Puget Sound Council of Teachers of Mathematics June 15, 2021

Puget Soundings

"Deep summer is when laziness finds respectability."- Sam Keen
"It's a smile, it's a kiss, it's a sip of wine…it's summertime!"
– Kenny Chesney

June 15, 2021 **Happy Summer – you deserve it!** **Editor: Joyce Frost (frostjoycee@gmail.com)**

2021/2022 PSCTM Dinners!

Fall Dinner:
Monday, October 18, 2021
Winter Dinner:
Monday, February 7, 2022
Spring Dinner:
Monday, May 9, 2022

The Fall dinner will again be ***virtual***, but we hope to be meeting back in person for the Winter and Spring dinners. Stay tuned!

Renew your PSCTM membership online!

Dear PSCTM members,
We made it! What a roller coaster adventure this school year has been.

I love this time of year when we celebrate the successes of our students. It's a time of joy as students graduate, and we recognize every student for their achievements.

Have you taken a minute to stop and think about all that you have achieved this year? I read recently, "There is a past version of you that is SO PROUD of how far you have come." This resonates with me; we're always willing to celebrate our students but rarely stop to celebrate ourselves.

As we begin this summer season, I hope you will take a little time to congratulate yourself on your accomplishments. Make a top 10 list of your achievements, tell a friend about your successes, buy yourself a treat, and take a break.
We value you, and we appreciate all that you do to make mathematics joyful for others.
Thank you for your continued membership and support of Puget Sound Council Teachers of Mathematics.

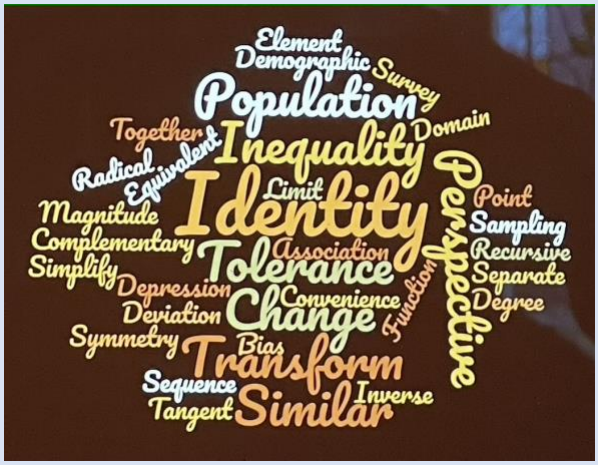
Congrats and best wishes,
Traci Cotton, PSCTM President

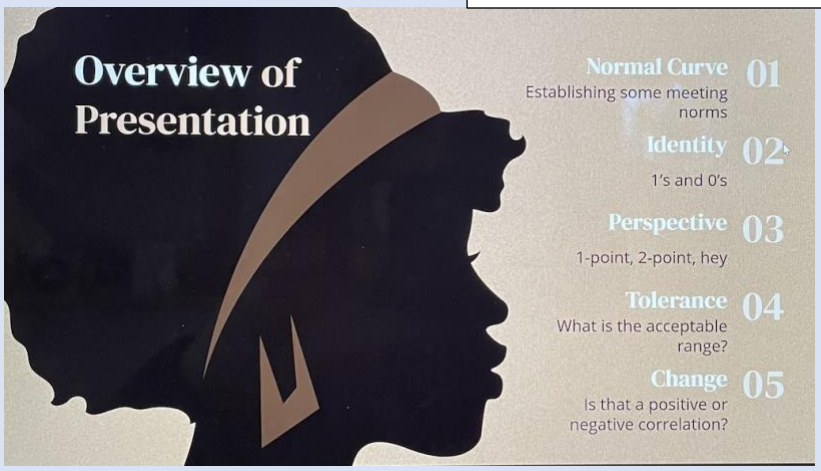
Jane Bissonnette - Past President, Secretary, Joyce Frost – Program, Newsletter, Jane Hunter - Newsletter, Art Mabbott – Treasurer, NCTM Rep, Joe Frost - Web Page, Laura Beckett, Maryke Haynes - Equity, Angela Ensminger – Membership/Social Media,

James Stallworth, Spring Presentation, May 17, 2021

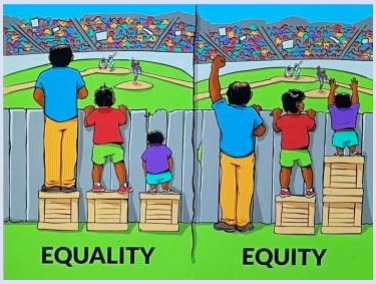
"If the 1 is invisible, does that mean I am too?" The role of personal identity in the mathematics classroom."

Enjoy this summary of James' presentation in pictures and quotes!

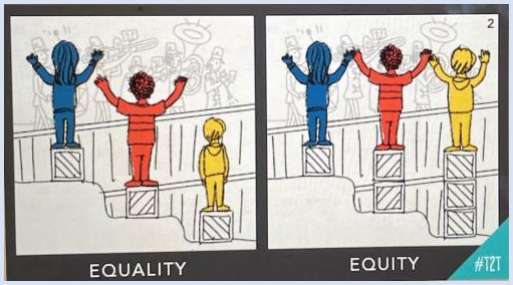




"The concept of identity is a complex one, shaped by individual characteristics, family dynamics, historical factors, social/political factors…"
"…Who am I? The answer depends in large part on who the world around me says I am. Who do my parents say I am? Who do my peers say I am?..."
"What message is reflected back to me in the faces and voices of my teachers, my neighbors, store clerks?..."
"What do I learn from the media about myself? How am I represented in the cultural images around me? Or am I missing from the picture altogether?
- - - *Beverly Tatum Daniel*



What we are used to saying



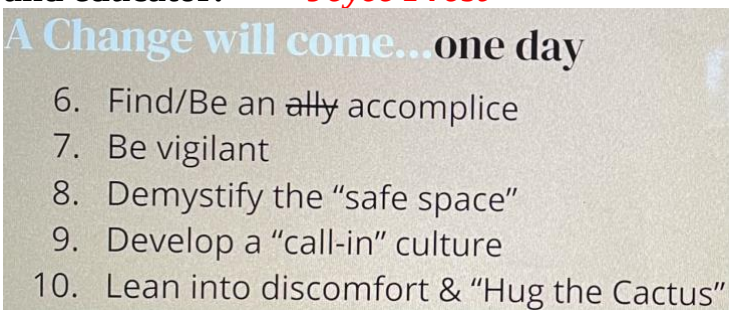
What we should be saying.

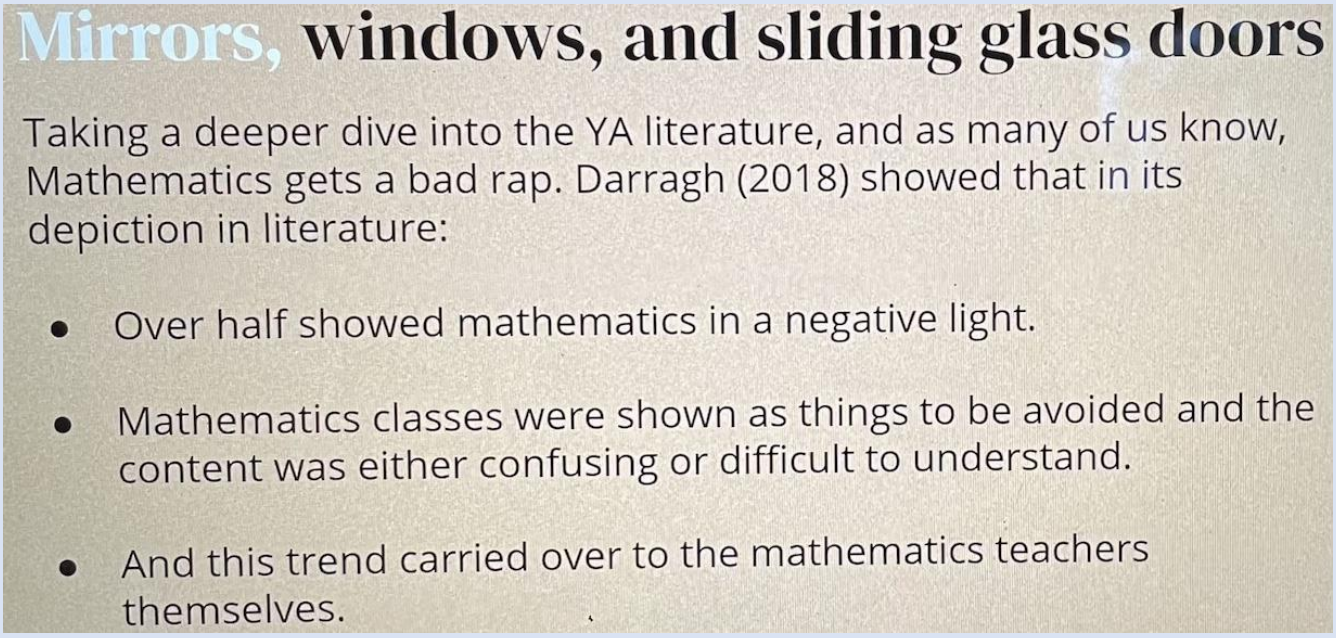
What we should be saying

Matrix of Oppression

Social Identity Categories	Privileged Social Groups	Border Social Groups ⟷	Targeted Social Groups	Ism
Race	White People	Biracial People (White/Latino, Black, Asian)	Asian, Black, Latino, Native People	Racism
Sex	Bio Men	Transsexual, Intersex People	Bio Women	Sexism
Gender	Gender Conforming Bio Men And Women	Gender Ambiguous Bio Men and Women	Transgender, Genderqueer, Intersex People	Transgender Oppression
Sexual Orientation	Heterosexual People	Bisexual People	Lesbians, Gay Men	Heterosexism
Class	Rich, Upper Class People	Middle Class People	Working Class, Poor People	Classism
Ability/Disability	Temporarily Abled-Bodied People	People with Temporary Disabilities	People with Disabilities	Ableism
Religion	Protestants	Roman Catholic (historically)	Jews, Muslims, Hindus	Religious Oppression
Age	Adults	Young Adults	Elders, Young People	Ageism/Adultism

This was an outstanding presentation! James has a true way with words and was able to convey both problems and solutions, all shared with heart. It is easy to see why he is such a beloved math teacher, principal, and educator. - - - *Joyce Frost*





And, the Winner is…

Congratulations to Anna-Maria de la Fuente, the winner of our Spring ***Royal Penewell*** Door Prize. She is the recipient of a $100 gift certificate to Math 'n Stuff! Anna-Maria de la Fuente has spent 34 years in education. She has worked as a classroom teacher at Rainier Beach And Chief Sealth High Schools. Out of the classroom, she Worked for the MESA program, Seattle Schools math Program, and now as a consulting teacher supporting Novice teachers. Anna-Maria is committed to ensuring that every student and especially our black and brown students, has full access to math learning at high levels.

Clock Hours for PSCTM events – from our PSCTM Clock Hour guru:

If you attended one of our PSCTM events: Fall 2020, Winter 2021, or Spring 2021 and forgot to submit a request for clock hours, it isn't too late. Just send an email to art@mabbott.org to start the process. We keep a list of our attendees and can help. **PSCTM's simplified 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 that you attended
- Complete the clock hour form and keep it for your records. (***Email Art if you have questions)***

Starlie Chinen (co-presenter from last fall) had this to share about her current graduate work.

So often conversations about equity in education focus on what teachers need to do to better support students. While this absolutely is an important avenue for improvement in mathematics education, it can put the onus of systemic improvement on teachers alone. This improvement needs to occur at multiple levels. Starlie's current research investigates how those who support mathematics teacher learning at the preservice teacher level can take on this work. In particular, Starlie is looking at the experiences and narratives of doctoral students who have transitioned from classroom teachers to teacher educators. - Starlie Chinen

Follow PSCTM on social media! Share your lesson ideas, news with us, too! @PSCTM

Get Ready for the Northwest Math Conference in Tacoma in 2022!

PSCTM is excited to partner with the **Washington State Math Council** for the **2022 NW Math Conference.** The conference will be returning to the Tacoma Convention Center in October 2022. The theme is, ***"Math: You Are Invited"***.

We will be focusing on strands of inviting **all voices** into math, addressing diversity and inclusion, planning for equity and access, inviting in through play and curiosity.

We plan to provide several ways to participate through registration options (Saturday only, Keynote streaming) and intentionally creating space for educators to connect.

If you are interested in helping, contact Maryke at: mhaynes@everettsd.org, (206) 351 – 3095

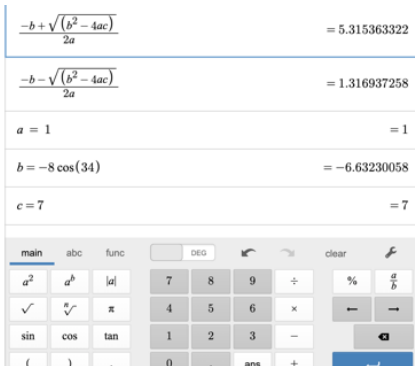
Maryke Haynes (co-chair, logistics)

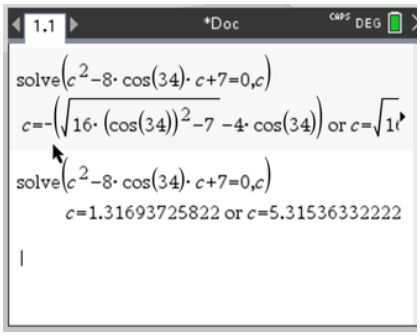
Teachers affect eternity; no one can tell where their influence stops.

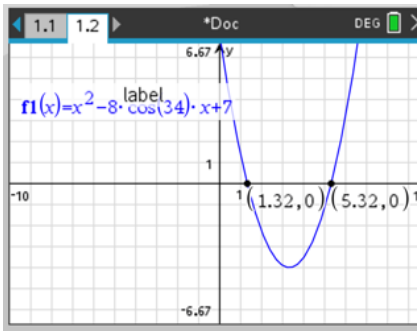
Henry Brooks Adams

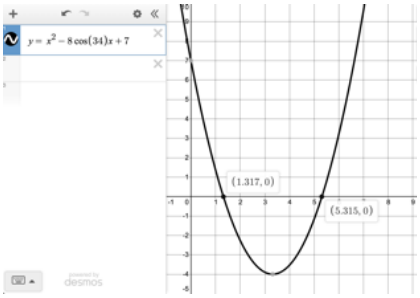
What Have I Learned During This Pandemic? - - - Art Mabbott

I am not sure what our friends in academia's research says about our online work, I am certain that I have learned from my students. I have learned that technology really is our friend; we need to be free to use it. Using technology, we can ask deeper and more important questions. As my friend Annie Fetter asks, "What do you notice? What do you wonder? "









Last week while exploring the Law of Cosines in Trig class, we were solving for one of the sides of a triangle. The triangle had sides of lengths 3 and 4, with the angle opposite 3 measuring 34˚. This gave the equation: $3^2 = 4^2 + c^2 - 2\,(4)\,(c)\,\text{Cos}\,(34^\circ)$. In solving for c, a quadratic equation resulted: $c^2 - 8\,\text{Cos}\,(34^\circ)\,c + 7 = 0$. I proceeded to solve for c using the quadratic formula. As I was working thru the algebra and making sure I didn't introduce a calculation error, one of my students, Peter, said to me, "Why don't you use a DESMOS scientific calculator? Wouldn't that be easier? And then you don't have to worry about mistakes." So, I said, "Peter, you are now a co-host (on Zoom). Show us what you mean." Peter opened up DESMOS' scientific calculator and literally typed in the + version of the quadratic formula, followed by values for a, b, and c. He apologized that he could not put in the +/- and proceeded to enter a second equation with the + replaced with a -. Suddenly, there before us on the screen were both of the solutions to this ambiguous triangle problem. I had never thought about entering the formula itself into DESMOS. I could now get to the real question, "What does that mean? What do those two answers mean?" I did not have to spend 5 or 10 minutes myself modeling or allow them to spend 10, 15 minutes or more crunching thru the numbers to calculate the value of c. We could look at those two values and dig a little deeper. "What do you notice? We got two answers, what do they tell us? What do you wonder about why you could have two answers?"

"BUT WAIT" Jesse says. "Couldn't I do the same thing on my nSpire?" Jesse now became the new co-host and opened up a calculator page. He entered the quadratic equation into a SOLVE format and first produced two answers in radical form. He then said to us: "Oh, let me get a decimal value. Isn't that the same thing as what Peter did? I get the same two answers." But again, I ask, "What do you notice? And, what do you wonder? What do those two answers mean to us?" From the back, I hear, "But, isn't that cheating to use the calculator to get the answer?"

We then had a great conversation about the appropriate use of technology. If we were learning how the quadratic formula works and why it works, then we would not have used the technology. But once we have mastered the formula and it's use, we can move to the next higher level to discus what the two answers really mean.

Then we ask, "How does this relate to the geometry of these problems? What does the graph of $y = x^2 - 8\,\text{Cos}\,(34)\,x + 7$ look like and how does it relate to our two solutions?" Moving to DESMOS Graphing Calculator or nSpire graphing page, we can start a conversation about zeros in the quadratic function vs. the solutions to the quadratic equation. From the back of my brain, I start thinking about SSS, SAS, ASA, AAS and why ASS (the hinge case) doesn't work in proving two triangles congruent - it all connects. As a side note, when we explored quadratics with complex solutions, we got some interesting solutions from DESMOS and the nSpire. "What does FALSE mean? What does UNDEFINED mean? What if we got just a single answer to a quadratic, when we know there are supposed to be two zeros. What does that mean?" I love it when the solution produces more questions.

As I plan for next year, I am excited to find other new ways to use technology to help my students gain a deeper understanding of math and how/why it works.

Tides and the Moon - - - *Joe Frost*

After a recent lunar eclipse, I wondered why we don't have them more often, since the moon appears in the same place in the sky every 25 hours. If the Earth's orbit around the Sun and the Moon's orbit around the Earth were co-planar, we would have one solar and one lunar eclipse practically every month, as the Moon passes between the Sun and the Moon passes on the opposite side of the Earth. In fact, the Moon's orbit is inclined 5° from the ecliptic plane, the plane of the Earth's orbit. Because the Moon is about 240,000 miles from the Earth and yet only about 2000 miles in diameter, the Moon must be very near the ecliptic at the full moon for a lunar eclipse or the new moon for a solar eclipse. That happens about twice per year, though the actual number in any calendar year can be more or less than that.

We seem to have especially high tides when we have a full moon or a new moon. You can easily walk along the beach from **Golden Gardens to Carkeek park** on a wide, sandy expanse during the low tide. The rest of the tidal cycle, you will probably get your feet wet.

The Moon's gravitational pull causes a bulge in the oceans under the moon and, indirectly, on the opposite side of the Earth from the Moon. On the near side of Earth, the Moon pulls the water toward itself, but on the other side, the Moon pulls the Earth more than the water! The Sun has a similar effect, but only about half as much. When the two line up, the effects add, and we get extreme tides - spring tides. At right angles to one another, we get less dramatic tides - neap tides. The shape and depth of the local seacoast and weather have a huge effect on the tidal range and the exact time of the high and low tides. The coast of Texas has about two feet of tidal range and the Bay of Fundy can have 50-foot tide changes. Generally, expect high tide to be when the Moon is overhead and again 12 hours and 25 minutes later, when the Moon is underfoot. The greatest tidal changes occur when the Earth is closest to the Sun and the Moon is closest to the Earth, but practically, the effect of the two orbital perigees is not easily noticed. The tilt of the Moon's orbit, the declination, has a stronger effect on tides. The Earth's axis is tilted about 23° from perpendicular to the ecliptic, so the Moon can be directly overhead in Corpus Christi, Texas, at 28° above the equator and have the strongest effect on the high latitudes. Near the equinox, the moon can be directly over the equator and have a weaker effect on tides in the high latitudes. Still, for any particular spot, the cycle of tides can best be predicted by the position of the Sun and the Moon.

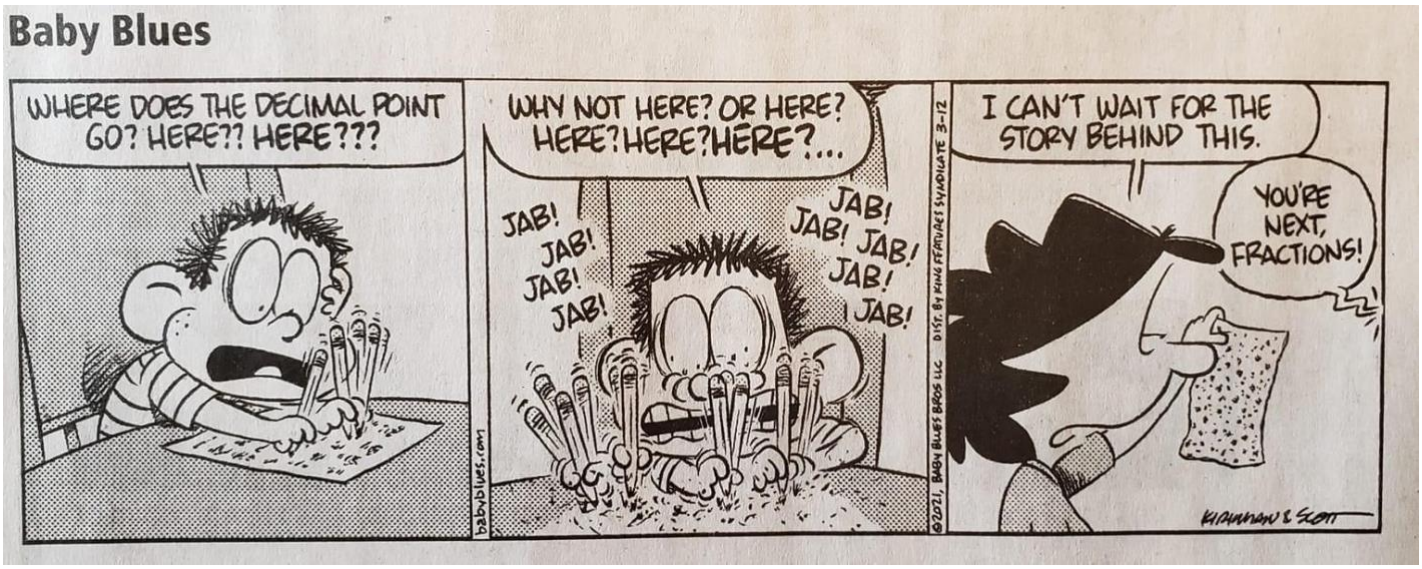
Thoughts as we go into Summer . . . Maryke Haynes

During a pandemic with extraordinary challenges to systems, one theme was revealed: Equity. Often *incorrectly* replaced with the word "equality", this is the image that will stick with me over the summer as I plan for the challenges ahead over the next couple of years to support students in their journey.

We have 12th graders in Pre-Calculus that did Geometry and Algebra 2 on a computer. We have 9th graders coming into high school that have not been in a traditional school since the middle of 7th grade. We have 2nd graders that haven't been around peers since kindergarten. We have 1st graders that have only seen teachers and peers on screen. The challenge of the pandemic is not over in education.

Here is the good news: Students always have "gaps" in learning. We have helped every student at some point gain more than a year of knowledge. We know how to do this. The answer is equity. We just need to figure out what they need (through thoughtful, formative assessment) and have a plan for supporting them (through quality instruction.)

But first: We ***all*** deserve a break! Whether you do an 'all-house-projects' breaker or a 'get-away-from-the-house' breaker, we deserve the exact summer which leaves us refreshed & ready to do what we do next year!

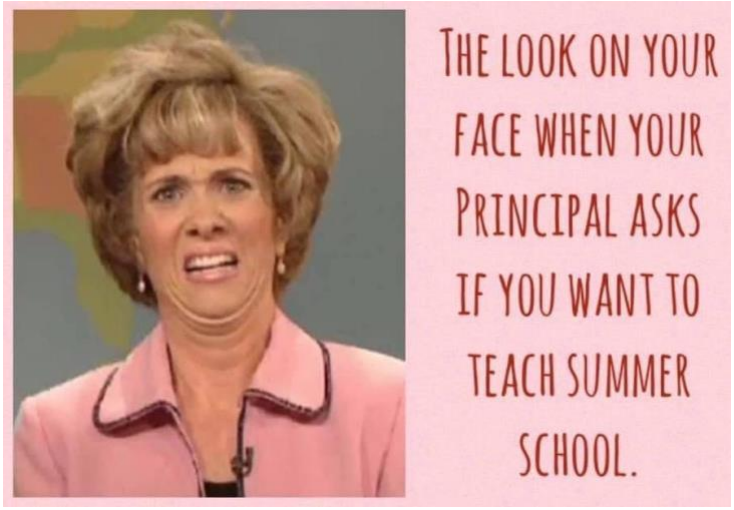


How do mathematicians scold their children?
"If I've told you n times, I've told vou n + 1 times..."

Why can you never trust a math teacher holding graph paper?
They must be plotting something!

What did one math book say to the other?
Don't bother me! I've got my own problems.

Why did the math professor divide sin by tan?
Just cos.



Turtles and Time Machines - Jim King (king@uw.edu)

Recently, I had a modest adventure into digital archeology that reminded me of the many ways that one can approach geometry.

The archeology occurred because I decided for some reason that it would be nice to have a digital version of a set of geometry class notes called *Logo Geometry* (an unpublished book really) that I had worked on from 1987 to 1992. While I still have the original files from 1988, converting them to a pdf was a multistep adventure featuring several old versions of Word software, reviving an old Mac PowerBook G3 and then file transfer by Zip disk! I found that trying to do some work with an old computer was like a time machine, even more so than watching an old home movie. A screen that used to be a familiar environment now seemed primitive and only vaguely familiar. Nonetheless, after a number or errors and false starts, I was able to convert the old 1988 Word files to later formats and then to pdfs.

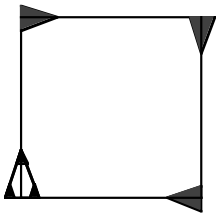
While working with this Logo Geometry document, I read some of it for the first time in a long while. The notes were for one quarter of the two-quarter geometry sequence at the UW called Geometry for Teachers. It explores geometry using the Logo programming language, drawing figures with a screen robot called a "turtle" that occupies a position on the plane and also has a direction (the name derives from an earlier actual robot that drew on paper). Likely, some readers of this newsletter are familiar with a version of this course.

In the Logo Geometry document, I found geometrical explorations that I expected to see, but I was surprised that there are two chapters explaining how to save and copy files and other bits of basic computer interaction. This reminded me that in 1988 a lot of people did not have experience with computers, much less with any kind of programming.

Logo has built-in simple commands for drawing with the turtle and also a complete programming language that can tell the turtle to carry out quite complicated instructions.

The simplest parts of the language have been used with small kids to learn about shapes. For example, the following command draws a square, where FD 50 means FORWARD in the turtle direction by 50 units of length and RT 90 means RIGHT TURN to change the direction by 90 degrees in a clockwise direction. LT means left turn, so RT 90 = LT -90.

```
REPEAT 4 [FD 50 LT 90]
```



The command REPEAT 3 [FD 50 LT 120} will draw a triangle (not LT 60!) since the turn angle is an exterior angle of the polygon. Such commands can be included in short programs with variables such as NGON and the generalization STARGON below.

```
TO NGON :N :SIDE
REPEAT :N [FD :SIDE LT 360/:N]
END
```

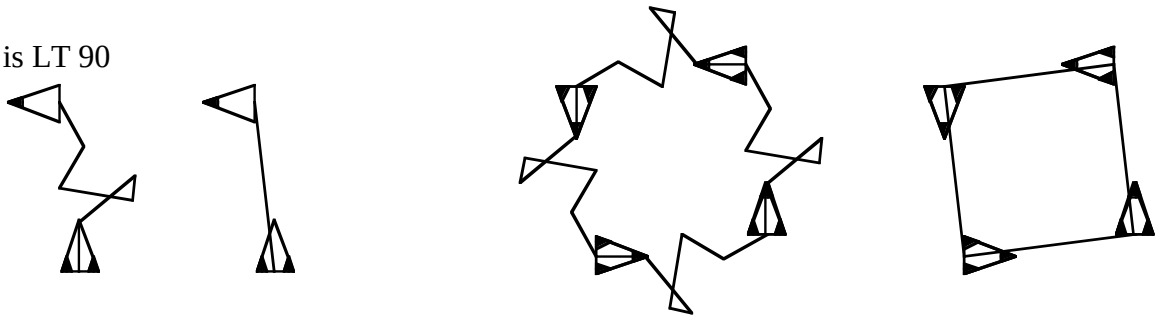
```
TO STARGON :P :Q :SIDE
REPEAT :Q [FD :SIDE LT
360*(:P/:Q)]
END
```

Then either NGON 5 50 or STARGON 1 5 50 means REPEAT 5 [FD 50 LT 72]; this will draw a regular pentagon with side 50. In contrast, STARGON 2 5 50 will draw a star pentagon (pentagram) of side 50. One can do many experiments with various inputs, especially contrasting prime values of :Q with composite ones.

One observation in understanding the angles of a regular n-gon is that the Total Turn, the sum of all the (signed) turn angles is always ±360 degrees. This Total Turn for a star polygon is ±360*:P. This leads to a formula for exterior angles simpler than the formula for interior angles.

A key concept for any command is the change in the turtle's state; the change in position and Total Turn, the sum of the signed LT turn angles. Any command with Total Turn equal to 90, like the ones in this figure, will draw a figure based on a square when repeated 4 times. This idea generalizes to other n-gons as well.

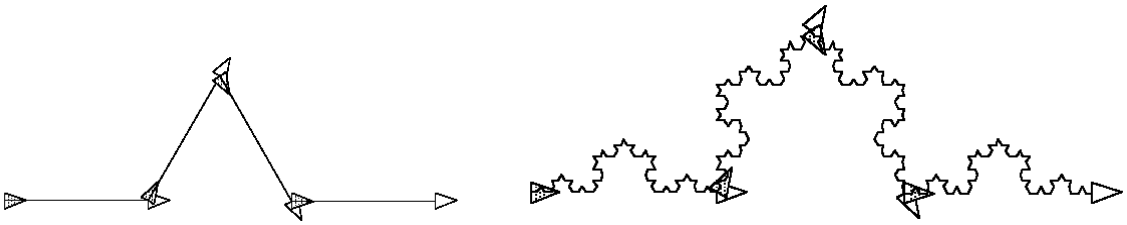
Total turn is LT 90



What is different about this perspective on geometry is that there is an implicit coordinate system, but the axes are relative to the turtle body and so move with the turtle.

One does not really need a computer to explore this total turning idea in a classroom. If one student acts out the turtle part, walking around a polygon, a second student can copy the direction change at each step without moving.

This intrinsic geometry allows one to write rather short recursive programs that will draw fractals such as the famous Koch snowflake at various levels of complexity.



Anyway, I wrote over 200 pages of this stuff, in 13 chapters. I certainly did not invent Turtle Geometry. The classic text is the book *Turtle Geometry* by Harold Abelson and Andrea DiSessa from MIT Press (free version now online at MIT Press)[1]. The turtle perspective is really a polygonal version of the moving coordinate frame of differential geometry (and physics). The total turtle turn is included in the concept of total curvature of a curve.

This did get me thinking about the many approaches there are for thinking about geometry and how the tools that one uses affect the problems and theorems that one is drawn to explore. At the end of 2020, I finished writing a book[2] under the auspices of the Park City Math Institute. It is based on the transformations called rigid motions that are central in the Common Core. There is quite a bit of symmetry in that book related to rotations. Now the turtle is also drawing rotationally symmetric figures. Where are the transformations?

An answer is that turtle commands are transformations but not transformations of points in the plane; they are transformations of turtle states. The set of all turtle states is a three-dimensional **state space** consisting of a location (a point in the plane) and a direction (a point on a circle). The commands FD *distance* and LT *angle* are transformations on the space of states.

[1] If there is any interest, I have some Logo books (other than Turtle Geometry) to give away. And the pdfs of *Logo Geometry* are available too.

[2] My PCMI book is called *Geometry Transformed: Euclidean Plane Geometry Based on Rigid Motions*, published by the American Mathematical Society. There is a description in the Textbook section of the AMS Bookstore (ams.org)

Check out Joyce Frost's article in the California Mathematics Project!

Peg Cagle and I have an article which was originally published by the Park City Math Institute.
We are pleased to announce that it is now also available through the Journal of the **California Mathematics Project.** You can see it by going to: jcmp.calstate.edu. - - - ***Joyce Frost***

An Amazing, Space Filling, Non-regular Tetrahedron: As Simple as √1, √2, √3

Joyce Frost, Margaret (Peg) Cagle 02_FrostCagle2019JCMP.pdf

Rethinking Summer Math Packets - Let's have summer Math fun!

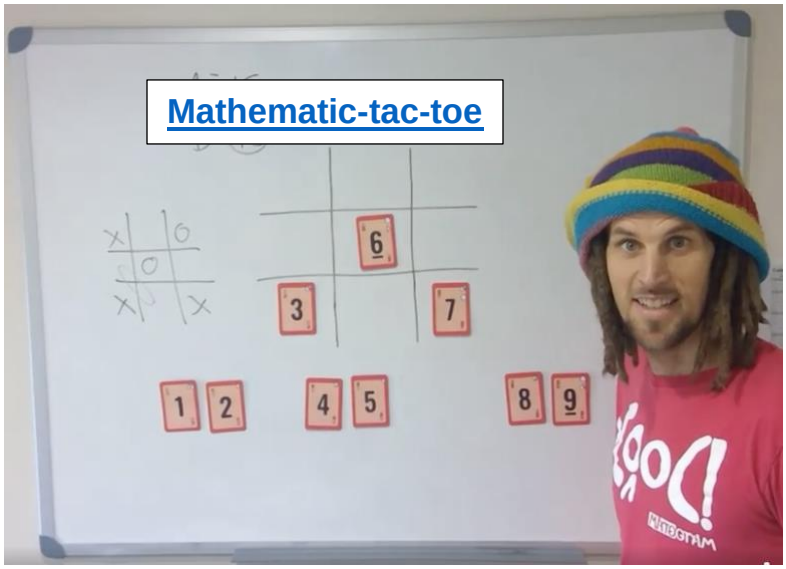
For some schools, summer vacation comes with the expectation of reading and math packets. *Traditionally*, these are generally worksheets with problems that review concepts from the previous school year to help with retention of those skills. The truth is most students complete the packet the first week of summer or the last (if at all). The hope for sustained practice over the summer is just that - a hope!

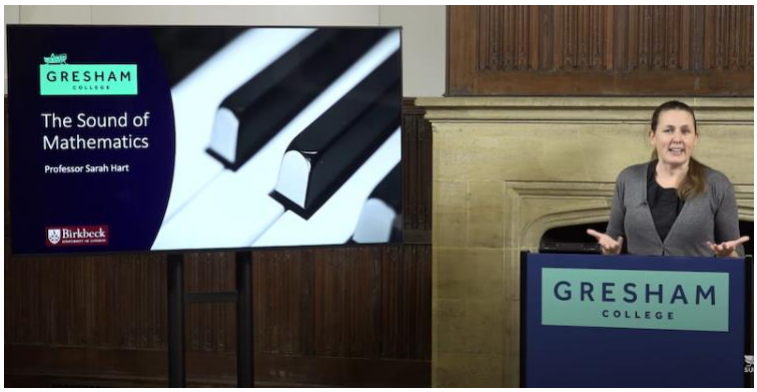
For the last 3 years, I have moved away from traditional review packets in favor of Family Math Projects. I provide a project for each month: June, July, and August. These are designed for families to work together - even with students in different grades - to explore math connections in everyday life. I take my inspirations from games, puzzles, art, and life!

Last summer, students planned, estimated costs and grocery shopped to have a family picnic. They made art pieces from random rolls of dice. They played with arrays while exploring coins. This year, they will be exploring the area of rectangles while making art inspired by the works of Piet Mondrian. They will be going on a data collection walk in their neighborhood and developing game strategies playing Ultimate Tic Tac Toe.

Families have embraced this new model of summer math fun. It has given them a chance to see Math used in many places throughout our world - and out of the textbook! More students complete the projects that even touched the old math packets, and it has developed curiosity in both the students and parents. I don't plan on going back! ***Angela Ensminger.*** ***Check out these two links for Angela's Summer Math Packets!***

http://bit.ly/SMSSummerMath2021 http://bit.ly/SMSSummerMath2020





The Sound of Mathematics

Sarah Hart is the first woman Professor of Geometry at Gresham College; appointed in 2020 as Professor of Mathematics and Head of Mathematics and Statistics at Birkbeck, University of London.

Enjoy the videos & articles for summer math reading!

A Number Theorist Who Connects Math to Other Creative Pursuits

Jordan Ellenberg enjoys studying — and writing about — the mathematics underlying everyday phenomena.

How modern mathematics emerged from a lost Islamic library

Centuries ago, a prestigious Islamic library brought Arabic numerals to the world. Though the library long since disappeared, its mathematical revolution changed our world.

Mathematicians Find a New Class of Digitally Delicate Primes

Despite finding no specific examples, researchers have proved the existence of a pervasive kind of prime number so delicate that changing any of its infinite digits renders it composite.

How Mathematicians Use Homology to Make Sense of Topology

Originally devised as a rigorous means of counting holes, homology provides a scaffolding for mathematical ideas, allowing a new way to analyze the shapes within data.

Math Fun: *Jane Bissonnette*

Sometimes when I think the students need a break during class, I present ***lateral thinking puzzles*** to the class. The students seem to really enjoy this break and they are still using their problem-solving brains. I usually present the problem and then allow them to ask me yes/no questions until it is solved. I have several lateral thinking books in my classroom. Puzzles can also be found online. Here is a sampling of problems:

Mystery Light Switches: You are standing next to three switches. You know these switches belong to three bulbs in a room behind a closed door – the door is tight closed, and heavy which means that it's impossible to see if any bulb is on or not. All three switches are now in position off.

You can do whatever you want with the switches and when you are finished you open the door and go into the room. While in there you must tell which switch belongs to which bulb.
How will you do that?

Cut the Cake: How can you divide a cake into 8 pieces with three cuts?

Division: Divide 40 by half and add ten. What is the answer?

A farmer and his cows: A farmer has 15 cows, all but 8 die. How many does he have left?

Doubling: The amount of water flowing into a tank doubles every minute. The tank is full in an hour. When is the tank half full?

Answers:

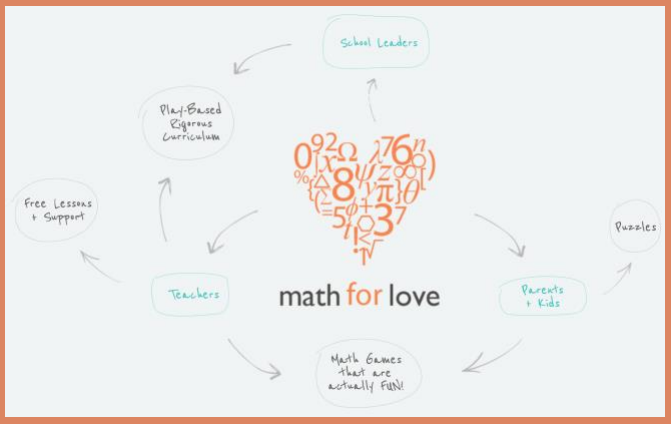
Mystery Light Switches: Turn on the first switch and wait awhile. Turn off the first one and turn on the second. Go into the room. One bulb is shining, the second bulb is hot and the third one nothing….

Cut the Cake: Four parts with two cuts are easy. Now, cut the cake horizontally (split the bottom & top part).

Division: 90 (40÷½ = 80 + 10)

A Farmer and his Cows: 8 survived.

Doubling: The minute before or 59 minutes.



Math For Love's Dan Finkel shares some exciting updates!

Check out their website and highlights at:
https://mathforlove.com/

- **Our *visual flashcards (Multiplication by Heart) will be available soon.***
- ***I have an online course on Mathematical Openers available through Grassroots Workshops***

We rewrote our summer curriculum and it's being used by districts around the country.
As schools open up around the country, there's been a surge of interest in a summer program that will help students get more rigorous math practice and thinking in, but that is also fun. Our play-based program—featuring games, openers, and rich tasks—has seen a spike in demand beyond anything we've encountered in the past! It's exciting to have districts call us and say that want kids to learn, but also to relax and have a great time.

2021 Perspective - - - James Stallworth

During the summer months, growing up in the Midwest, I played Stoplight tag with my neighborhood friends. For those unfamiliar with the game, one person stands some distance away from his peers facing the opposite direction. With closed eyes, maybe spinning around if the spirit so moved them, they would call out "Red Light, Green Light, Yellow Light, STOP!!!" Any person caught moving would have to return to the starting line. If someone was able to make it all the way to the caller, they would win the round and be the next caller. Part of the fun was seeing who you could either trick into moving prematurely or lull into a false sense of security.

I am sure that if I looked hard enough, there probably would be an app out there now for this game and kids would be able to play it virtually from the comfort of their own couch instead of worrying about skinned knees on the blacktop as you stretched your body into an unnatural position trying to reach the caller first. There was a risk to the game, but it was something that we undertook to gain this fun experience.

I bring this up because for the first time in a generation, the entire society was at a Red Light, and we stopped moving and froze in place. The pandemic placed us all at the starting line and asked us to move our kids to the finish line with someone or something else in control. Should we be in-person or fully remote? Should we have videos on or off? Should everyone pass to the next grade, or should everyone stay behind for a do-over? Each of these questions has come up at some point in the discussion of the 2020-2021 school year, especially in terms of mathematics instruction. Do we move forward with reckless abandon or so we stop and reflect on the successes we were able to experience through these challenging times. Or even still do we return to the starting line and begin again like nothing truly happened?

Anyone that knows me will tell you that I am passionate about mathematics and mathematics instruction. But I am equally passionate about students being able to construct their own mathematical knowledge and create a deeper understanding of the content rather than quickly memorizing an algorithm that may or may not benefit them in every situation. If we race to patch the remainder of our school year with formulas, superficial concepts, and "tips and tricks of the trade" are we truly teaching our students to appreciate mathematical thinking or are we pushing our own academic agenda on them? We have to acknowledge that there will be learning losses from this past year, but do we want to compound those deficits with a new distaste or disgust for mathematics if we remove some of the inherent beauty and fun out of problem solving and reasoning?

As teachers we had to step out of our comfort zone and learn multiple new devices, technologies, and learning platforms. Now that we are returning to something that looks a little bit more normal, are we going to place all of that learning on the shelf or apply it to our "new normal," a term that if you are anything like me have heard at least 14 times a week in the myriad of zoom meetings you were forced to sit through. Already I am thinking of ways I can build on my new skills for the next school year. Shouldn't we provide our students with the same opportunities rather than asking them to return to sitting quietly in rows and completing blackline masters of skills that came from the district office?

The world is and has drastically changed around us in the last 18 months. This was our own little game of Stoplight Tag. And now we have a choice to make. We can sit at the starting line waiting for someone else to take the lead. We could sprint straight ahead and run the risk of being caught off guard and get sent back to the drawing board. Or we could find a middle ground and an innovative way to move forward into uncharted territory with a new bank of skills and experiences that can turn a temporary setback into a potential reshaping of how we do and teach mathematics to our students.

I don't know about you, but I am game to venture off the beaten path.

I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel. - - - Maya Angelou