

Great Tasks: The Pleasure and Luxury of Being Wrong in Mathematics!

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Goals of the Session



- Reflect on the quality of tasks in teachers' Professional Learning Communities.
- Examine powerful PLC models that engage teachers in learning how to improve student discourse.
- Encourage teaching practices where learners experience cognitive dissonance and create, examine, and correct wrong strategies.

Definition of a Great Task

- multiple entry points and several methods of solution
- Is directed at essential mathematical content
- Requires examination and perseverance – challenging students
- Offers rich discourse on the mathematics involved
- Builds student understanding
- Warrants a summary look back – with reflection and extension opportunities

Assumptions of Problem Solvers

Effective Solvers

- Multiple pathways to solve
- Seeks multiple solutions
- Try something!
- Learns from mistakes
- Sees problem as a challenge
- Tries multiple methods

Struggling Solvers

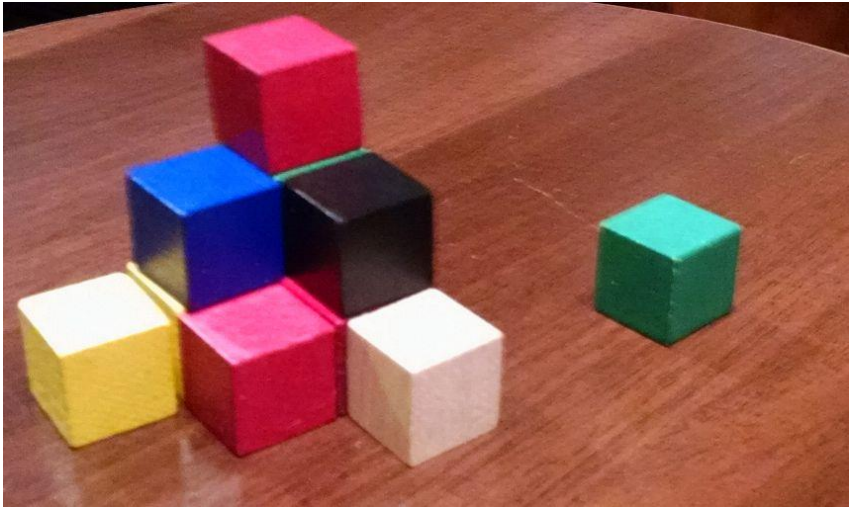
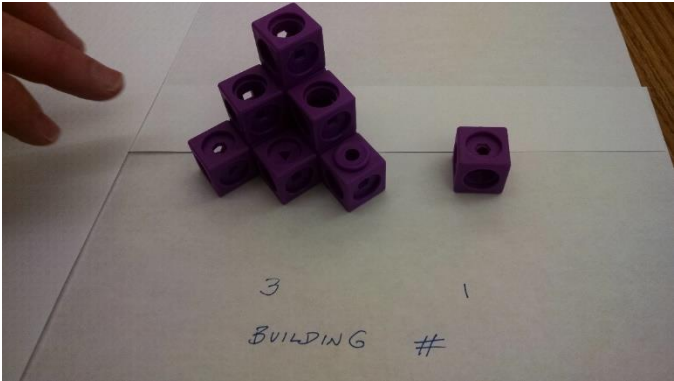
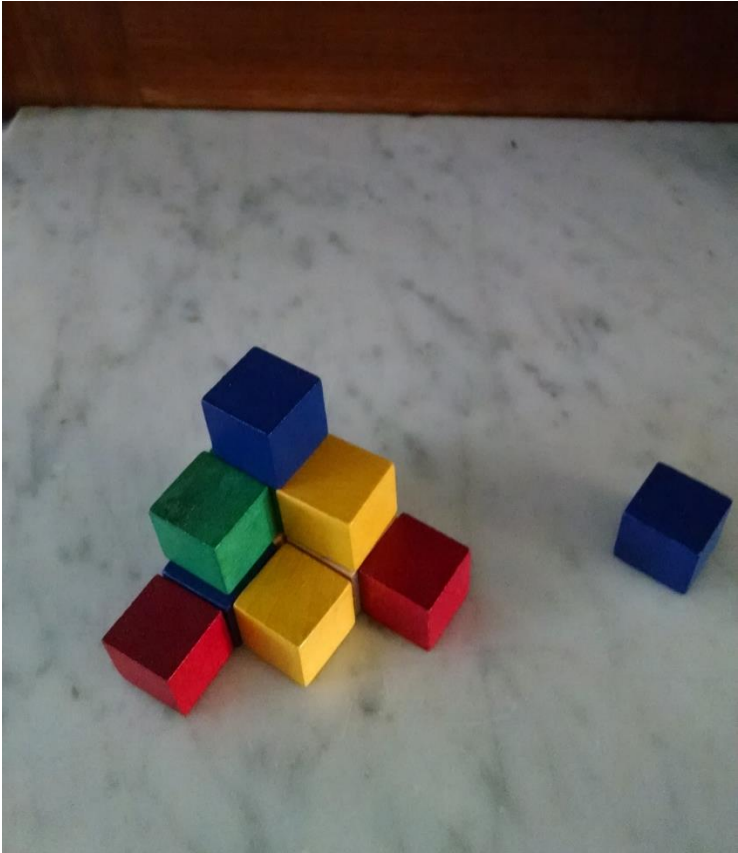
- Seeks the path & answer
- Looking for one solution
- Looking for the obvious
- Dislikes struggling
- Seeks fast solution
- Tries one method

Feynman “The Pleasure of Figuring Things Out



- Effective Teaching
- https://youtu.be/PVob_tATVRI?t=2s

Cubical Creations



Reflecting on A Problem

- What mathematics does this problem entail?
- What technology could help enhance the understanding of this problem?
- What additional questions would help the entire PLC to develop student engagement for the problem?



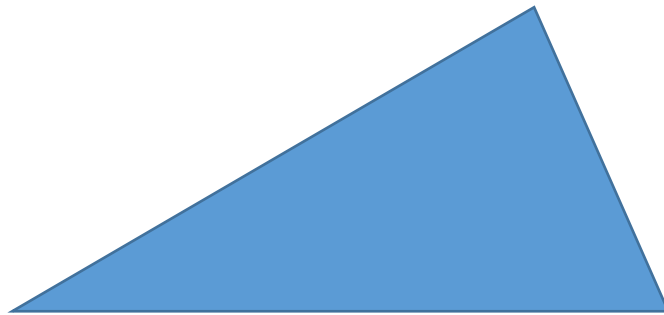
Infinity Pizza “Great Tasks”

- **Exploration 1:** Sally’s Pizza Chop Shop specializes in gigantic pizzas made in random triangle shapes. You and two good friends decide to get a pizza and share it equally.



Infinity Pizza

- Devise a fair method for cutting any triangular pizza into 3 equal sized pieces. Justify that your method creates a fair division using the formulas and properties of area for geometry.
- Use a dynamic geometry program (Sketchpad, GeoGebra, Cabri, N-Spire, etc) to model the problem and show that the areas are the same with that model.



Reflecting on A Problem

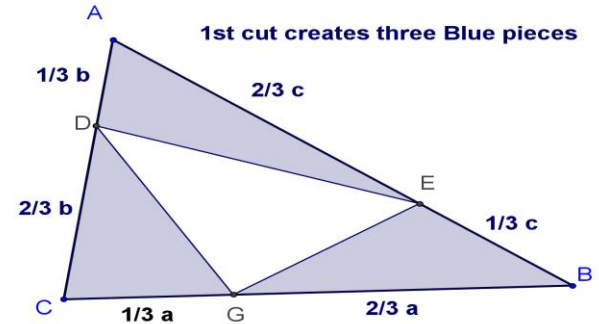
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Pizza Part 2:

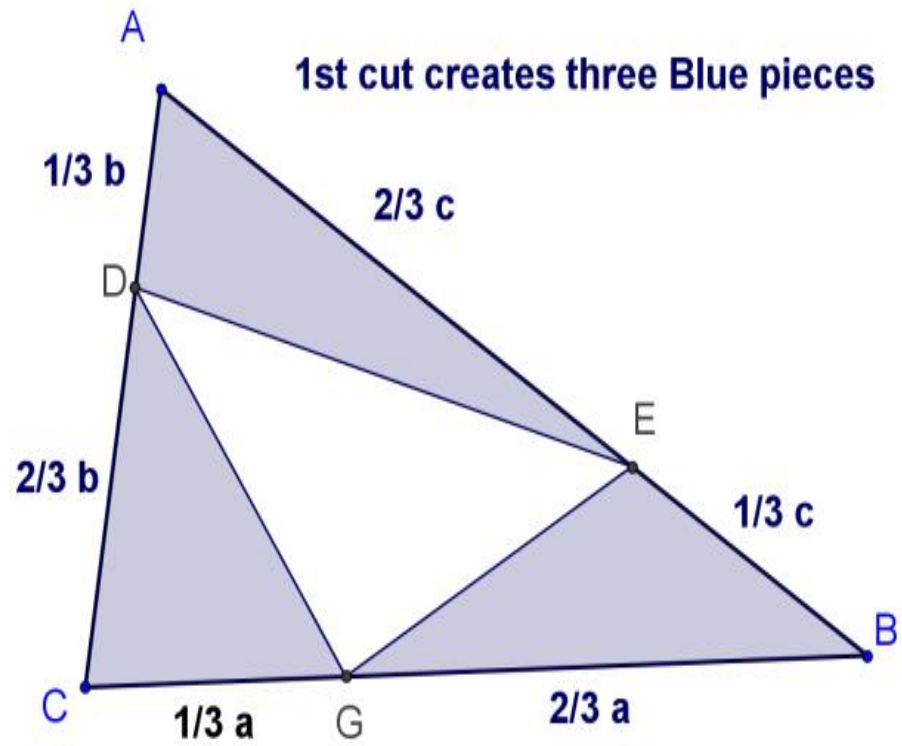
- Sally uses her famous infinity cut share a pizza with 3 people! She first cuts along the lines from $1/3$ of one side to $2/3$ of the adjoining side. She claims that this gives each person gets an equal share ($1/3 \circ 2/3 = 2/9$) and leaves a triangular piece ($1/3$ of the pizza) for a second cut! Then she cuts the remaining triangle in the same manner, ...

Pizza Part 2:



Explain why Sally's cut creates 3 equal shares.

- Create a sequence of fractions that represent each person's share with each successive cut.
- Does the sum of the sequence for each person's slices converge to $1/3$? Explain.
- Discuss the strengths and limitations to this method of pizza cutting and eating.



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How should we tackle this equation?

$$(x^2 - 5x + 7)^{(x^2 - 4)} = 1$$

⚠ quadratic exponential?

The Pleasure and Luxury of Being Wrong in Mathematics

- We hope you have had both
 - the pleasure and
 - luxury of being wrong.
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