

Teaching Logic & Proofs through Games & Number Theory

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Presenters

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Proofs & Games: Student as Mathematician

- NYC Department of Education Certified College Preparatory Course
- New York Performance Standards Consortium
Center for Inquiry in Teaching and Learning
- Portfolios and Performance-Based Assessment Tasks (PBATs)
- Teacher-Developed Inquiry-Based College Preparatory Coursework
- Developed with the goals of fostering student perseverance through the mathematical thinking process and writing proofs.
- Student as Mathematician

Proofs & Games... One More Thing...

Once you've solved:

- Don't give it away! :)
 - Can you support a peer through the process of discovery?
 - Can you think of another way to approach the problem?
 - How would you prove that?
- Extensions
 - We have them!
 - But, can you come up with your own?

Game of 27 (Base Case)

Scenario:

There is a bag with 27 tokens.

Two people take turns drawing tokens out of the bag.

Each person may take exactly 1, 2, 3, 4 or 5 tokens on their turn.

The person who takes the last token wins.

Directions:

- Find a strategy to win.
- Keep track of your work!
- Be prepared to justify yourself.

(20 minutes to investigate)

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Reflection: The Proof & The Process

Workshop Input:

What was your student as mathematician experience like?

Notes will be added after the workshop.

Starting the conversation...

- What did you try?
- When you made a poor choice,
 - How did you know?
 - How did you adjust?
- When you made a better choice,
 - How did you know you?
 - How would you prove that you're right?
- What other ideas do you have?

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Reflection: Productive Struggle

Workshop Input:

How do students work through productive struggle?

Notes will be added after the workshop.

Starting the conversation...

- What was the most difficult part of this exercise for you?
- How did you overcome this?
- Where did the struggles come from?
- How do you think your students might struggle?

Discussion: Teacher as Facilitator

How would you help your students?

Some guiding questions for your group...

- In this particular activity, what are some prompts that you think would be helpful for students when they are frustrated, stuck, or struggling?
- How does this experience help you reflect on your planning for engaging students in productive struggle?
- How would you differentiate this activity?

Workshop Input:

It says questions above, but we want you to submit your ideas, too!

Upvote ideas and questions you want to discuss.

Student Work: Final Portfolio Products

While you read...

- Do you see yourself in the student work that you read?
- How could the student improve their paper?
- What else do you wonder?

For the whole group...

- What were the different strategies?

Thank You!

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Q & A

All of our materials from this workshop (and more!) are published on our website. Please feel free to use them.

<http://tinyurl.com/proofsandgames>

We have a survey, please help us improve and give us feedback! (It's also on our website if you want to respond later.)

<http://tinyurl.com/PGNCTM2017>

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