Finding, Altering, and Implementing Low Floor-High Ceiling Tasks in a Middle School Classroom

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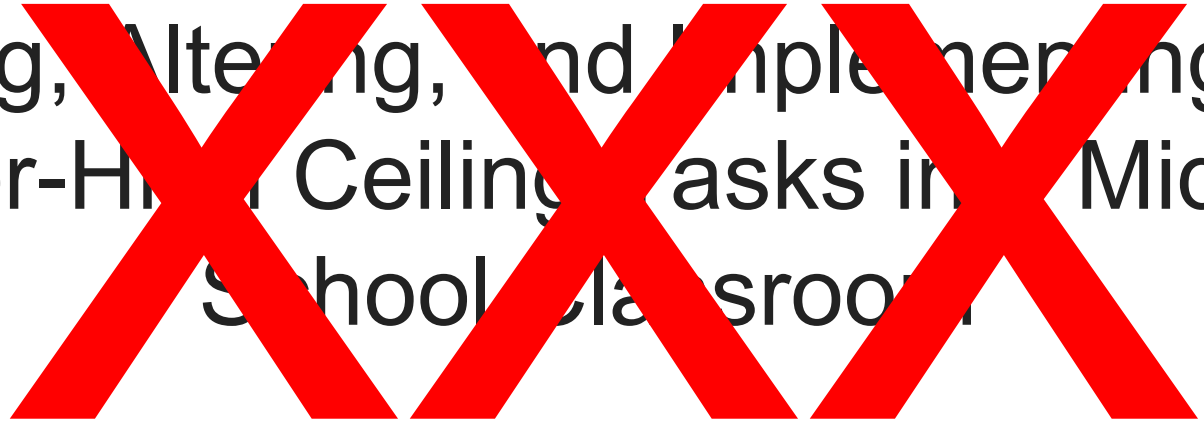


Low Floor / High Ceiling
and so much more

These are themes we will be talking about:

1. Low-Floor High-Ceiling Tasks
2. My personal vision as a middle school mathematics teacher
3. The most important thing I learned at PCMI
4. Classroom 360 (Vertical Non-Permanent Spaces)
5. Refusing to Lecture
6. Amazing Things on the Web

...classic bait and switch

Introductions and discussion preparation:

1) Name
2) School location
3) Level(s) course(s) you teach
4) Something else about your school
5) Something about yourself

Important Notification!!!

PCMI has not seen what I am going to present.

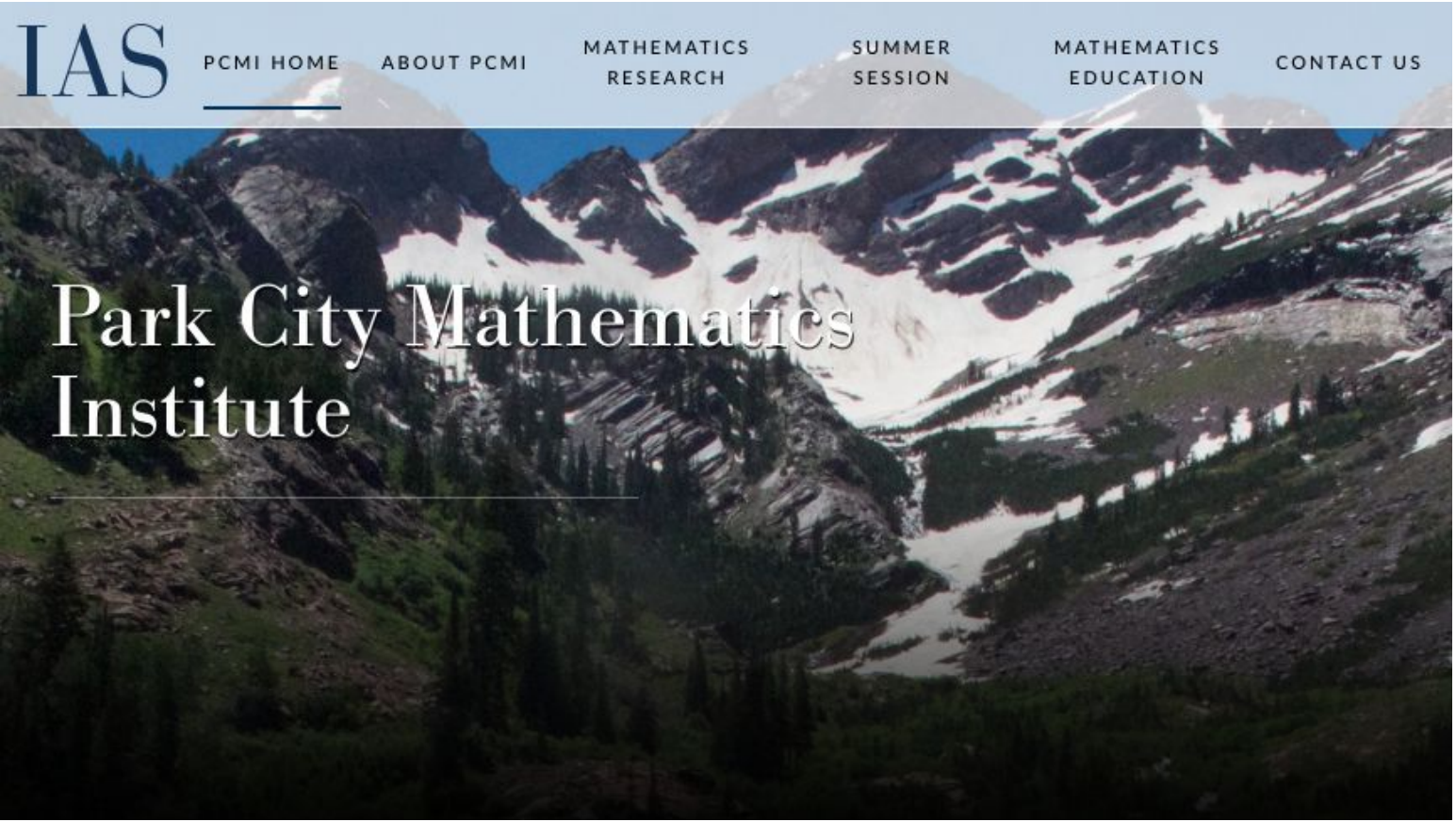
They may not agree with my opinions.

So if I present something that you think or

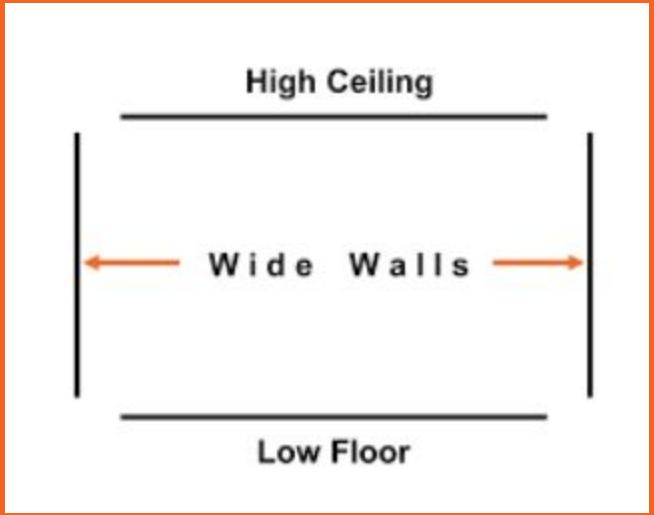
perhaps know is incorrect please take it out on me not PCMI.

How to sign up for PCMI

Link to their website



Altering Low Floor-High Ceiling Tasks



During this part of class I push the kids to their resources to find these answers.

Warm Up

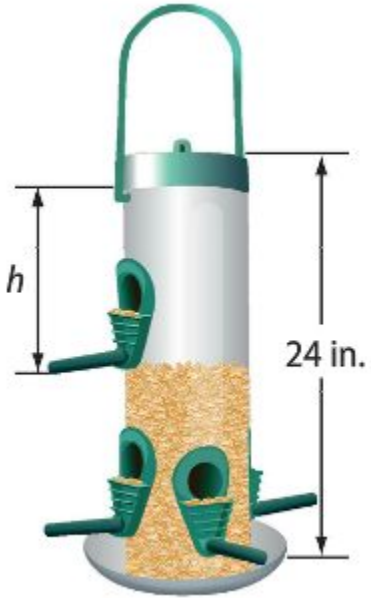
1) How do you find the area of a circle?

2) How do you find the volume of a cylinder?

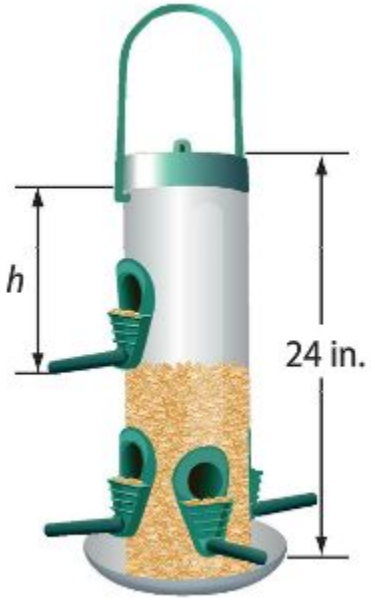
3) How are the two related?

What do you notice?

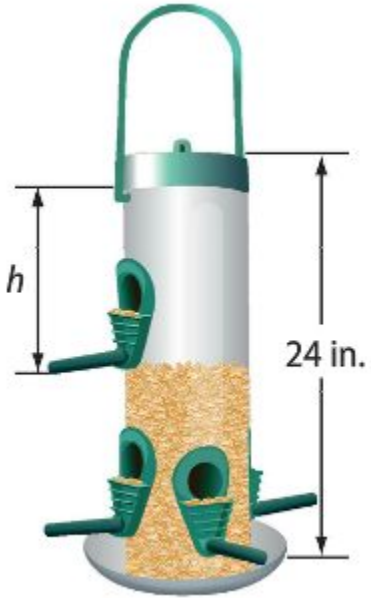
Three different students live script in a rotation on the slides during the discussion.



What do you wonder?



What do you notice now?



$$V = 12pi(24 - h)$$

This piece is optional, depending on how open you want this task to be.

What do you notice?

Rinoa is starting a babysitting business. She spent $26 on signs for advertising. She charges an initial fee of $5 and then $3 for each hour of service.

I notice…
She spent $26 on signs & advertising.but couldve just used a piece of paper.

I notice… Rinoa is starting a baby sitter business.
She charges 3 dollars every hour.

Actual Google slide from my students.

I notice…
Rinoa is babysitting for a cheap price.she charges 5 dollars for the initial fee.

What do you wonder?

Rinoa is starting a babysitting business. She spent $26 on signs for advertising. She charges an initial fee of $5 and then $3 for each hour of service.

I wonder…
Why shes working for such low rate?
Is the area profitable..?

I wonder… why did she start a baby sitting business?

I wonder… why she spent 26 dollars signs for advertising.what is she blowing her money on.

What questions can we make?

Rinoa is starting a babysitting business. She spent $26 on signs for advertising. She charges an initial fee of $5 and then $3 for each hour of service.

1) How much profit would she make after 3 hours?
2) How many hours does she have to work to replace the money for the advertising?

3)How much would she earn if she worked three hours for a week?
4) How much profit would she make if she worked for two weeks, three hours every day?

5) how could we use this information to make an equation?
6)how could we use this information to make an inequality?

How to get started:

1. Go to the story problems in your textbook
2. Use the stimulus (data/context) without the actual question
3. Use what do you Notice/Wonder as a whole class discussion
4. Use the a warm up to help students remember key information If you want to target a specific skill, guide your class with notes and or a problem set they will do before the discussion

Once you think your ready here’s level 2:

1. Know your students and have multiple “pushes” prepared
2. Use visual patterns and other stimuli that don’t have numbers and or variables
3. Open it way up (I’m not really here yet, but it can be done)

Why do Low Floor High Ceiling Tasks?

1. They are great for promoting class discourse
2. They are easy to differentiate
3. Many students are least comfortable doing any math problem that is in English (Story Problems)
4. You and your students will be able to see the connections between different units and topics within your subject
5. The Smarter Balanced tasks are very difficult, but more importantly some of the most fun math problems to work on are very difficult

Discussion preparation:

One example of Low Floor-High Ceiling Tasks or Open Tasks that my students do is…

One way that I alter my tasks or problems so that all my students can access the mathematics and start to explore…

I plan on trying this out with my class by…

Share something else that came to your mind during this portion of the presentation.

Now I’m going to really open up to you… the switch

These all tie loosely into the idea of implementing “Low Floor-High Ceiling Tasks”.

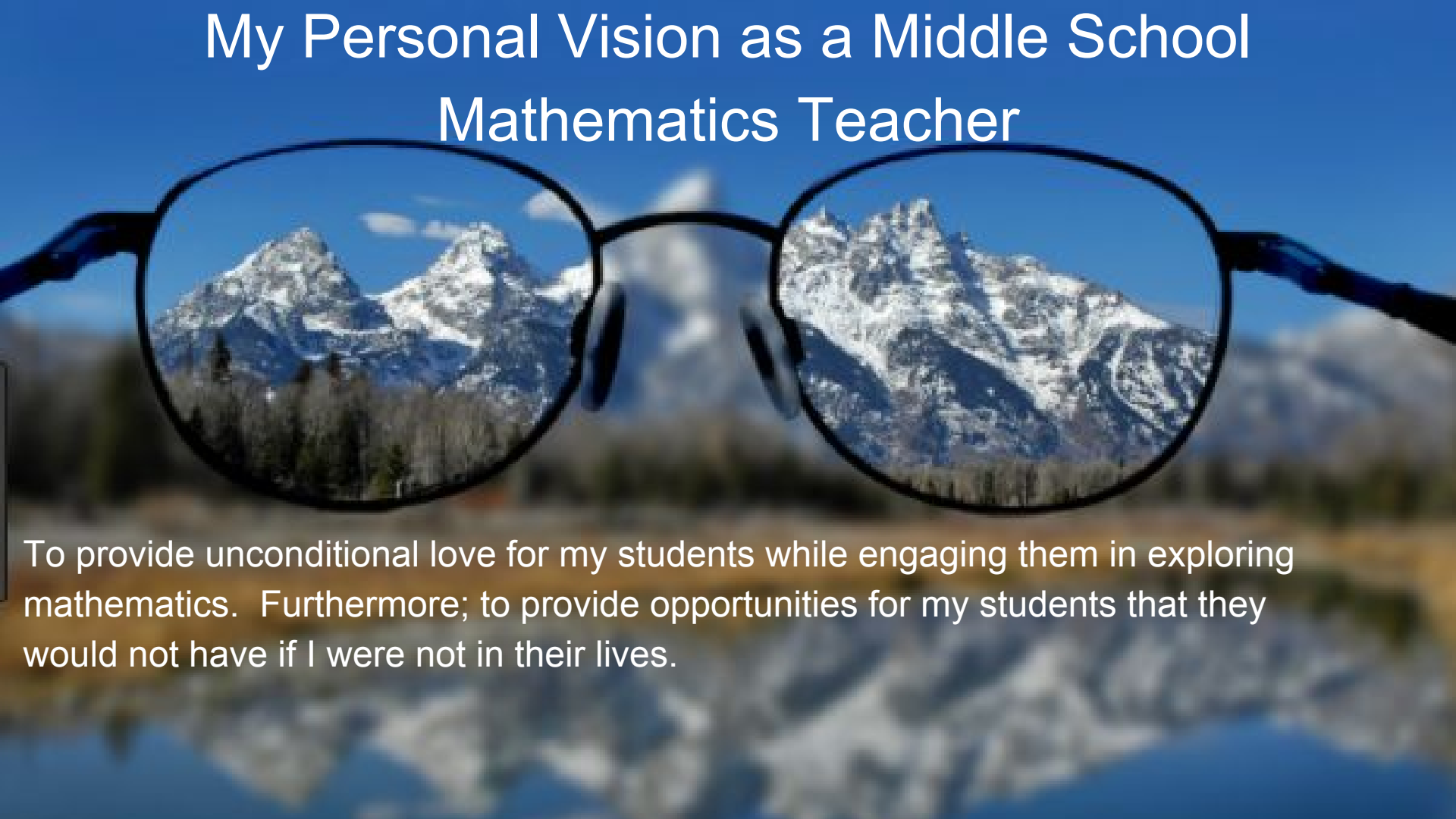
Students that feel cared for will have a higher degree of participation with lowered affective filters.

Students must have a sense of inclusion inside of your mathematics community to develop the perseverance to work on these tasks.

Getting your students up at the boards will increase engagement and help you provide feedback to them.

Finding new ways of providing your students the necessary information they need in order to make discoveries will help your students with these tasks.

My Personal Vision as a Middle School Mathematics Teacher



To provide unconditional love for my students while engaging them in exploring mathematics. Furthermore; to provide opportunities for my students that they would not have if I were not in their lives.

Culture of Care

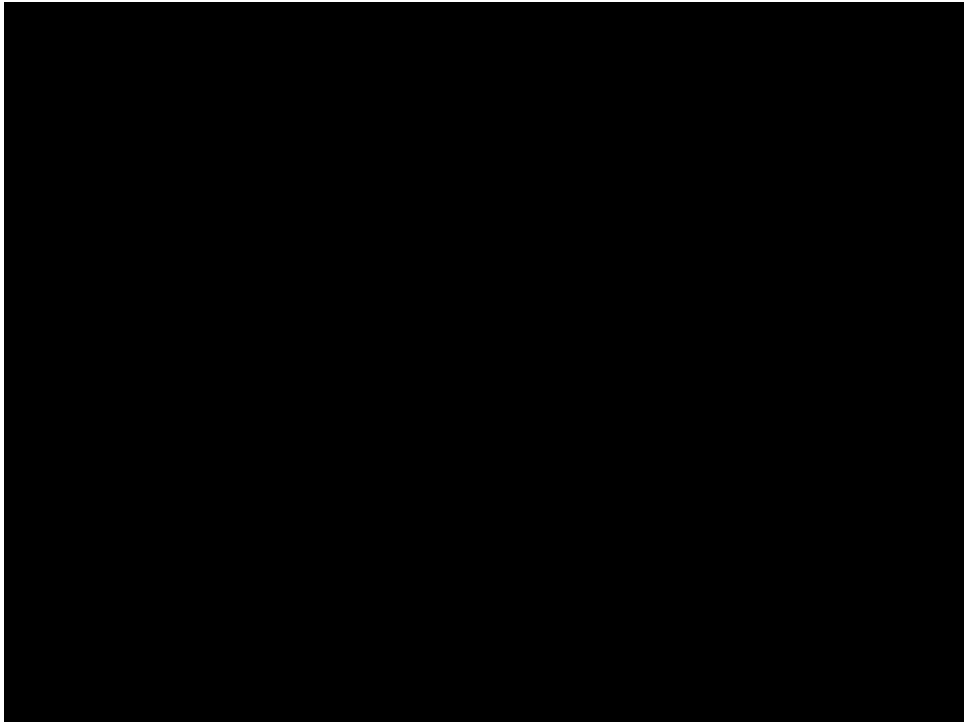
Professor Cooper at UCLA

CARE

http://journals.sagepub.com/doi/abs/10.1177/1942775114525046

Link to the article

My most recent life change...



Discussion preparation:

My personal vision as a teacher is…

I have never thought creating a vision as a teacher. But what i think is most important as a teacher is…

I address care in my classroom by…

Share something else that came to your mind during this portion of the presentation.

IAS | PCMI PARK CITY MATHEMATICS INSTITUTE

A program of the Institute for Advanced Study

How intimidating doing something new and or difficult can be.

How this feeling is exacerbated when there are various levels of knowledge amongst the group.

MfA LA PD **2017 PCMI Capsule: Catalan Numbers** Oct 7, 2017

3. (a) How many rhyme schemes are possible for a five-line poem whose scheme starts with AABB? ABAC?

(b) Complete this table of the number of possible rhyme schemes:

	# of letters used					
	1	2	3	4	5	6
1-line poems	1					
2-line poems	1	1				
3-line poems	1		1			
4-line poems						
5-line poems		15				
6-line poems						

(c) Look for patterns in the table that can be justified using what you know about rhyme schemes.

4. Here are all the ways that a regular pentagon can be cut into 3 triangles by drawing two non-intersecting diagonals.

Count the number of ways that a regular $(n+2)$-gon can be cut into n triangles by drawing $(n-1)$ non-intersecting diagonals. Hint: Once you get to the regular hexagon, don't forget to include the triangulations that create an equilateral triangle within the hexagon.

5. Six people are seated at a round table. Three pairs of them simultaneously shake hands in such a way that their arms don't cross over each other. There are five different ways that they could accomplish this.

(a) How many possible ways could 4 people simultaneously shake hands like this?

(b) ... 8 people?

(c) Based on your work over the last few problems, make a conjecture for the number of ways to perform these handshakes for 10 people or more.

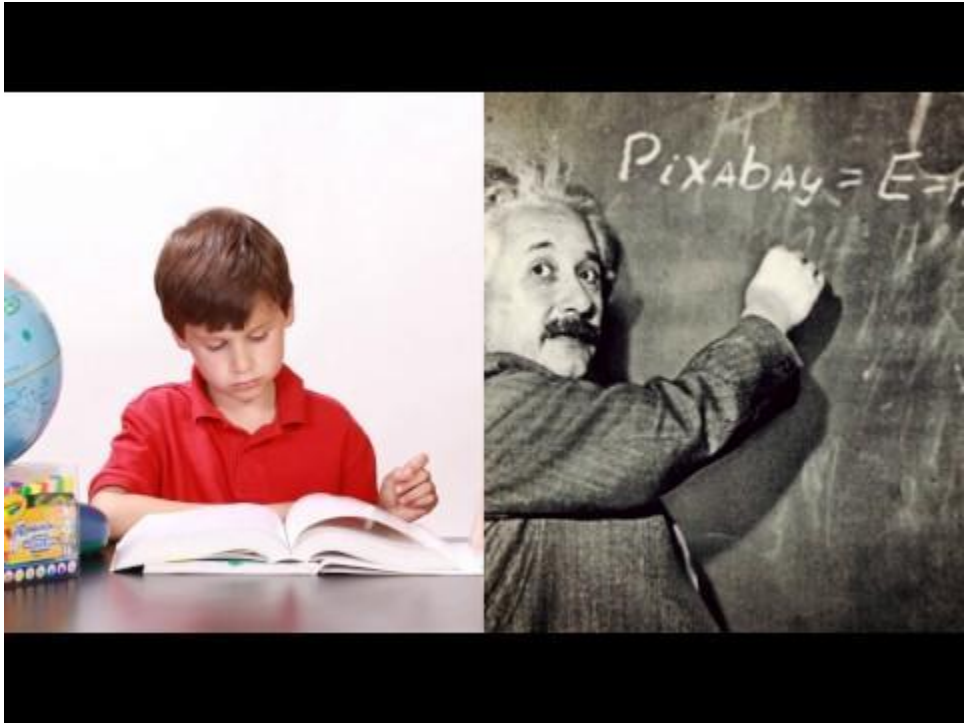
Morning Math and Doing Problem Sets in General

The vision for Morning Math and the program in general is extremely positive and is meant to minimize the feeling of intimidation.

I value my experience that I brought from MfA Los Angeles, specifically from Math with Darryl.

If I have these feelings what do my students feel like in my room

Relating to My Students...



Side note:

About every 3-5 years in my career I have looked back just 3-5 years and have said to myself, “What was I thinking. Man I was doing that all wrong.” Not everything but one or more pieces of the most intricate machine ever created: The Master Teacher

Discussion preparation:

Share about a time that you felt intimidated by something, someone or a group.

Share an experience where you related to your students.

Share a practice that you previously used that you now find ineffective.

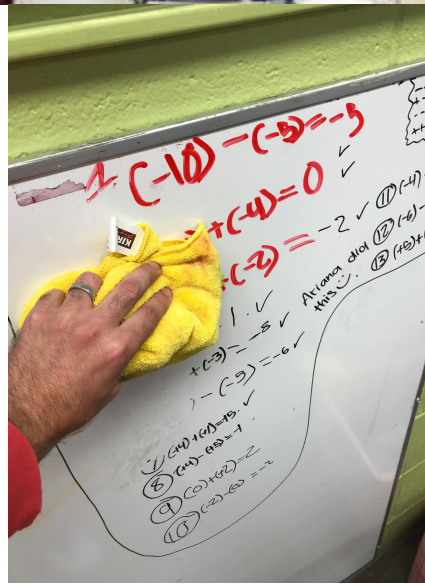
Share something else that came to your mind during this portion of the presentation.

Why getting your students up to the boards is so important:

Classroom 360 or Non-Permanent Vertical Spaces

Students working at the boards

Classroom 360



At PCMI this was known as “Vertical Non-Permanent Spaces”

Tips:

1) Do it ASAP (link for a decent product here)
2) Use structures and have clear expectations
3) Buy a pack of inexpensive microfiber cloths
4) Buy a class set of erasable coordinate planes
5) Store the markers tip down
6) Ask questions but don’t wait for answers
7) Build capacity with patience, but make your goal very transparent
8) “Just start, the worst case scenario is your wrong. Someone will help”

Discussion preparation:

Share how whiteboards are used in your room.

Share how you structure group work in your room.

Share a reason you would not want your kids up at the boards.

Share something else that came to your mind during this portion of the presentation.

Refusing to Lecture

Me

Them

doceri

edpuzzle

Possible solutions

Sample of one of my lectures

edpuzzle

doceri

Discussion preparation:

Share how you deliver content in your classroom.

Share another non-traditional manner to deliver content.

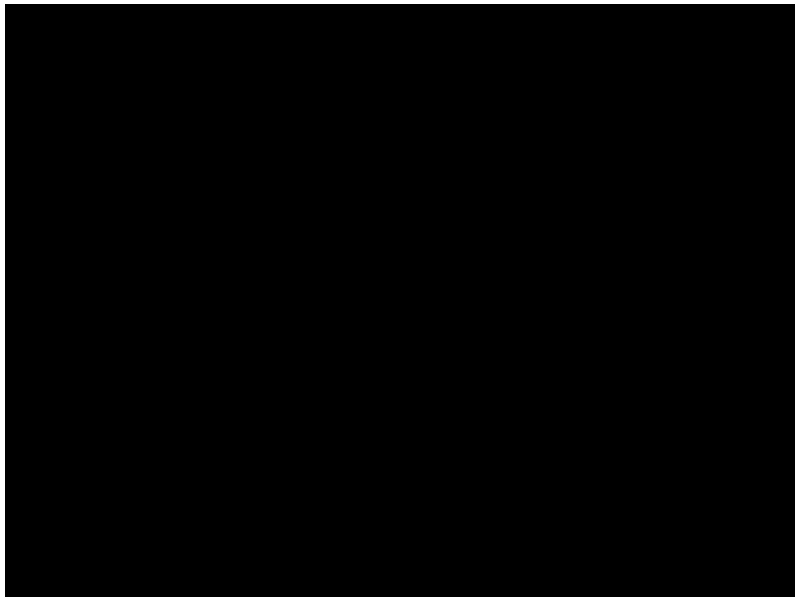
Share a reason you would not want your students to receive their content in this manner.

Share something else that came to your mind during this portion of the presentation.

Amazing Things on the Web

1. If you are not one-to-one with technology you need to make sure your administrator knows that the students are missing out
2. Games are most engaging, but most difficult to find Ratio Rumble
3. student.desmos.com
4. Arithmetic Practice (My Students Love It)
5. Which One Doesn't Belong
6. Visual Patterns
7. Kahoot

*All of these are free



We did it!

...one last chat?

References and links

Link to PCMI's website Link to their website (Slide 6)

What do you Notice/Wonder by Annie Fetter. Link to her blog. (Slides 9-14)

Link to Professor Cooper and Chickwe's Research
http://journals.sagepub.com/doi/abs/10.1177/1942775114525046 (Slide 21)

Link for non-permanent vertical spaces (Slide 33)

Link for iPad Pro and Apple Pencil (Slide 36)

Doceri (Record Videos) and EdPuzzle (Add Questions to Videos)

*Don't forget slide 40 has more links to the websites I love