Uncovering the Power of STEAM Leadership:

A Journey of Inclusion and Transformation

This session will empower you with a renewed understanding of the value of inclusive STEAM leadership and actionable strategies to foster a more inclusive, diverse, and dynamic learning environment.

NORMA JOST
EPSILON KAPPA , PRESENTER

KATHRYN WRIGHT
XI , FACILITATOR

WEDNESDAY

June 25, 2025

10:30-11:30 AM

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Texas State Organization

ANNUAL CONVENTION

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Uncovering the Power of STEAM Leadership: A Journey of Inclusion and Transformation

Norma Jost
Epsilon Kappa Chapter
Austin, TX

Agenda

- *Journeys*
- *STEM vs STEAM*
- *Barriers*
- *Actionable Strategies*
- *References*

Two Questions:
Please turn to a partner and answer

- What did you dream to do (as a child…)?
  1 minute each (2 minutes total)

- What happened to your DREAM?
  (3 minutes all together)

Dreams

1. Who had the dream career as a child that led you to a career of passion? Please raise your hand.
2. Who had the dream career changed that led to a career of passion? Please raise your hand.
3. Who had the dream career derailed and had to search for a career of passion? Please stand if you can.
4. Other…

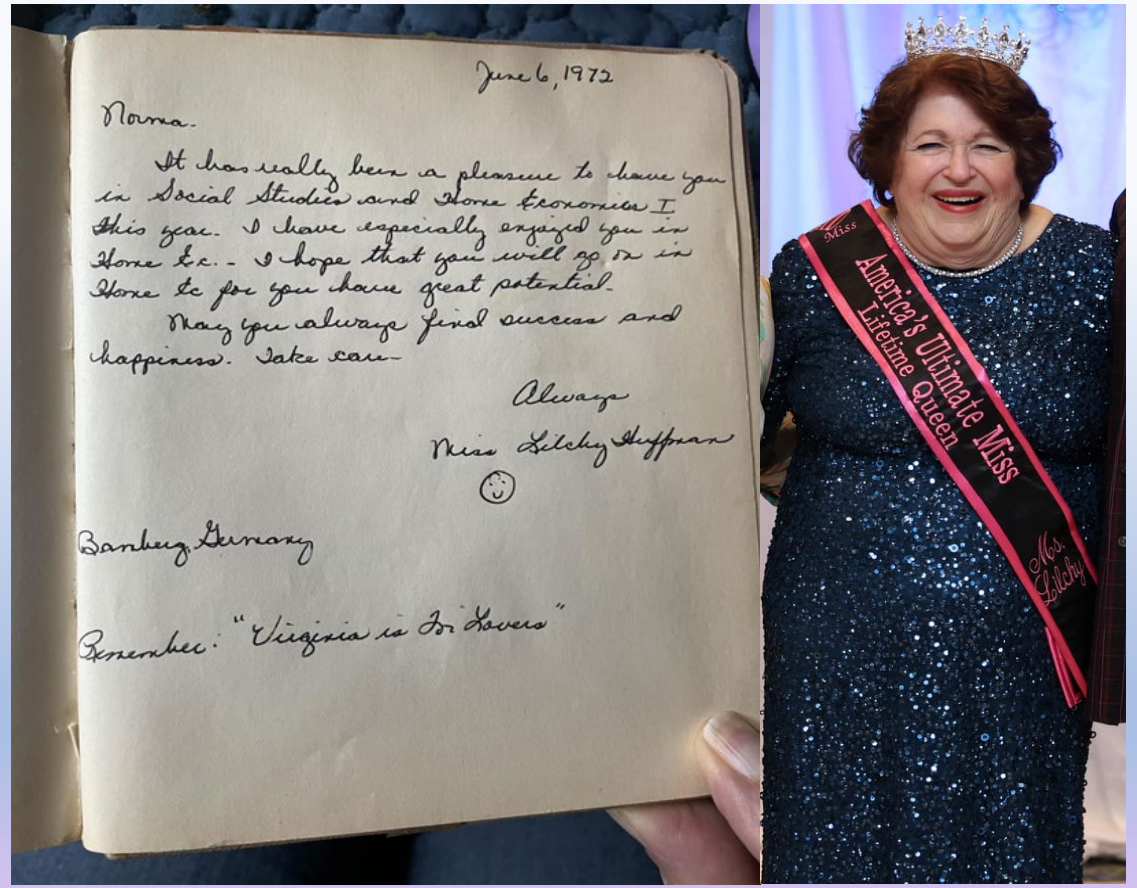
My Dream

- Military Family, traveled a lot, I wanted to be a NURSE
- As a 10th grader, and in November of 1972, I transferred to my 11th school from Bamburg, Germany to Austin, TX.
- Had a teacher that did not believe girls should be in Algebra II and **failed that class**.
- Did not take any other mathematics/science courses and gave up nursing plans.

My Reality

- I grew up reading all the time, loving ART, and I was good in mathematics (until having that 10th grade Algebra II teacher), and I had these 2 teachers…

Bamberg, Germany, 9th Grade Home Economics/Social Studies DOD Teacher: Lilchy Huffman

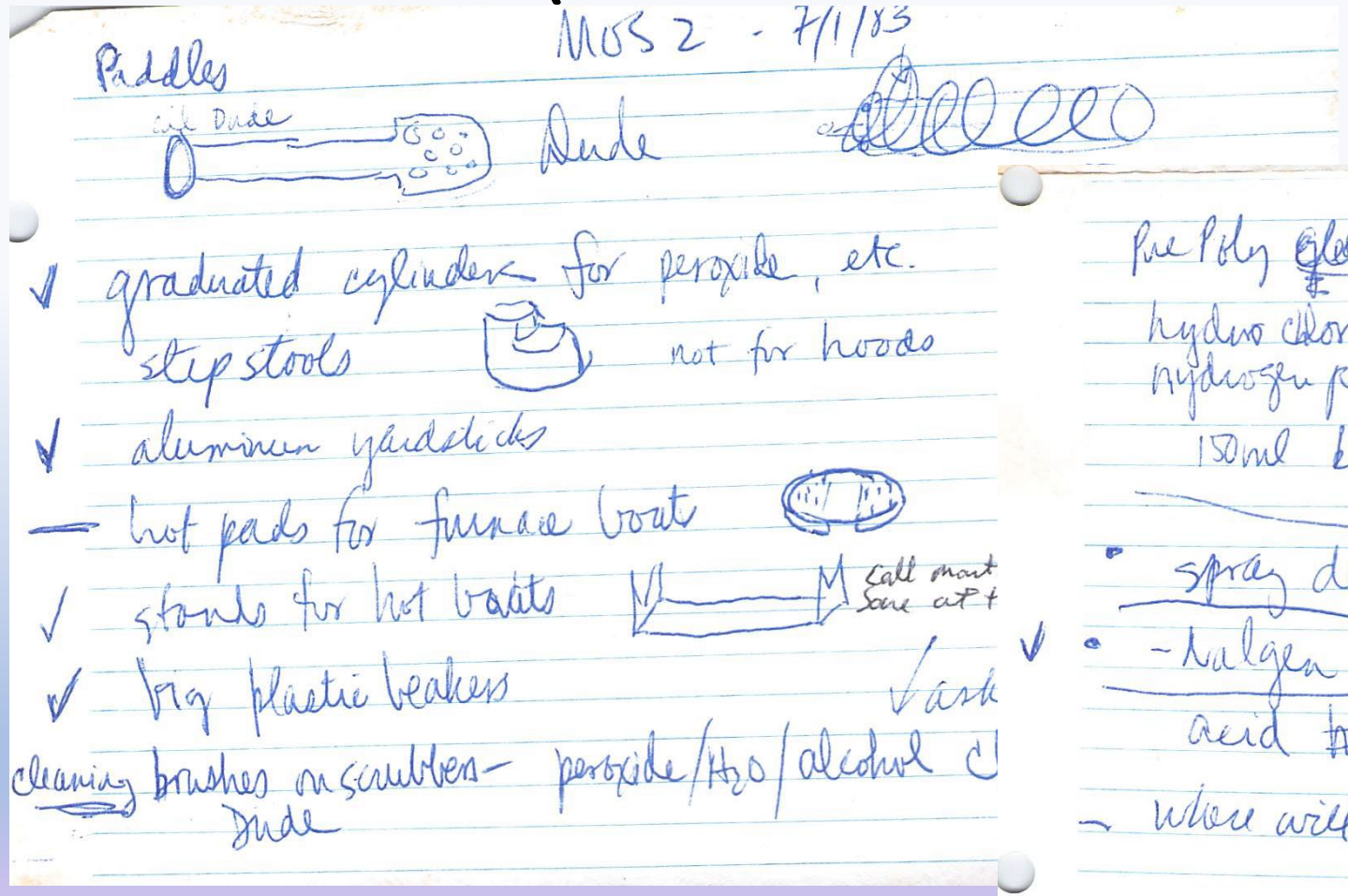


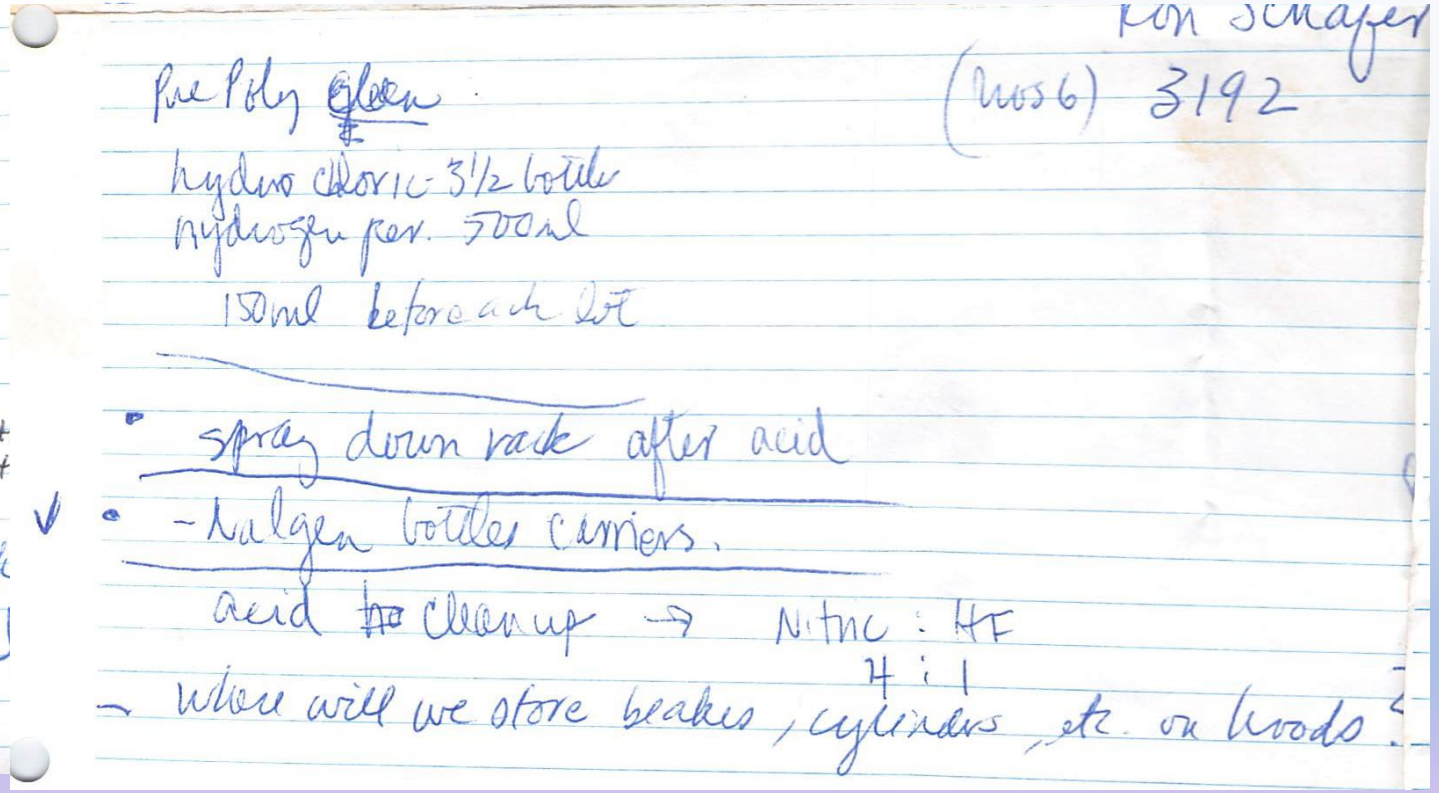
Professor Velasco in Pre-Calculus at Austin Community College

✓ERA

- University of Texas at Austin BS Electrical Engineering
- University of Texas at Austin Mathematics Certification
- Texas State University Masters Educational Leadership

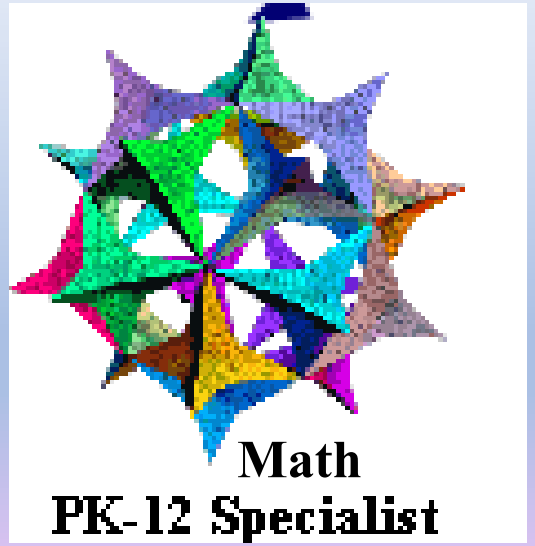
I became a Motorola Engineer (11 years)
Designed and made integrated circuits
(MOS 8 WAFER FAB Paper Notes)

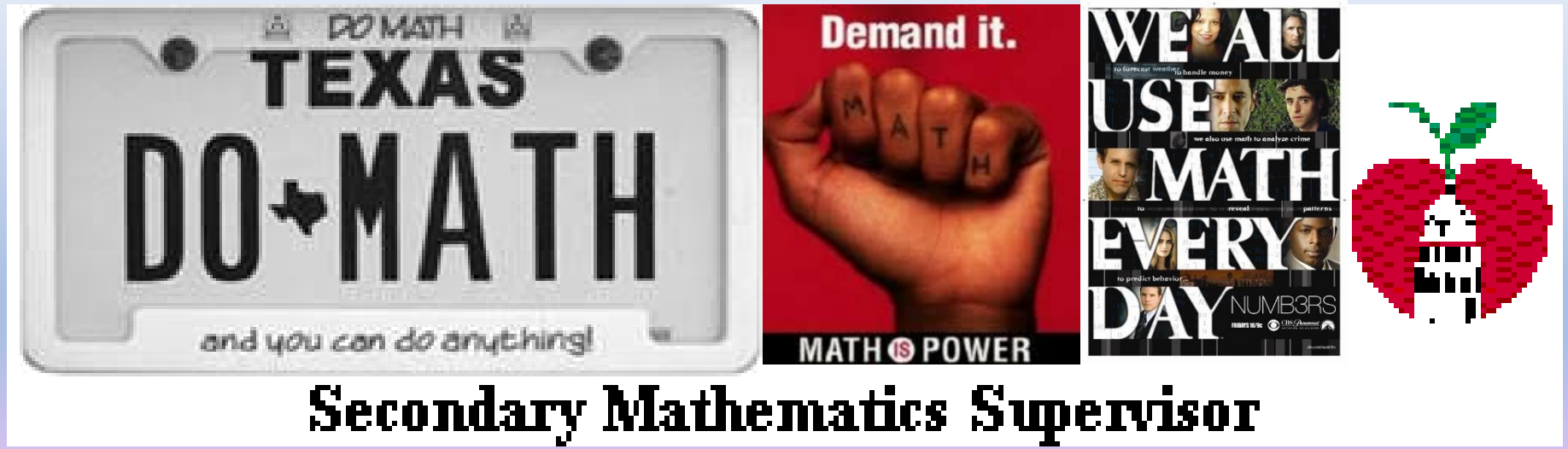




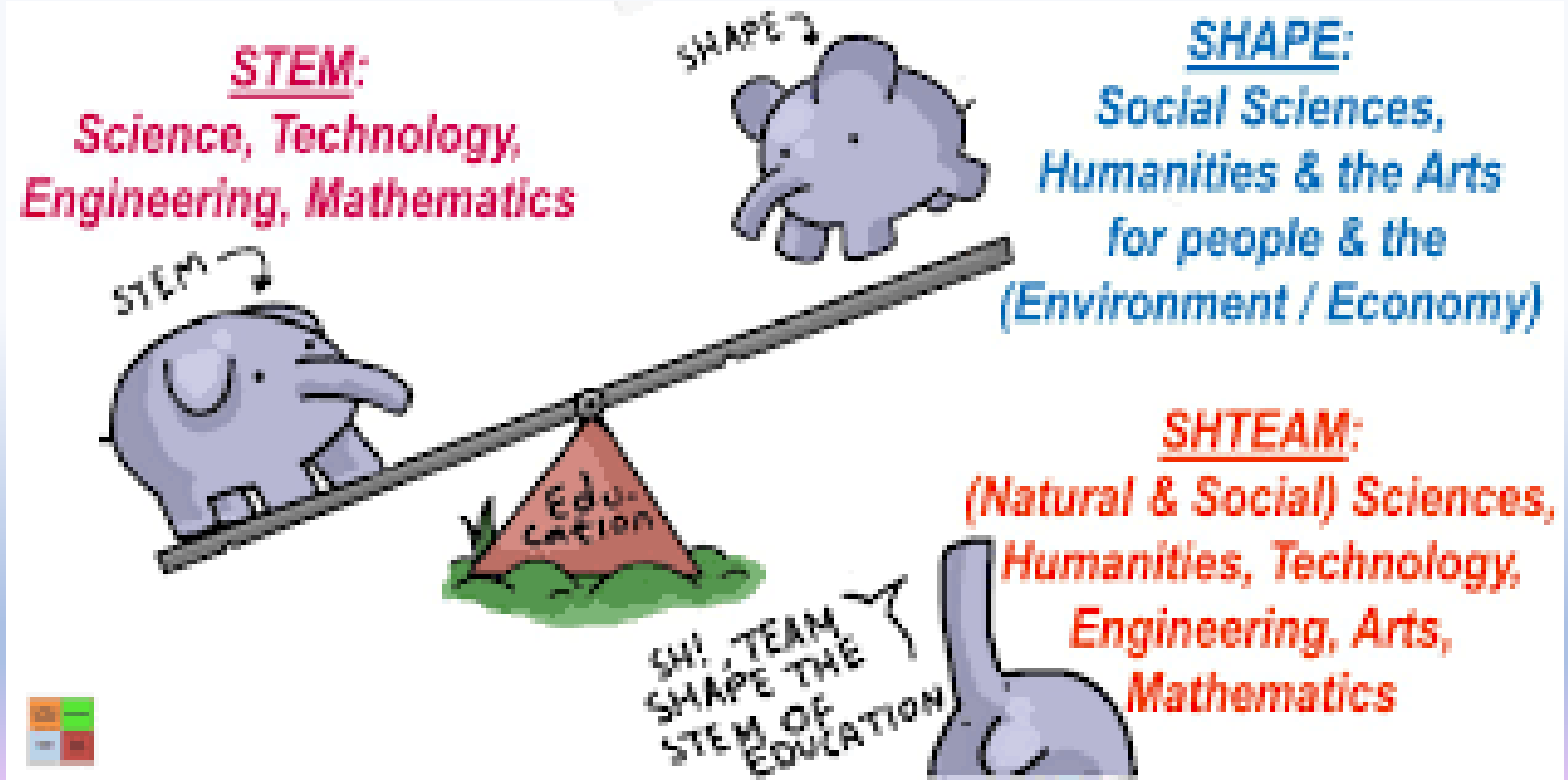
My Passion

- **AISD Mathematics Teacher 1990-1996, Reagan High School**
- **AISD K-12 Mathematics Specialist 1996-1999**
- **AISD Administrative Supervisor of Secondary Mathematics 1999 – 2010**
- **AISD Administrative Supervisor of Assessment 2010-2013**
- **Retired Educator 2013-present!!**





Let’s talk about the Elephant In the Room



WHAT IS STEM?

STEM education became popular as schools and governments realized the growing need for workers in technical fields. By encouraging kids to explore these subjects early on, educators hoped to spark interest in areas like **engineering, robotics, and science research**.

The focus in STEM is often on:

- Analytical thinking
- Logical problem-solving
- Hands-on experiments
- Preparing for high-demand careers in science and technology

References: STEAM vs STEM: What's the Difference?

What is STEAM?

STEAM includes visual design, storytelling, music, movement, and creative thinking. STEAM recognizes that creativity is just as important as logic when it comes to innovation.

STEAM brings in the arts to encourage:

- Creative expression
- Design thinking
- Empathy and user-focused problem solving
- Collaboration across disciplines

References: STEAM vs STEM: What's the Difference?

So… side by side

The focus in STEM is often on:

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ART and…..

- Engineering: At first glance, engineers and artists inhabit different worlds. But do they, though?
- **At the heart of engineers and artists' work lies a strong and shared spark of creativity.**

References: Artists and Engineers

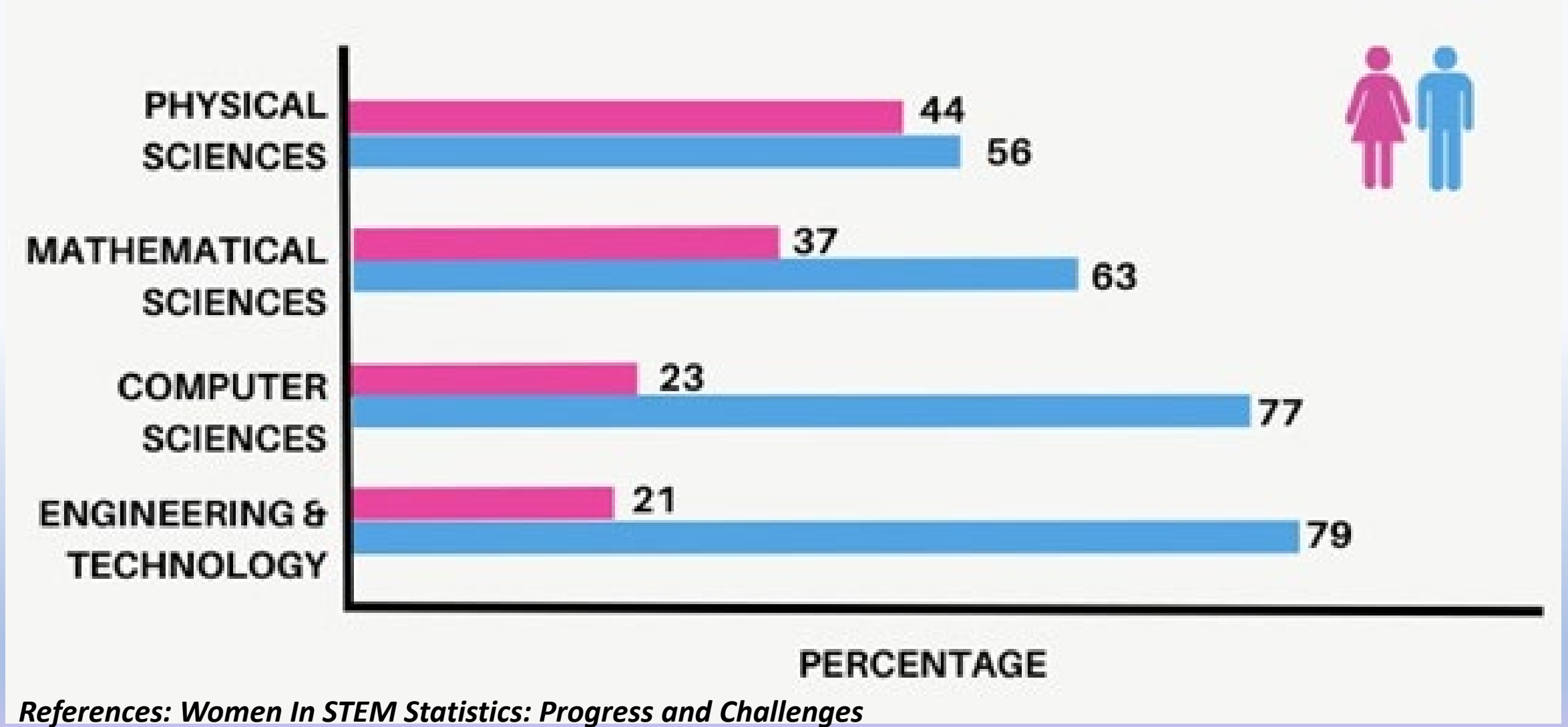
- Mathematics: Many parents view art and math as completely separate subjects. This is because art is thought of as only creative, and math as only analytical. However, both disciplines are closely related.
- **Mathematics is an art of human understanding.**

REFERENCES: THE LINK BETWEEN MATH AND ART

Barriers

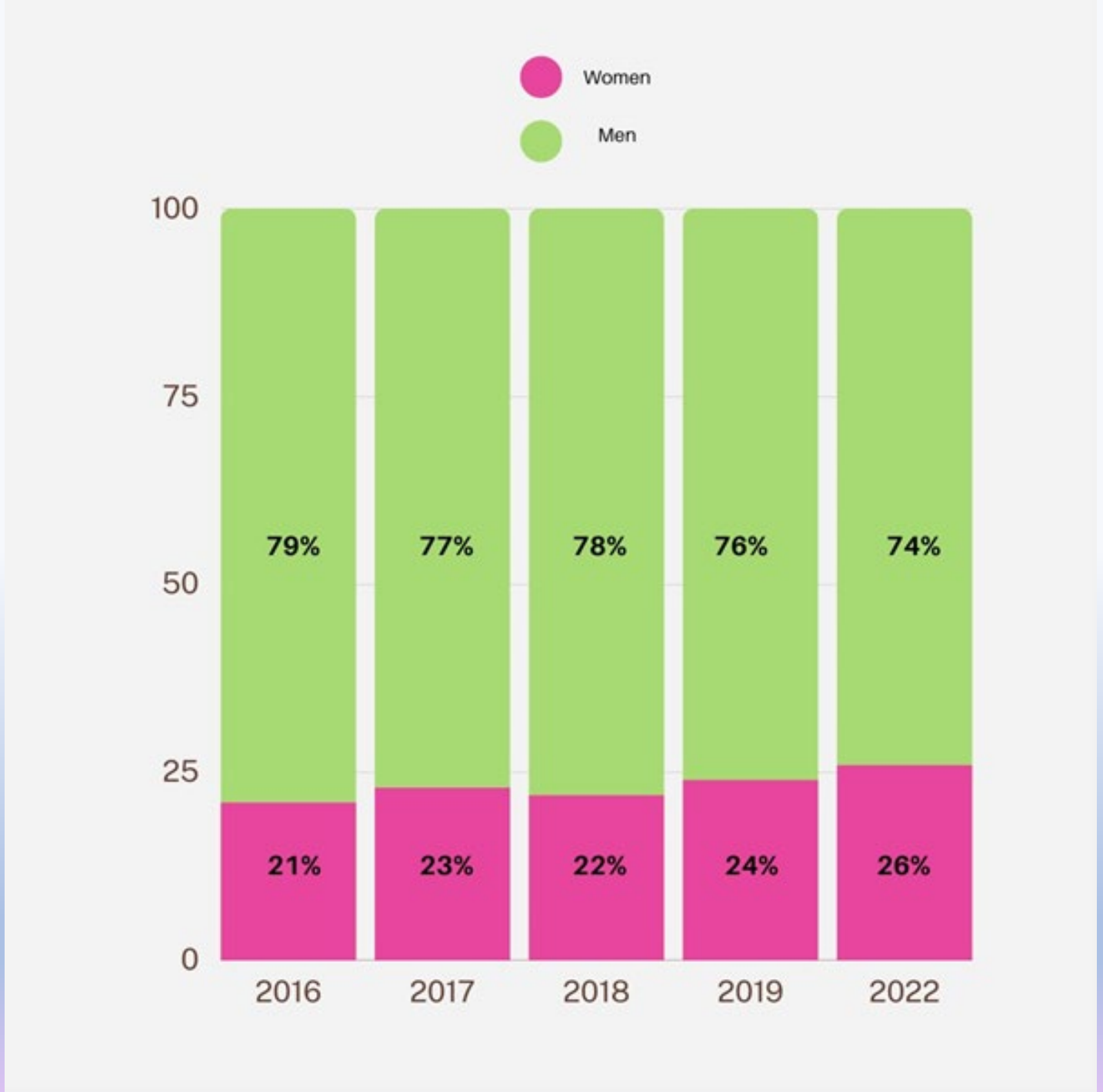
GLASS CEILING?
I DON'T SEE NO
GLASS CEILING...
https://www.facebook.com/rayut.simantov
רעות
סימן טוב

“STEM” Subject Breakdown 2022

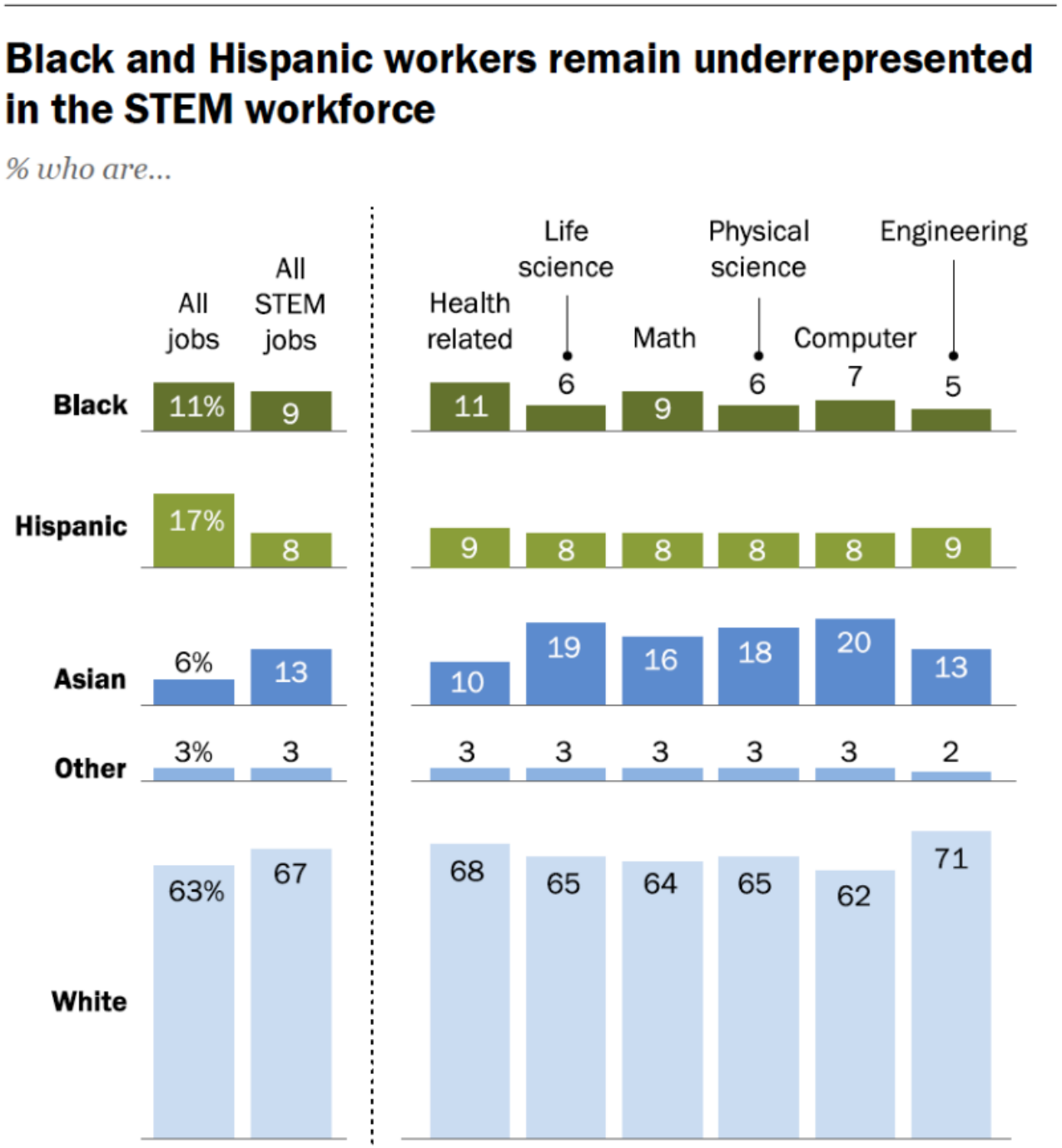


References: Women In STEM Statistics: Progress and Challenges

Women in “STEM” Workforce 2016-2022



References: Women In STEM Statistics: Progress and Challenges



STEM Jobs See Uneven Progress in Increasing Gender, Racial and Ethnic Diversity

References: The Pew Research Center

Barriers

- Black and Hispanic workers remain underrepresented in the science, technology, engineering and math (STEM) workforce compared with their share of all workers, including in computing jobs, which have seen considerable growth in recent years.
- Black and Hispanic adults are underrepresented among those earning advanced degrees in STEM, especially among those earning Ph.D. or other research doctorates. **Representation of Black and Hispanic adults is lowest in math, physical sciences and engineering degree fields.**

References: The Pew Research Center

Barriers

- Women earned 53% of STEM college degrees in 2018, smaller than their 58% share of all college degrees. The gender dynamics in STEM degree attainment mirror many of those seen across STEM job clusters. **For instance, women earned 85% of the bachelor's degrees in health-related fields, but just 22% in engineering and 19% in computer science as of 2018.** In fields where women have been especially scarce, there have been incremental gains over the past decade. The share of women earning a degree in engineering is up 2 points since 2014 at the bachelor's and master's level.

References: The Pew Research Center

THE BIGGEST BARRIER

The document discusses the capabilities of individuals in learning mathematics, emphasizing the importance of various types of knowledge. [1]

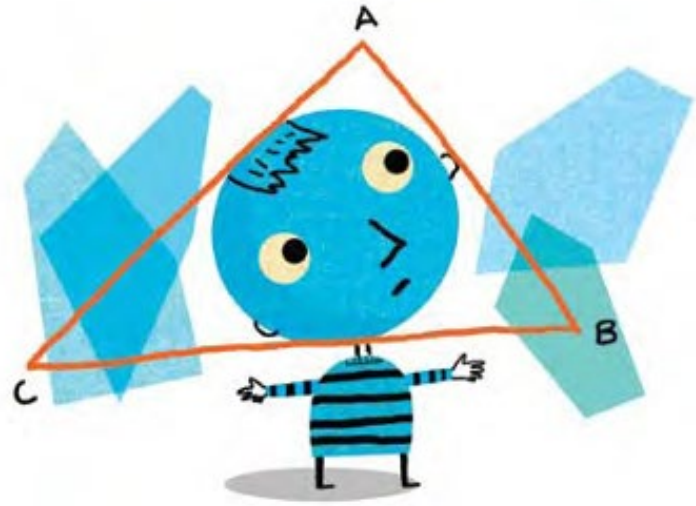
Understanding Math Learning

- Most people can learn K–12 mathematics, similar to learning to read. [2]
- Learning math requires time, effort, and mastery of complex skills. [3]
- The belief that some people are "just no good at math" is a myth. [4]

References: American Educator 2009-2010

ASK THE COGNITIVE SCIENTIST

Is It True That Some People Just Can't Do Math?



How does the mind work—and especially how does it learn? Teachers' instructional decisions are based on a mix of theories learned in teacher education, trial and error, craft knowledge, and gut instinct. Such knowledge often serves us well, but is there anything sturdier to rely on?

Cognitive science is an interdisciplinary field of researchers from psychology, neuroscience, linguistics, philosophy, computer science, and anthropology who seek to understand the mind. In this regular American Educator *column, we consider findings from this field that are strong and clear enough to merit classroom application.*

Answer: While it is true that some people are better at math than others—just like some are better than others at writing or building cabinets or anything else—it is also true that the vast majority of people are fully capable of learning K–12 mathematics. Learning mathematics does not come as naturally as learning to speak, but our brains do have the necessary equipment. So, learning math is somewhat like learning to read: we can do it, but it takes time and

There is Dyscalculia…

Wikipedia describes it as follows:

"Dyscalculia is difficulty in learning or comprehending arithmetic, such as difficulty in understanding numbers, learning how to manipulate numbers, and learning facts in mathematics. It is generally seen as a specific developmental disorder."

References: Dyscalculia

Actionable strategies to foster a more inclusive, diverse, and dynamic learning environment.

Can we all agree that Mathematics is a Language?

- In considering whether math is a language, we first need to ask, “What exactly defines a language, and does math meet these criteria?
- One common way to define language is a system of communication that conveys ideas and concepts.
- Another way to think about language is by considering its component parts. A language has vocabulary, the basic units of meaning (words or symbols), and grammar, the rules for using the vocabulary.
- A language also has syntax, the structured order in which these symbols are arranged to convey meaning. These components work together to allow the communication of ideas.
- **On careful consideration, most of us would agree that math fits this definition.**
- Understanding math as a language anyone can speak helps teachers and students alike overcome the very common resistance of those who believe they are not “math people.”

***References: IS MATH A LANGUAGE: EXPLORING THE RELATIONSHIP OF LANGUAGE AND MATH*; ACCELERATE LEARNING**

STEAM Strategies

1. Understanding the Importance of a STEAM Mindset
2. How to Develop a STEAM Mindset
    a. Encouraging Curiosity and Exploration
    b. Providing Hands-On Learning Experiences
    c. Promoting Problem-Solving and Critical Thinking Skills
    d. Encouraging Collaboration and Teamwork
    e. Integrating Arts Into Traditional STEM Subjects
    f. Applying STEAM Concepts to the Real World
3. Thinking Like a Scientist, Engineer, or Artist

References: Developing a STEAM Mindset: Strategies for Helping Students Think Like Scientists, Engineers, and Artists; 21st Century ED.

Another way to look at it…

What is STEAM about?

STEAM stands for Science, Technology, Engineering, Arts, and Mathematics. It's a big deal in today's teaching and learning world.

Why? Well, these fields shape our world, from the devices we use to how we solve complex problems. Adding the 'A' for Arts emphasizes the critical and creative thinking skills necessary for these fields.

References: Developing a STEAM Mindset: Strategies for Helping Students Think Like Scientists, Engineers, and Artists; 21st Century ED.

Know Your Students & Build a Learning Community

1. Make a Hand Quilt for extra credit on the 1st day students enter class, make a poster of them for each class, then compile their birthdays in your grade book, or on a calendar.
2. Honor the Student's Birthdays – I wrote names on my blackboard, had a shoe box with candies/stickers/pencils, and let them pick 3 things. For summer birthdays, I did them all in the last month of school.
3. Ask students to write a journal and the first entry is what is their dream when they grow up. Have other topics and have them turn it in once week or every 2 weeks for a "grade". Revisit this topic of their dream at the middle and end of the year.
4. Have students do projects individually, in groups of three, etc.
5. Find a way to have the students do the homework on the board and give 10 smaller quizzes, 5 group, 5 individual. Find a way to STOP doing the homework for them.
6. Change groups up – by high, middle, low or all by high, etc. Use statistics from exams!
7. Use ANYTHING you hear to make the community gel.

Hand Quilt Activity: Directions and Example

Favorite Food

Trace hand, write NAME, and decorate

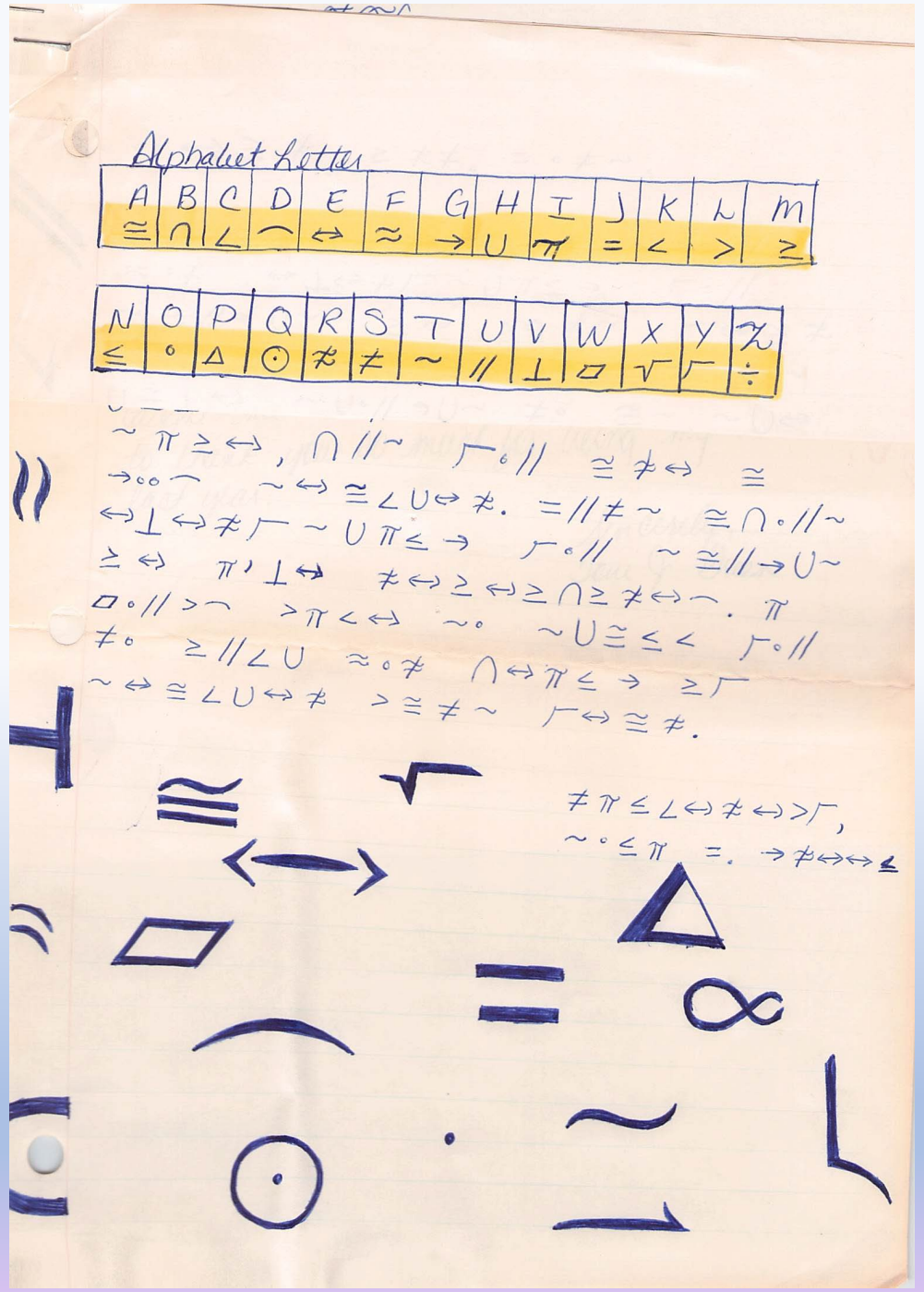
Last Math Teacher

Favorite Subject

Birthday (do not include year)

Project of making a badge of your favorite graph with streamers of graph properties (Alg 1, Alg2, PreCal, Calc) or favorite polygon with streamers of polygon properties (Geo)

Projects Continued



Mrs. Jost's Cake Volume!!

scale : cm

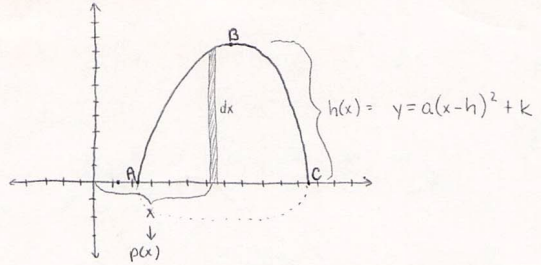
D = 4.5 cm

r = 2.25 cm

A = (2.25, 0) → (x, y)

B = (7.25, 8.5) → (h, k)

C = (11.5, 0)



Shell method: $V = 2\pi \int_A^C p(x)\, h(x)\, dx$

$y = a(x - \overset{h}{7.25})^2 + \overset{k}{8.5}$

$0 = a(2.25 - 7.25)^2 + 8.5$

$0 = a(-5)^2 + 8.5$

$0 = 25a + 8.5$

$\frac{-8.5}{25} = \frac{25a}{25}$

$a = -.34$

$h(x) = -.34(x - 7.25)^2 + 8.5$

$h(x) = -.34x^2 + 4.93x - 9.37$

$p(x) = x \quad h(x) = a(x-h)^2 + k$

$V = 2\pi \int_{2.25}^{11.5} (x)(-.34x^2 + 4.93x - 9.37)\, dx$

$V = 2\pi \int_{2.25}^{11.5} (-.34x^3 + 4.93x^2 - 9.37x)\, dx$

$V = 2\pi \left[\frac{-.34x^4}{4} + \frac{4.93x^3}{3} - \frac{9.37x^2}{2} \right]_{2.25}^{11.5}$

$V = 2\pi \left[(-1486.66 + 2499.3 - 619.6) + (+2.18 + -18.72 + +23.72) \right]$

$V = 2\pi \cdot [393.04 + 7.18] = 2\pi (400.22) = 800.44\pi$

$800.44 \times \pi = 2514.656424$

$\sqrt[3]{2514.656424} = 13.598 = 13.6$ (box is 13.6 cm on each side)

Messages for students…

1. We all hit brick walls. Your journey must be one of Lifelong Learning. You are the FUTURE.
2. Listen to your heart/head to find your path. Change is always around and is beautiful.
3. Mathematics is a LANGUAGE. It is in EVERYTHING.

I firmly believe when you CARE about your students and have High Expectations for Learning, they will become a Learning Community.

If Time: Other IDEAS

- YOU HAVE IDEAS to foster a more inclusive, diverse, and dynamic learning environment
- SHARE!
- Discuss in groups your ideas to build learning communities, and get adults/students to know adults/students.

MY CONTACT INFO:

Norma Jost, njost2@yahoo.com, 512-914-1870

References

1. ***STEAM vs STEM: What's the Difference?*** **All Things Science;** https://www.atsclub.org/blog/steam-vs-stem, Ryan Hill Chemist, May 26, 2024
2. ***Women In STEM Statistics: Progress and Challenges***; **STEM Women;** https://www.stemwomen.com/women-in-stem-statistics-progress-and-challenges; Aug 30, 2023
3. ***IS MATH A LANGUAGE: EXPLORING THE RELATIONSHIP OF LANGUAGE AND MATH*****; ACCELERATE LEARNING;** https://blog.acceleratelearning.com/is-math-a-language , CJ Thompson, May 31, 2024
4. ***Developing a STEAM Mindset: Strategies for Helping Students Think Like Scientists, Engineers, and Artists;*** **21st Century ED.** *https://21stcented.com/developing-a-steam-mindset-strategies-for-helping-students-think-like-scientists-engineers-and-artists/#:~:text=Encouraging%20Curiosity%20and%20Exploration,sunlight%20and%20how%20photosynthesis%20works.*
5. ***STEM Jobs See Uneven Progress in Increasing Gender, Racial and Ethnic Diversity*****; Pew Research Center; March 30, 2021;** https://www.pewresearch.org/social-trends/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/ps_2021-04-01_diversity-in-stem_00-01-png/
6. ***Artists and Engineers*** https://www.sciencemuseum.org.uk/objects-and-stories/artists-and-engineers
7. ***The link between math and art*** https://www.mathnasium.com/math-centers/southbeaverton/news/the-link-between-math-and-art-777312489
8. ***Ask The Cognitive Scientist: Is it True That Some People Just Can't Do Math?*** **American Educator 2009-2010;** chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.aft.org/sites/default/files/willingham.pdf
9. ***Dyscalculia*** https://en.wikipedia.org/wiki/Dyscalculia