#### Puget Sound Council of Teachers of Mathematics

June 4, 2023







"Summertime is always the best of what might be." - - - *Charles Bowden* 

June 4, 2023 Happy Summer!

Editor: Joyce Frost (frostjoycee@gmail.com)

#### **Greetings fellow PSCTM members!**

The end of another school year is fast approaching. As educators, we wrap up our lessons, prepare our classrooms for summer, and say goodbye to students and staff. We celebrate our students' accomplishments, and hope that our shared learning experiences will serve them well as they move forward on their journeys. We step away from our day-to-day schedules to take a much-needed break to reflect and rejuvenate.

"How lucky I am to have something that makes saying goodbye so hard." - Winnie the Pooh. This quote resonates with me as I wrap up another school year, and I step away from serving as the PSCTM President. It has been an honor to serve on our PSCTM board since 2005, and a privilege to be PSCTM President for three terms. Congratulations to our new PSCTM President, Angela Ensminger. She will be a wonderful leader for our beloved organization!

My teaching career has been shaped by my experiences and the leadership opportunities given to me through the Puget Sound Council of Teachers of Mathematics. Speaking at

conferences, connecting with other teachers who love mathematics, and participating at our PSCTM events has brought me joy and encouraged me to continue to enhance my practices. If you have interest in stepping into a leadership position, I encourage you to let a board member know. We are always looking for great ideas and ways to continue to grow our membership. Enjoy this 'last week of school' edition of Puget Soundings. Have a wonderful well-deserved summer!



Traci Cotton, PSCTM President – soon to be Past President!

Jane Bissonnette - Secretary, Joyce Frost – Program, Newsletter, Jane Hunter - Newsletter, Art Mabbott – Treasurer, NCTM Rep, Joe Frost - Web Page, Laura Beckett, Maryke Haynes - Equity, Angela Ensminger – President Elect



### Spring 2023 PSCTM Dinner: Anita Lenges and Anita Garcia Morales Monday, May 8, 2023 from 5 – 7:30 pm at Bishop Blanchet HS



Anita Lenges

Anita Lenges began teaching math, chemistry, and Physics in the Peace Corp in Kenya, followed by teaching JH math, then a Masters in Math Ed, PhD in Math Teacher Education, Post Doc in preparing teachers for diverse urban schools, The Evergreen State faculty, and now UW Clinical Professor working with K-12 math teachers, coaches, principals, and district leaders.



Anita Garcia Morales Anita Garcia Morales - Anita's experience being the perpetual immigrant student in class and sensing the "otherness" to which her family and ethnic group were subjected to were what shaped Anita's racial, class, and cultural lens. The common thread that runs through all that Anita does is her focus on Social Justice and Racial Equity. Racing 2 Excellence & Social Justice (R2E), Co-founder anitgm@r2esj.org

## MAKING THE INVISIBLE MORE VISIBLE – ANITA LENGES AND ANITA GARCIA MORALES

What do we need to do to make our math learning spaces fertile for BiPoC thriving? How can we uncover that which we do not see? Anita Morales, Racing 2 Excellence and Social Justice Co-founder, and Anita Lenges, UW Math Teacher Educator, will explore with us how to support affirming joy in math learning.

#### Thoughts from this phenomenal presentation! I wish all could have been there for this!

Some things that support students' Joy, Awe and Epiphanies

- They get challenging problems & problems that invite curiosity
- Students are supported to express authentic self and ideas in authentic ways
- Students get to follow their own thinking, curiosities, and reasoning
- Students are allowed to ask their own real questions that are honored by the teacher and the class
- Classroom environment is not over-directed, loud, chaotic, or too calm
- The environment supports students' health, safety and identity
- The teacher communicates high expectations and a belief in students' brilliance
- These help mathematical autonomy and authority

What eclipses BiPoC students' experiencing Joy, Awe and Epiphanies?

- Cultural space of the classroom does not allow for authenticity in students; ways of talking and being
- Racialized or gendered (or intersectional) assumptions about students play out in teacher (and other students') decisions, actions and interactions
- Representations of others like them are lacking (non-existent, stereotypical or underrepresented)

What comes to mind with the question, "How do you show your students they matter?" Reflecting on your practice what did you do/say to show your students they mattered? How do we know if our students feel like they matter?

We all wake up in the morning with the same goal in mind: seeking a sense of belonging and significance. - - - Alfred Adler

How can you access students' perspectives to inform your teaching?

Congratulations to the Spring Dinner Book Prize Winners! Each winner was sent a book of their choosing from the following recommendations from Anita Lenges and Anita Garcia Morales.

#### We Want to Do More Than Survive - Dr. Bettina Love (selected by Joyce Frost)

Winner of the 2020 Society of Professors of Education Outstanding Book Award

Drawing on personal stories, research, and historical events, an esteemed educator offers a vision of educational justice inspired by the rebellious spirit and methods of abolitionists.

Coaching for Equity - Elena Aguilar (selected by Anita Lenges)

Your Guide to Creating Equitable Schools

If we hope to interrupt educational inequities and create schools in which every child thrives, we must open our hearts to purposeful conversation and hone our skills to make those conversations effective. With characteristic honesty and wisdom, Elena inspires us to commit to transforming our classrooms, lays bare the hidden obstacles to equity, and helps us see how to overcome these obstacles, one conversation at a time.

*Culturally Responsive Teaching and The Brain* - Zaretta Hammond (selected by Kerry Burrows) A bold, brain based teaching approach to culturally responsive instruction

To close the achievement gap, diverse classrooms need a proven framework for optimizing student engagement. Culturally responsive instruction has shown promise, but many teachers have struggled with its implementation—until now.

In this book, Zaretta Hammond draws on cutting edge neuroscience research to offer an innovative approach for designing and implementing brain compatible culturally responsive instruction.

# **Rehumanizing mathematics for Black, Indigenous and Latinx students –** Imani Goffney, Rochelle Gutierrez, Melissa Boston

Placing Black, Latinx, and Indigenous Students at the Center of Mathematics Education

Mathematics education will never truly improve until it adequately addresses those students whom the system has most failed. The 2018 volume of Annual Perspectives in Mathematics Education(APME)series showcases the efforts of classroom teachers, school counselors and administrators, teacher educators, and education researchers to ensure mathematics teaching and learning is a humane, positive, and powerful experience for students who are Black, Indigenous, and/or Latinx.

#### Young Gifted and Black: Promoting high achievement among African American students -Perry, Steele, Hilliard

"An important and powerful book" that radically reframes the debates swirling around the academic achievement of African American students (Boston Review)

In three separate but allied essays, African American scholars Theresa Perry, Claude Steele, and Asa Hilliard examine the alleged 'achievement gap' between Black and white students. Each author addresses how the unique social and cultural position Black students occupy—in a society which often devalues and stereotypes African American identity—fundamentally shapes students' experience of school and sets up unique obstacles. Young, Gifted and Black provides an understanding of how these forces work, opening the door to practical, powerful methods for promoting high achievement at all levels.

**Mathematics teaching, learning and liberation in the lives of black children** – Danny Martin With issues of equity at the forefront of mathematics education research and policy, Mathematics Teaching, Learning, and Liberation in the Lives of Black Children fills the need for authoritative, rigorous scholarship that sheds light on the ways that young black learners experience mathematics in schools and their communities. This timely collection significantly extends the knowledge base on mathematics teaching, learning, participation, and policy for black children, and it provides new framings of relevant issues that researchers can use in future work.

**For White Folks Who Teach in the Hood**, Christopher Emdin (selected by Marc Anderson) A New York Times Best Seller

Merging real stories with theory, research, and practice, a prominent scholar offers a new approach to teaching and learning for every stakeholder in urban education.

Drawing on his own experience of feeling undervalued and invisible in classrooms as a young man of color and merging his experiences with more than a decade of teaching and researching in urban America, award-winning educator Christopher Emdin offers a new lens on an approach to teaching and learning in urban schools. For White Folks Who Teach in the Hood...and the Rest of Y'all Too is the much-needed antidote to traditional top-down pedagogy and promises to radically reframe the landscape of urban education for the better.

#### **Receive Clock Hours for PSCTM events!**

For attending one or more PSCTM events: Fall 2022, Winter or Spring 2023, you can receive 1 ½ clock hours per presentation. Email <u>art@mabbott.org</u> after the event. **PSCTM's Clock Hour process:** 

Request clock hours for any one of the events Art will send you an evaluation form Complete evaluation form and email to Art Art will send you the clock hour form for the event Complete clock hour form and keep for your records. (*Email Art if you have questions*) Follow PSCTM on social media! Share your lesson ideas, news with us, too! @PSCTM



# What to do with students the last week of School?

## Math Fun - Jane Bissonnette

Here's some fun math break activities for the end of the school year.

#### Multiplying by 6 Trick

If you multiply 6 by an even number, the answer will end with the same digit. The number in the ten's place will be half of the number in the one's place. Example:  $6 \ge 4 = 24$ .

#### The 1089 trick

Here's another trick that you can try with your class that will leave them amazed.

- $\sqrt{}$  To start off, ask the class to write down any three-digit number.
- $\sqrt{}$  Ask them to rearrange the units of the three-digit numbers they've written in both ascending and descending order. If the number they wrote down is 603, then the descending order of the number is 630 and the ascending number order is 036.
- $\sqrt{}$  Now, ask the students to subtract the ascending number from the descending number. For this example, the number they should have is 594. (603 036)

 $\sqrt{}$  The final step is to reverse this value and sum. For this example, (594 + 495 = ) 1089! I think it is fun to ask students to call out their numbers and have the class realize that everyone has the same answer: 1089!

#### The 37 trick

Here's a cool math problem.

- $\sqrt{}$  Ask the students to choose any three-digit number. For example, 354.
- $\sqrt{}$  Add the three digits. (3 + 5 + 4 = 12)
- $\sqrt{}$  Divide the original number by the sum of the digits (354/12 = 37)
- $\sqrt{}$  The answer will always be 37.

#### The Answer Is 18

- $\sqrt{}$  Choose any number (We'll use 31).
- $\sqrt{}$  Multiply the number by 100 (31 x 100 = 3,100).
- $\sqrt{}$  Subtract the original number from the answer (3,100 31 = 3,069).
- $\sqrt{}$  Add those individual numerals together (3 + 0 + 6 + 9 = 18).
- $\sqrt{}$  The answer is always 18

For more advanced students you could show the algebra that gives the results.



## It's the End of the Year and I'm Out of Ideas! - - - Jane Hunter

Every year I swear I'm going to plan ahead: look up great labs and come up with amazing ideas to keep my students engaged when all they can think of is...Summer! It doesn't help to have the beautiful weather we have enjoyed recently. So, here are a few ideas I've saved up, begged, borrowed and stolen from some of the most creative of my teacher friends.

#### Algebra 1- Water Balloon Beach Towel Volleyball

By this time of the year my students are fairly well versed in quadratics; how to complete the square and how to use a slider on Desmos. I split students up into pairs, give them a beach towel, and prepare a bucket of water balloons. I have the students stand in an area where I have secretly measured the heights of things so that I can tell how close they actually get. I give one team a water balloon and show them how to fling them to the other team using a student on each end of a beach towel. We also get some kids involved as the video crew with their phones and then go for it. The kids really get into it because it isn't as easy as one would think. Invariably we have some balloon explosions! The next day I download the short videos. We play them on the screen taking the distances we have already measured and create equations. We see who can estimate the correct highest height for each balloon. Each team of 4 does a poster with their equations, the math, and the equation they were able to get using Desmos. I go to Walmart the night before and print out pictures for each group for their presentations. It is a really a fun activity!



#### **<u>Geometry Picture Flip Cubes</u>** – (Borrowed from Joyce Frost) - <u>Another video</u>

Start by having students cut out a cube template from card stock (110 lb. works best). Have each student make 8 cubes and bring in their favorite pictures from home. We printed pictures they liked online. There are tons of videos that show you how to tape them, but the ones above use paper made cubes which I liked best. The kids create amazing infinity photo cubes. It was so popular, I actually had kids (that weren't even in any of my classes) staying after school the last week of school to learn how to make them. --- Jane Hunter







#### PSCTM Newsletter: Puget Soundings

#### Advanced Algebra – Top Gun Paper Airplane Competition - - - Jane Hunter

The newer Top Gun had just come out last summer, so I talked about F-18's and the accuracy, speed and agility these jets need. After an introduction of the training that jet pilots need to go through in the Navy, I have students build their favorite paper airplane without looking up anything online. I supplied students with bright copy paper. We threw them around the room at the end of class to give them an idea of the reality of paper airplanes. I then told them that the next day we would have a competition with 3 categories; A- Distance, B – Accuracy, and C - Agility. They were given as much paper as they wanted to take home to build one using their research. The limitations were that they could use only one piece of paper and some tape - nothing else. The next day I had a course with standing up hula hoops for the agility competition that their plane would need to fly through. Hula hoops were placed on the ground to see whose plane got the closest for accuracy. Finally, for distance, they were rated on whose plane went the farthest. I had prizes for all, and we had an absolute blast filming many of the competitions. I rented the movie, <u>Top Gun: Maverick</u> to watch for the last two days. Remember, good math can be snuck in even if they don't want to do it. Hope your year ends well!



## Aperiodic monotiles exist! - <u>Dan Finkel Blog</u>

"Some delightful news from the world of pure mathematics yesterday (3/20/23): a team of four mathematician (Smith, Myers, Kaplan, Goodman-Strauss) released a <u>preprint on the Arxiv</u> with a proof that aperiodic monotiles, or "*einsteins,*" exist. Their representative example is the "hat polykite," which can be built from eight kite shapes. In fact, I was able to build one this morning using my <u>21st Century Pattern Blocks</u>!

To be clear, the shape in question is the entirely of what's above, not the individual kites. And what makes it special isn't that it tiles the plane by itself—lots of shapes do that, including a single kite (or any triangle). What's special about it is that none of these tilings of the plane are *periodic*, meaning that none of them repeat in any fundamental way.

If you'd like to play around with this tiling now, <u>click here</u> to explore in its own tab."



"If you've noticed some of us math educator/communicator types swooning over this result on social media, there's a reason. First off, the statement of the problem—do these tiles that, by themselves, tile the plane without admitting repetitions—is relatively easy to understand. And the tile itself is a pretty simple polygon! When you consider that the earliest example of an aperiodic tiling required 20426 *different tiles*, this is a triumph of simplicity over complexity! There's something fundamentally beautiful about that." You will definitely want to read his whole blog post!

#### A Picture is worth a thousand digits - - - Joe Frost

I've noticed that I feel a better connection to number patterns if I can see them in a picture. For example, the Sieve of Eratosthenes, a visual tool for finding prime numbers, can also lead to some fascinating insights about multiplication facts. The standard way of constructing the Sieve of Eratosthenes is to start with a grid of the integers of interest, for example the integers from 1 to 100 laid out in 10 rows of 10 numbers. Then you circle the 2 and cross off the larger multiples of 2. You circle the 3 and cross off all the larger multiples of 3. You take the next unmarked cell, circle it, and cross off all the larger multiples of that number. The circled numbers are the prime numbers, and a tantalizing pattern emerges, where prime numbers seem to come in pairs on the grid: 13 and 23, 31 and 41, 43 and 53, 61 and 71, and so on. It occurs to me to wonder whether the pattern will continue, and, if not, how large would the grid have to be to break that pattern? A more interesting set of patterns emerge when we use colored pencils and create a stripe instead of an X on the multiples as we go. The way we move on the grid to place the stripes makes an interesting pattern as well.

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
20	21	22	22	24	25	26	27	28	20
30	31	32	33	34	35	36	37	38	39
						_			_
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
_									
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

To mark the multiples of three, we move down one and back one each time until we hit the left side, then wrap around to the end and repeat the pattern. The patterns for 2 and 5 are very easy. 11 is like three, but down and forward. Why? Are there other patterns that are related like that?

There are not many numbers with only one color, many with only one colors, and only a few with three colors. Are there any with four colors? If not, how big would the grid have to be to require four colors?

I could certainly understand these number theory concepts without drawing on a grid, but somehow they are much more interesting when presented visually.

## **Puzzles and Toys!**

One of the things that I enjoy most about teaching is encouraging mathematical curiosity! Like the old tv show, *Numbers*, I believe that "We all use Math everyday". On a recent trip, I found this lovely four piece red puzzle. I was anxious to play with it and see how hard it would be to put back together into a tetrahedron. Some questions immediately came to mind:

Is it a regular tetrahedron? How could I check?

Are the four pieces congruent?

What shapes have to be on the outside vs inside to produce the correct angles for the tetrahedron?

How could I make a net (or pattern) for the shape?

Where do the four pieces come from? Does this remind me of any of the other Tetrahedron dissection puzzles?

Almost immediately, I visualized the famous two piece puzzle (in white) and realized that each of the two pieces was cut in half to create  $2 \ge 2$  or 4 congruent pieces. By thinking of them as sets of two, I was easily able to solve the puzzle.

Would your students enjoy taking some time to analyze this? - - - Joyce Frost



A few years ago, I discovered that a friend of mine had a brother who was a 'Package Engineer'. He created unique packaging for chocolates and other commercial products. Why did I not know that this kind of career existed? Maybe I would have had a completely different career! So, of course I could not help myself when we purchased some short bread cookies on a recent trip to Mexico City. Within minutes, I was "noticing and wondering" as Annie Fetter always says. The net (pattern) would actually be quite easy to create. What kind of a shape is this? What do you notice and wonder? - - **Joyce Frost** 



## <u>Jacob's Ladder</u>

"The simple toy ... is very illusive in action. When the upper block is grasped by the edges ... and turned so as to lift the second block in the series to the same height, the upper end of the second block falls into an inverted position and appears to pass downward on the other members of the series, first upon one side of the ladder and then upon the other until it reaches the bottom. But this effect is only apparent, as the second block in reality only falls back into its original position in the series; but in the operation it becomes reversed, what was before the lower end becoming the upper end, the front having exchanged places with the back. This change of position of the second member brings it parallel with the third block, which is then released, and the third member drops over onto the fourth, when the fifth block is released, and so on throughout the entire series."

— "Jacob's Ladder", Scientific American, Vol. 61, No. 15 (October 1889)

I always thought that this would be a great challenge to make with my students! All you need is wood pieces (Michaels?) and some ribbon!

Try it with your students and let me know! Click on this link to: Watch it in action! - - - Joyce Frost





"An arrangement of interlaced ribbons allows each block to act as if hinged to the next one at either of its two ends. The same mechanism is used in the 1980s toy <u>Rubik's Magic</u><sup>[3]</sup> but with plastic filaments run diagonally across squares, with the result that the squares can hinge along either of two adjacent sides. In Fig. 2 are shown the three upper blocks of the series, 1, 2, and 3, and their connecting tapes, the blocks being represented as transparent and separated from each other a short distance to show the arrangement of the connections. Block 1 has attached to it three tapes, a, b, b. The tape, a, is attached to the face of the block at the center, at the upper end, and extends over the rounded end of this block and under the rounded end of block 2. The tapes, b, b, are attached to the face of block 1, extending downwardly under the lower end of this block and upwardly over the upper end of block 2. The tape, a, which is attached to the center of the upper face of block 2, extends over the end of this block, downward underneath, the block, and over the upper end of block 3, where it is secured. This arrangement of tapes is observed throughout the entire series." — Scientific American

## Desmos Escape Room! - - - Angela Ensminger

Twitter User Sean Sweeney (@SweenWSweens) has created some great escape rooms using Desmos. Students use logic to solve puzzles, open up new rooms and eventually escape! The first was extremely popular in my classes last June and I can't wait to share the sequel next week with my students!

#### Desmos Escape 1: The House

(Click on the link and notice the teacher guide in the upper right). <u>https://bit.ly/3qovg1E</u>



# Dan Finkel (Math For Love) has published his first Children's book, *Pattern Breakers.*

#### It is now available on <u>Amazon</u>

"You're invited to a game of hide and seek - with a twist! This first book of patterns is a playful way to introduce math to the kids in your life - with laughter, delight, and surprises! My hope for the book is that it gives families and teachers another way to share math with play and

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delight. I also hope that it provides a clear reference for how we can mathematize any children's book. There are some key moves to this:

- slowing down
- making your thoughts clear with words
- deliberately pointing to what you see in the book
- inviting participation by having fun yourself

In my perfect-world version of events, I hope that this book actually makes it clearer how to infuse math into children's books whenever folks might want to, and in a light, fun way. But I'm getting ahead of myself! The first step is to get the book out there and hear what people think about it. If this looks like something you want, you can grab a copy at the link below (from Amazon) and let me know how you like it!"

#### June 4, 2023



## **SUMMER MATH JOKES!**

What do you call a man who spent all summer at the beach? (A Tan gent)	What is a Math Teacher's Favorite Vacation Destination? Times Square				
Why Did the Obtuse Angle Go to the Beach? Because it was over 90 degrees	Have You Heard the Latest Statistics Joke? Probably				
What Do You Get When You Take the Sun and Divide It's Circumference By Its Diameter? Pi in the Sky	How do You Make Seven Even? You subtract the "S".				
Why Doesn't Anybody Talk to Circles? Because There's no point	What is a Teacher's Favorite Season? SUMmer.				
Why Did the Obtuse Angle Jump in the Pool? Because it was over 90 degrees.	Why Are Obtuse Angles always depressed? Because They Are Never Right.				