Puget Sound Council of Teachers of Mathematics Septem Puget Soundings

September 18, 2023







Join Math Teacher Dean Willis (Lake Washington HS), for our Fall Dinner Presentation: "Using Chat GPT to personalize word problems & projects and make them more relevant to students".

Puget Soundings Newsletter: September 18, 2023 Happy Fall!

Editor: Joyce Frost (frostjoycee@gmail.com)

Save these Dates!

2023/2024 PSCTM Dinner Presentations

Fall Dinner <u>(Register)</u> October 23, 2023

Winter Dinner February 26, 2024

Spring Dinner May 13, 2024

Board Meetings are: September 11th, December 11th, January 22nd, March 11th, April 15th, and June 10th.

Greetings fellow PSCTM members!

Welcome back to a new school year! From new school supplies to new students, we can find new opportunities to grow and learn with our students and each other.

I invite you to join us in Portland for the Northwest Mathematics Conference on Oct 12-14th. Come and hear fabulous speakers and connect with other math teachers in the region. Stop by our PSCTM table and say hi! We even have scholarships available to help with the cost of attending. Check out the info on page 6 to apply for up to \$200!

On October 23, we will have our first in person meeting of the

year! We will be hosting Dean Willis from Lake Washington High School as he teaches us about Chat GPT and how its power can be harnessed in our classes. Come enjoy the social hour (5 - 5:30), dinner (5:30 - 6:30 pm, and the presentation from 6:30 - 7:30 pm. Sign up today!



Angela Ensminger, PSCTM President

PSCTM Board: Jane Bissonnette - Secretary, Joyce Frost – Program, Newsletter, Jane Hunter - Newsletter, Art Mabbott – Treasurer, NCTM Rep, Joe Frost - Web Page, Angela Ensminger – President













Fall 2023 PSCTM Dinner, October 23, 2023 featuring Dean Willis, Math Teacher at Lake Washington High School. "Using Chat GPT to personalize word problems and projects and make them more relevant to students".

Artificial Intelligence has finally made its way into the classroom. Its most popular form is **Chat GPT**. Whether we like it or not AI is here to stay. As teachers, we should familiarize ourselves with this technology to enhance the skills we already have. How do we use all of its features to their full potential? Why is a writing tool like Chat GPT important in a Math classroom? What parts of the lesson planning process can Chat GPT handle? Dean has already used Chat GPT in his classrooms multiple times this year. With some basic rules to follow you can use it too, regardless of what you teach. (Plan to bring your laptop. Laptops are optional but highly recommended.)

Note from Dean: "We have started projects in a big way this year, and Chat GPT has definitely lifted some of that burden. We will have already done a project that came from Chat GPT by this presentation, so everything that I will be presenting will have come full circle! That makes me extra excited for this opportunity!"

About Dean Willis:

Dean is in his 7th year teaching math, all but 1 of which were at Lake Washington High School where he currently teaches Algebra 1 and Algebra 2 Honors. When he finished his Masters in Curriculum and Instruction in 2021, his biggest passion became helping students make connections between math and the real world. In his class, story problems and projects are not just words around a familiar equation but problems that require research and critical thinking.

The Oct. 23, 2023 Fall Dinner/Presentation will be at:

St. Madeleine Sophie Catholic School

14400 130th Pl SE Bellevue, WA 98006.
Social Time: 5 – 5:30 pm
Dinner/Announcements: 5:30 – 6:30 pm
Chat GPT Presentation: 6:30 – 7:30 pm
Register <u>HERE</u> for the Dinner.

Receive Clock Hours for PSCTM events!

For attending one or more PSCTM events, you can receive 1.5 clock hours per presentation. Earn clock hours for Fall (October 23, 2023), Winter (February 26, 2024) and/or Spring (May 13, 2024). Our treasurer, Art Mabbott, will have details at each of our presentations.

Email him (art@mabbott.org) for details!

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



Look Up (or Maybe Down)! - - - Angela Ensminger

While on vacation, I took a lot of photos! Looking back, some of my favorite ones are when I focused on patterns around me – especially on ceilings (and a few floors). Many of these could be the basis for conversations about patterns and curves in classes. Enjoy! If you can identify where these were taken, email me at <u>aensming@gmail.com</u>. (I may have a prize for you!)



PSCTM Newsletter: Puget Soundings



Northwest Mathematics Conference

62nd Annual NWMC October 12-14th, 2023

Conference Schedule

Thursday, October 12

8:30 - 12:30PM Pre-Conference Sessions 11:30 - 12:30PM Lunch on your own 1:30-4:30PM Pre-Conference Sessions** 7:00 - 8:00PM Opening Keynote Karim Ani

Friday, October 13

8:00 - 9:30AM Breakfast Keynote with Barbara Oakley** 8:00 - 5:30PM Sessions 11:30 - 12:30PM Boxed lunches available in various locations 5:30 - 6:25PM Appetizers and Networking downstairs^^ 6:30 - 7:30PM Ignite! in Clark and Clackamas^^

Saturday, October 14

8:00 - 2:50PM Sessions 9:18AM Eclipse (glasses provided) 3:00 - 4:00 Closing Keynote with Fawn Nguyen

** Additional tickets need to be purchased for this event ^^Included in Saturday-only registration



Karim Ani, Thursday evening Opening Keynote

Karim Ani is the founder of Citizen Math (formerly Mathalicious) and the author of "Dear Citizen Math: How Math Class Can Inspire a More Rational and Respectful Society." Prior to developing curriculum, Karim was a middle school math teacher and instructional coach. Karim has a bachelor's degree in economics from Stanford University and a master's degree in secondary math education from the University of Virginia.

Dr. Barbara Oakley, PhD, PE, Friday Breakfast Keynote

Barbara Oakley, PhD, PE is a Distinguished Professor of Engineering at Oakland University in Rochester, Michigan; Michigan's Distinguished Professor of the Year; and Coursera's inaugural "Innovation Instructor." Her work focuses on the complex relationship between neuroscience and social behavior. Dr. Oakley's research has been described as "revolutionary" in the Wall Street Journal. She is a New York Times best-selling author who has published in outlets as varied as the Proceedings of the National Academy of Sciences, the Wall Street Journal, and The New York Times. Her book A Mind for Numbers, on effective learning in STEM disciplines, has sold over a million copies worldwide; Uncommon Sense Teaching is a critically praised guide to teaching based on insights from neuroscience.

Fawn Nguyen, Saturday afternoon Keynote

Fawn begins her work this year as a Specialist on the Math Advance Team at Amplify Desmos Math. She was a math coach for a K-8 school district for three years and before that, a middle school teacher for 30 years. Fawn was the 2014 Ventura County Teacher of the Year, was awarded the Math Teacher Hero from Raytheon in 2009 and the Sarah D. Barder Fellowship from the Johns Hopkins Center for Talented Youth in 2005. Fawn blogs about her lessons and classroom teaching at fawnnguyen.com. She also authors three other websites for teachers: visualpatterns.org, between2numbers.com, and chewablemath.com.

Could you use \$200 to attend the Portland NW Mathematics Conference? PSCTM would like to award two scholarships for PSCTM members.

PSCTM members,

It is my pleasure to invite you to apply for the Eldon Egbers Scholarship.

Eldon Egbers was a special friend to math teachers in the state of Washington. He wanted other teachers to experience the delight of teaching mathematics and believed that the Northwest Mathematics Conference was a great place to share and embrace that enthusiasm for teaching mathematics. In honor of his dedication and enthusiasm for math education, the Puget Sound Council Teachers of Mathematics has established a scholarship to be awarded to two teachers to attend the Portland NWMC October 12 - 14, 2023. This \$200 scholarship (each recipient) may be used to offset the costs of attending this amazing event. The following requirements must be met to be awarded the scholarship:

- The applicant has a minimum of two years of membership to PSCTM.
- An article about the recipient's conference experience should be emailed to our editor, Joyce Frost for publication in the newsletter.
- The applicant has not been a previous recipient of the award.
- This \$200 scholarship may be used toward the costs of: registration, transportation, lodging, meals, or a substitute teacher.

The recipient will receive the funds **after** the awardee has submitted receipts to the PSCTM treasurer, and a brief article to be published in Puget Soundings (the PSCTM newsletter) has been delivered to the editor at **frostjoycee@gmail.com**. The article could contain lesson ideas, resources, reflections on practice, or other ideas the awardee learned at the conference. Letters of application should be emailed to Angela Ensminger, PSCTM President at

<u>aensming@gmail.com</u>. Please include Eldon Egbers Scholarship in the headline of the email. **Applications are due by Friday, September 29, 2023.**

Award selection process

1. The awardees will be selected September 30, 2023 by lottery (granted that each applicant has met the requirements).

2. The awardees will be contacted by a PSCTM Board Member.

The awardees will also be publicly recognized on our PSCTM social media accounts and at our Fall Dinner Event October23, 2023.

Best wishes,

Angela Ensminger, PSCTM President

DESMOS as a teaching/learning tool

An exciting result of introducing my students to the DESMOS graphing calculator has been that my students now ask to use it to demonstrate their mastery of concepts.

One of my students was solving a quadratic expression for x. As they showed their work line by line, they could see the graph and commented that the graph remained the same as they stepped through their work. They also noticed that when they made a mistake and left out a solution, the graph deleted one of the sections. Amazingly, they usually knew why. I didn't have to say anything about 'don't' forget to take the +/-.' They knew what was wrong and knew how to fix it to get the lost value back into their graph. That was wonderful for both of us. --- Art Mabbott

An afternoon with Dr. John Conway - - - Art Mabbott

Over my teaching career stretching back to the 1970's, I have had some rare opportunities to hang out with some really great mathematicians; spending time with and exchanging thoughts and ideas. This article is about an afternoon spent with the late Dr. John Conway, a Princeton University Mathematics professor and world famous mathematician. Sadly, he died from complications of Covid-19. (26 December 1937 – 11 April 2020).

John Conway had invited a friend of mine, Annie Fetter, from the Math Forum, to spend an afternoon chatting about Geometer's Sketchpad. Annie let Dr. Jim King and I tag along. When we arrived, we noticed the size of the Princeton Professors' offices - they were very large. John Conway actually had two offices! In the second one he shared and displayed his many models, games and math toys. When Annie introduced us, Dr. Conway mentioned that he already knew Dr. King. But what amazed me was that John Conway recognized me as the person that he had a little fight with on a secondary teachers discussion group. At the time, I didn't know who John Conway was and had argued with him. He was taking the traditional perspective that we can never use one of the commonly known conjectures that kids think is true but isn't, the ASS/SSA Conjecture in Geometry. For those of you who teach geometry or can remember back to your own time as a student, ASS stands for Angle Side Side; if two sides of a triangle and an angle opposite one of those sides are congruent to the corresponding parts of a second triangle, then the triangles may or may not be congruent. This is often referred to as THE HINGE CONJECTURE since the side opposite the angle can hinge to form a pair of non-congruent triangles. My perspective was that there are only two cases to consider. If you place two triangles together along one of the congruent sides, you can form either a parallelogram or a trapezoid. In the parallelogram case, the two triangles are congruent. But if you find yourself with a trapezoid case, they aren't. It took some encouragement from other teachers on the forum for Dr. Conway to visualize what I was seeing. But the point of this essay is to say the he remembered that dialogue and what I had said. The four of us spent the majority of our time discussing some of the finer intricacies of Geometer Sketchpad both on the surface and what is embedded behind the curtain. We also enjoyed discussing the varied projects that he was currently working on. One involved a garden outside the math building. There was a pathway that wound around throughout this peaceful area. He envisioned placing a number of lanterns to light up the pathway, but the lanterns had to have a geometric connection. He wanted the ends of the paths to be lit by one of the five Platonic solids connecting each with its dual. Along the interior paths, he would place the non-platonic solids in a line between the Platonic solids. A great idea but his only problem was a lack of funding. Later he talked about a project he was working on with a mural artist in downtown Princeton. The artist was having trouble with a building on the corner incorporating a figure which needed to wrap around the corner. The problem was how to get the eyes to follow you as you walked or drove along the street. What a great problem to deal with and what a great mathematician to help the artist solve it. Dr. John Conway has been quite an inspiration to many.

From Wikipedia: "Conway's career was intertwined with that of <u>Martin Gardner</u>. When Gardner featured <u>Conway's Game of Life</u> in his <u>Mathematical Games column</u> in October 1970, it became the most widely read of all his columns and made Conway an instant celebrity.^{[16][17]} Gardner and Conway had first corresponded in the late 1950s, and over the years Gardner had frequently written about recreational aspects of Conway's work.^[18] For instance, he discussed Conway's game of <u>Sprouts</u> (July 1967), <u>Hackenbush</u> (January 1972), and his <u>angel and devil problem</u> (February 1974). In the September 1976 column, he reviewed Conway's book <u>On Numbers and Games</u> and even managed to explain Conway's <u>surreal numbers</u>."

Seeing in 3 – D, How Art Grew Through the Centuries - - - Joe Frost

One of my favorite things to do while traveling is to visit art galleries and museums. This summer we visited the Termesphere Gallery in Spearfish, South Dakota, that features the work of Dick Termes, whose work is especially interesting to mathematicians. His gallery has an extensive set of spheres, hemispheres, and flat pieces that play with your understanding of perspective. In addition to being beautiful artwork, some are mind-bending.

Filippo Brunelleschi reportedly developed the mathematics of linear perspective through experiments from 1415 to 1420 by making drawings of various Florentine buildings in correct perspective. His method of creating life-like representation of 3D objects on a 2D surface revolutionized art. In about 1435, his friend Leon Battista Alberti published *De Pictura*, a treatise on using a vanishing point. One of the best examples of the use of a vanishing point is Raphael's 1509 fresco, *The School of Athens.*

Almost a century after Brunelleschi, Jean Pèlerin published the first known treatise on two-point perspective. His drawings show how a building is drawn if you are viewing it near a corner, rather than face-on. Both faces of the building recede into the distance toward two vanishing points on the horizon. Albrecht Dürer wrote about two-point perspective 1525, when he published the first book for adults on mathematics in German, but he had largely quit painting by then. The technique didn't catch on until 1650, when Dutch artist Gerard Houckgeest painted an oblique view of the interior of a church in Delft. The idea caught fire in the Netherlands, but didn't become popular in Italy until Canaletto started using it fifty years later.

In three point perspective, there is a vanishing point above or below the viewpoint, so he vertical lines converge as well. M. C. Escher used three-point perspective to hide the discontinuities in some of his "impossible" drawings.

In four point perspective, there are vanishing points both above and below the viewer. The odd-looking discontinuity at the horizon in linear four point perspective can be corrected by using curvilinear projection. Instead of straight lines leading to the vanishing point above and below, the lines curve in an arc from one vanishing point to its opposite.

Five point perspective is often called fish-eye perspective. In this grid, there is a circle inscribed on the four external vanishing points, curves like lunes connecting the pairs of opposite vanishing points, and a central vanishing point with rays radiating out to the circle. Images drawn on this look like they were photographed with a fish-eye lens.

In six point perspective, there is a vanishing point behind the viewer as well as the five in five-point perspective. Dick Termes has used this method to paint on spheres, giving you a fascinating way of seeing from the outside what the viewer would see from the inside. See his video at <u>https://www.youtube.com/watch?v=wwItamYHt5U</u>.

Termes has written a book on systems of perspectives, stepping the reader from one-point perspective up to six-point perspective. His very clear description of each is at his website: <u>https://termespheres.com/6-point-perspective/</u> His book is available there, also, (\$15 for paperback and \$10 for digital) and includes the grids needed to draw in those perspectives, from one to six.

In the 19th century, the mathematics of perspective drawing grew into the field called projective geometry, which deals with the relationships between geometric

figures and the images, or mappings, that result from projecting them onto another surface. It has since branched into many research subtopics. Wikipedia has an enlightening introduction to some of them. Much of M C Escher's later work explores non-Euclidean geometries interpreted through projective geometry.

Only those who attempt the absurd will achieve the impossible. M.C. Escher He who wonders discovers that this in itself is wonder. M.C. Escher











Designing the Best Online Platform for your Students - Jane Hunter

The stack of "To Do's" in a teacher's life at the beginning of the year seems to be growing almost exponentially. Most of us have learned that if we can create a system of organization in our classroom at the start it saves a ton of time and headache later on down the road. If there were a tiny silver lining to the pandemic ...we all learned how to create a now required online platform for our classes. The two that I have used the most were Google Classroom and Schoology. Regardless of the platform you are using designing and organizing, it should best suit student's needs (and ours). To create the one that I now use, I had to ask my students what was most useful for them. Here is what students told me:

- 1. They didn't want to search for anything. They wanted it simple and easy.
- 2. They wanted the most recent info at the top.
- 3. They wanted to be able to access any special websites with directions easy to find.
- 4. They wanted to know when assignments had been given and where they were located
- 5. They wanted to find their grades easy (this one depends on your online platform Schoology works easily for that)
- 6. They wanted access by using their phones.

I worked with my students and together we arrived at a mutual method of organization. <u>Weekly Announcements</u> – I have used Google Slides so that each week I can easily add a new slide with announcements. In Schoology you create a new Page and connect it to a google slide.



<u>Math Links Folder</u> – I have a folder right under the announcements that has the links to those sites like our online book, interesting articles, and math helps sites like Khan Academy. The page idea that I used for Google Slides also works great for posting visual directions on something. In the Algebra Links folder, I used it to display how to sign up for the online book.



It is up to you how you organize things, but I select assignments that early on teach students to use my class site. To help my students do this, I created a scavenger hunt. *Best wishes and have some fun with your website and your year!*

Math in the movies and in the news!

How "Oppenheimer" is connected back to Washington State.

Washington state has a unique connection to the period of time portrayed in this movie.



<u>What is Benford's Law?</u> Why This Unexpected Pattern of Numbers is Everywhere

A curious mathematical phenomenon called Benford's law governs numbers all around us. "Benford's law is not merely a statistical oddity: financial advisor <u>Wesley Rhodes was convicted of</u> <u>defrauding investors</u> when prosecutors argued in court that his documents did not accord with the expected distribution of leading digits, and they were therefore likely fabricated. The principle later helped computer scientist Jennifer Golbeck <u>uncover a Russian bot network</u> on Twitter. She observed that for most users, the number of followers that their followers have adheres to Benford's law, but artificial accounts significantly veer from the pattern. She used similar methods to catch people who purchase <u>bogus retweets</u>. Examples of <u>Benford's law applied to fraud detection</u> abound, from <u>Greece manipulating macroeconomic data</u> in its application to join the eurozone to vote-rigging in <u>Iran's 2009 presidential election</u>. The message is clear: organic processes generate numbers that favor small leading digits, whereas naive methods of falsifying data do not."

Scientists uncover hidden math that governs genetic mutations

By Stephanie Pappas, published 11 August 2023

The ability of a gene to keep functioning despite mutations shows a surprising link to fundamental math. Understanding the dynamics of these neutral mutations could eventually be important for preventing disease, Mohanty said. Viruses and bacteria evolve rapidly, and they accumulate many neutral mutations in the process. If there were a way to prevent these pathogens from landing on the needle-in-the-haystack beneficial mutation among all the chaff, researchers might be able to stymie pathogens' ability to become more infectious or resistant to antibiotics.

Bees and wasps devised the same clever math trick to build nests

These insects solved a building problem as a mathematician would, with geometry. Honeybees and yellow jackets don't look like mathematicians. But working as a colony, these insects can solve a common building problem using a geometric solution. Enjoy these new resources from math educator, Robert Kaplinsky.

This is the second video in the 3-part math educators series. <u>How To</u> <u>Survive And Thrive As A Math Educator By Changing The</u>

<u>Rules</u> describes how teachers are at the end of a frustrating game of telephone.

Here is a digit activity from his video. And you will want to watch this "Father of the Bride" clip (1991). *Superfluous Buns* is a hilarious example of why you might actually want to think about GCFs and LCMs outside of math class!

How To Survive And Thrive As A Math Educator By Changing The Rules

Using the digits 1 to 9 exactly one time each, place a digit in each box to make the sum as

close to 1000 as possible.

Source: John Ulbright and Robert Kaplinsky on openmiddle.com



This #3ActMath is how I introduce our GCF/LCM unit every year. It's my

Ms. Sklar @MissSklar

Robert Kaplinsky has 70 plus problems for Kindergarten – Calculus: Open Middle Math Problems, all free and ready to use.

SAVE THE DATE!

The 2024 NCTM Regional Conference & Exposition is in Seattle February 7 – 9, 2024!

More information at: <u>https://www.nctm.org/Conferences-and-Professional-</u> <u>Development/Regional-Conferences-and-Expositions/</u>

Math For Love has new resources for your classroom!

Teachers, check out the free lesson library which is chock full of <u>Openers</u>, <u>Games</u>, and <u>Rich</u>

<u>Tasks</u>, easily filterable by grade, topic, type, and standard. Everything posted is there because they love it!



For Families, Check out these Math Night Activities Whether you're looking for great games and activities for your Home, or organizing a Math Night at your school, <u>this pack of activities</u> is a fabulous place to start! They're perfect games and puzzles to break out whenever you have a free moment at home.

Dan Finkel (Math For Love) has a new TED-Ed riddle out: *The Cursed Dice Riddle*! This is the 26th video he's authored for TED-Ed. See the entire collection <u>here</u>.

A New Resource for Making Math Visual (And a Labor of Love!) from PSCTM member, *Linda Christensen*

My sister Mary and I have been working on a new math resource for over four years, and in late Spring of 2023, it became a reality! It is a deck of cards that makes math visual and includes 50+ games for preschool through 8th grade!

As special education teachers for many years, we both saw such a need for bringing PLAY into math and making numbers visual and easy to understand. We played card games with students to practice skills and have fun with math, but we found that a regular deck limited the usefulness (and fun) of the games. For example, on a 6 of hearts, there are 8 hearts on the card! Students still trying to understand numbers and quantities were confused by this. We heard, "What is the A card for, Ms. C?" On the face cards, only numbers 1-10 could be used in games!

We decided that kids needed their own deck of cards, and that teachers and parents needed a new way to play with math with lots of ideas for games to help kids actually play with math! Wild Side Number Sense cards have four colored 'suits' with numbers from zero (SUCH an important concept!) to 20, and wild cards to encourage strategy and to make the games really fun, along with more than 50 games and variations, organized into grade bands. Each numbered card shows the number visually in four ways: ten frames, tallies, fingers and number lines.

We are proud of Wild Side cards, and are hearing great things from teachers & parents about boosting fluency and deeper understanding. **We also received a NAPPA award**! I am excited to share this with fellow PSCTM members! Visit <u>Wild Side Number Sense Cards</u> for more info.



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MATH JOKES for those extra 2 minutes...





"I hate to say it, but your problems aren't as complex as you think. In fact, they are purely imaginary..."



It's so sad to think that parallel lines have so much in common, but they'll never be able to meet ...