area?

Day 175: What else might we ask about the rolling cup?



Let's Talk

Open your name tent & in today's section labeled "participant", tell us one thing from this morning that resonated with you and *why*.



Don't forget about the parking lot.

It is a place for your comments, questions and observations on our shared work.

(And thank you for all your thoughtful work this morning!)



This afternoon...

Lunch- in the tent @ as soon as we finish these last few slides

Working Groups- assignments and room locations are posted on the doors @ 1:00

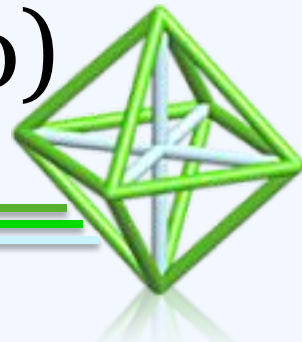


Later this afternoon...

Cookies- in the hallway @ 3:00

Cross-program meeting- in the theatre @ 3:15 (organizational meeting for Ignite! & Math Labs)

Knitting Circle- here in Silver King @4:30 (with Sabetta Matsumoto)



This evening...

Welcome dinner- at Doubletree
Hotel @ 6:00

Field trip to Java Cow- take the
free bus into town for ice cream @
whenever dinner winds down

Parade!- tent @ 7:30

