



Making the Most of Math Connections at Museums and Historic Sites

Welcome!

The webinar will begin at 10:00 a.m. CT.

While you wait:

1. Download PDFs of the slides and handout under the "Handouts" tab of your control bar.
2. Confirm that your speakers are turned on and your audio is working by doing a sound check in the "Audio" tab of the control bar. Having problems? Exit and restart the webinar, or switch to "phone call" for a phone number and access code to hear the audio through your telephone.
3. Watch the 4 minute MathHappens introductory video. The URL can bwe found in the "Chat" box of your control bar.

The Museum Services Program provides support, resources, and training to museums in Texas.

- Consultations
- Webinars and workshops
- Resources

www.thc.texas.gov/museum-services

On our webpage:

- Webinars
- Workshops
- Grants and Fundraising
- Helpful Resources
- Connect and Learn

Laura Casey

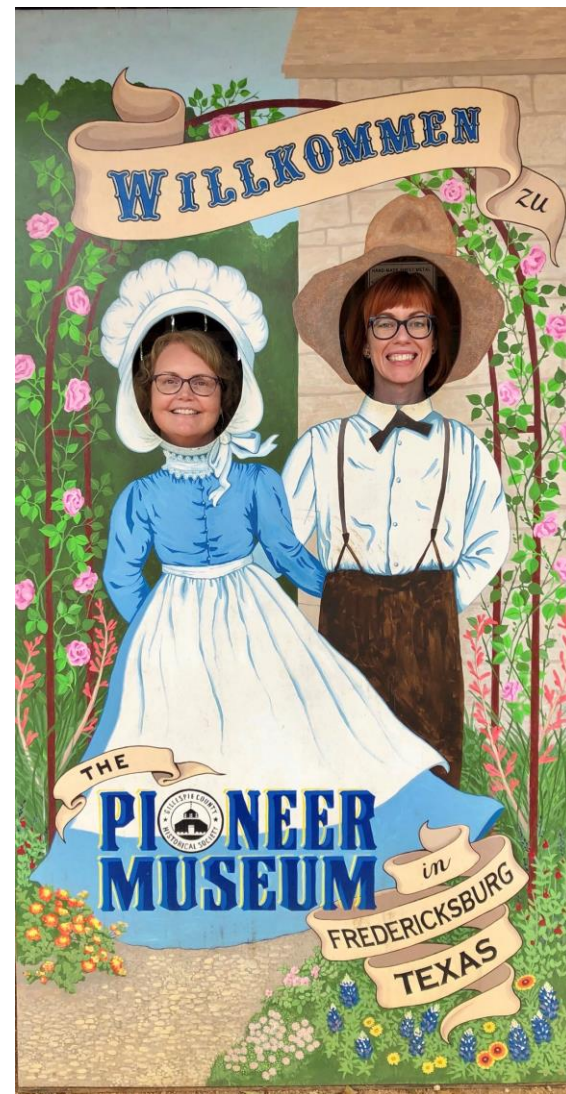
Museum Services Program Coordinator

laura.casey@thc.texas.gov

Emily Hermans

Museum Services Program Specialist

emily.hermans@thc.texas.gov



www.thc.texas.gov/awards

- Applications due July 10
- Recognizes an individual or institution in the museum field for significant achievement in the areas of historical interpretation, museum education, conservation of collections, and/or community involvement
- Recipient receives monetary stipend for their museum

Upcoming Free Museum Services Webinars

www.thc.texas.gov/museumwebinars

- How to Develop Effective Social Media Content to Engage Your Visitors
 - Thursday, July 9, 10:00 a.m. CT
- Grant Evaluation: Setting Goals and Measuring Impact
 - Wednesday, July 22, 2:00 p.m. CT
- Building a Collaborative Online Archive: A Case Study
 - Wednesday, August 5, 10:00 a.m. CT

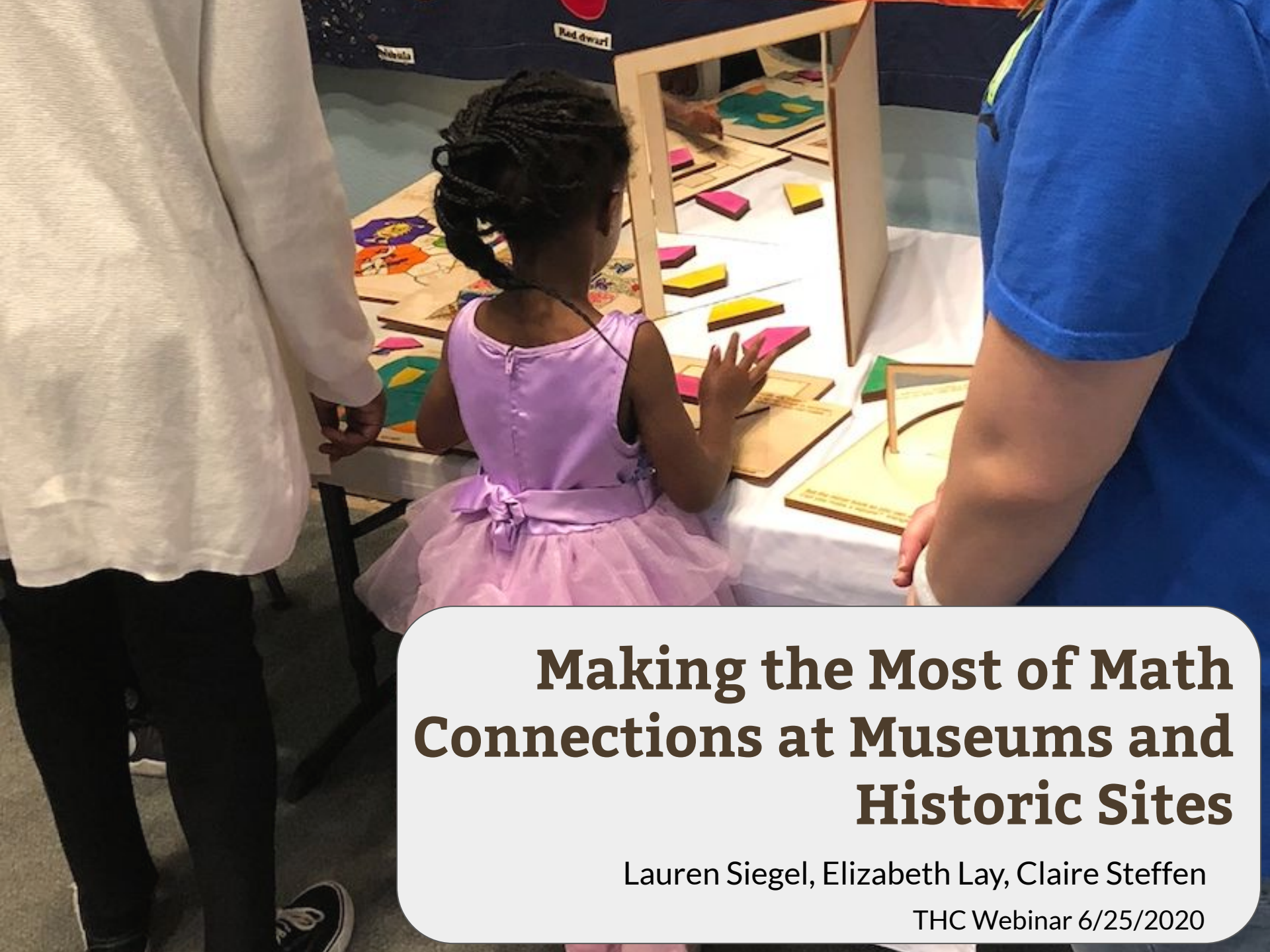
Upcoming Free Webinars from Other Orgs

www.thc.texas.gov/museumconnections

- *Being an Agile Leader in Your Nonprofit (Regardless of Your Title)*, June 25, 11:00 a.m. CT, Foundant
- *How to Support Your Favorite Museum During These Times*, June 25, 2:30 p.m. CT, Museum Trustee Association
- *File Storage for Digitization*, June 30, 1:00 p.m. CT, Conservation Center for Art and Historic Artifacts
- *Adapting to the Changing Pandemic Landscape*, July 1, 10:00 a.m. CT, Texas Commission on the Arts
- *Do's and Don'ts of Communicating with Your Community During COVID-19*, July 1, 1:00 p.m. CT, Grantspace
- *Decolonizing Initiatives at the San Diego Museum of Man*, July 2, 2:00 p.m. CT, California Association of Museums
- *7 Free Tools to Boost Your Marketing Efforts Despite COVID-19 Budget Cuts*, July 7, 12:00 p.m. CT, Marcum LLP
- *File Specifications for Digitization*, July 7, 1:00 p.m. CT, Conservation Center for Art and Historic Artifacts
- *Introduction to Proposal Writing*, July 8, 1:00 p.m. CT, Grantspace

Lauren Siegel, Elizabeth Lay, Claire Steffen





Making the Most of Math Connections at Museums and Historic Sites

Lauren Siegel, Elizabeth Lay, Claire Steffen

THC Webinar 6/25/2020

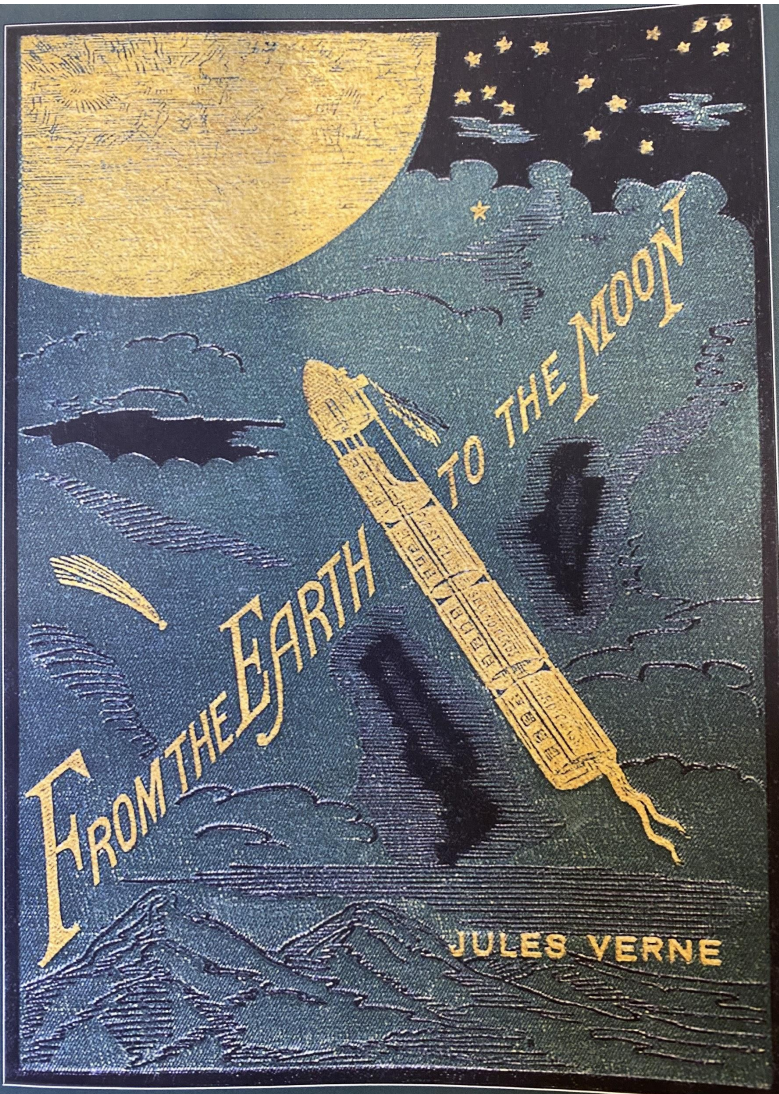
Where are we from?

alberta arizona brescia-italy california catalunya colorado
connecticut delaware district of columbia florida hawaii illinois
indiana iowa kansas kentucky louisiana maryland
massachusetts michigan minnesota mississippi missouri montana
nebraska new hampshire new mexico new york
north carolina north dakota nova scotia ohio oklahoma
ontario oregon pennsylvania south carolina tennessee
texas vermont virginia washington west virginia
wisconsin

What are we interested in?

able active affiliated african aging airplanes american ancient animals app apple architecture art
artifacts auto automobiles banking based bat beading beneficial better bicycle buddy building business cameras canoes
carts cataloging century ceramic children chinese civil class cloth collection college colonial combining concepts
connections context count culture curriculum dates daughter depot descriptions design diary displaying documents
dragon early employee engineering equipment era etc exhibit expenses explore farm fine fluid food
formation former fossil found fractions freight furniture gardens genealogy general grinding hand hearses helicopters heritage
historic history holly home house identification incorporate indigenous inn interested
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material math mathematical measurement mill model moving
museum music native nature nearby normal nudie objects painting patterns perfect performance personal pieces
pine pioneer places poc pottery power presidential principles programming project proportions quilts rail railroad
ranching ratio records referenced relate representation roads rock room running scale schedules science
setting shipwreck simple site solar spanish star state stem store strategies street students suits support
surveying talk teacher texas textile timetables tools tours traders trail train
transportation travel tree tx users Screenshot wages wagon war water west worked wwii years

“...like nails in a bag.”



“That I admit,” answered Michel; “and I understand it, although your x’s and zero’s, and algebraic formulæ, are rattling in my head like nails in a bag.”



MATHHAPPENS

Math for All Ages, Shared in All Places

MathHappens is dedicated to creating math models and supporting development of mathematical experiences outside of the classroom.



The People who
Make MathHappens!

LEARN MORE

Screenshot

Your Presenters

Lauren Siegel

Austin, Texas

University of Chicago BA Applied Mathematics 1988

University of Texas UTeach Program Teacher Preparation Training

Head of Math at Ace Academy

Co-Founder and Director, MathHappens Foundation

UTeach Maker Mentor

Claire Steffen

St. Paul, Minnesota

M.S. Museum and Field Studies, University of Colorado- Boulder

B.A. History & Anthropology, University of Wisconsin Madison

Former Director of Experience, Jourdan-Bachman Pioneer Farms

Elizabeth Lay

Austin, Texas

Grinnell College BA History

Former Teacher and Administrator, ACE Academy

History Programs Manager, MathHappens Foundation

Available for questions...MathHappens staff Josephine Sheng & Ximena Mercado.

Making the Most of Math Connections at Museums and Historic Sites

Our goals for you today:

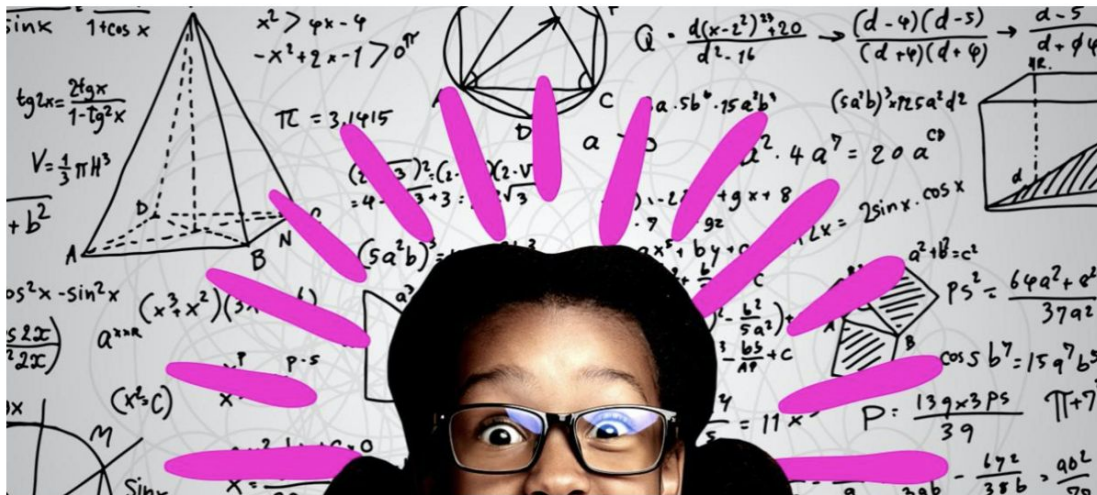
1. Find ways that you, as a museum professional, can enhance the visitor experience with math.
2. See a variety of real world examples that your peers have successfully implemented.
3. Understand the MathHappens Foundation process to help you on this journey.

We need Mathematics in Museums.

11 ways to help your child enjoy math



Elizabeth Michaelson Monaghan

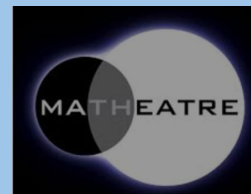
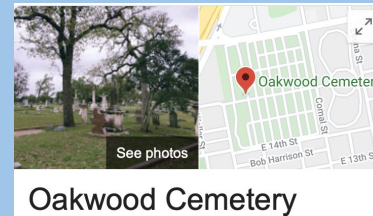
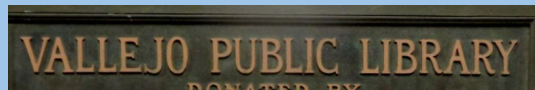
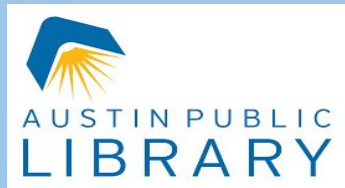


Illustrated | Tidarat Tiemjai/iStock, Prostock-Studio/iStock, EvgVect/iStock

December 10, 2019 Just 40 percent of U.S. fourth-graders are proficient at math. This is a worrying statistic, given that young kids' numeracy skills are associated with later academic achievement. Fortunately, parents — even those who count themselves among the 30 percent of U.S. adults who lack basic math skills — can help their kids can improve in, and maybe even enjoy, the subject. Here's how.

- Educators are aware of the “emotional crisis” in mathematics.
- Not one of these solutions is “go to a museum or cultural center”
- Yet one of our biggest challenges is to motivate students to value their math studies.
- Museums connect us to our community, and also help us understand other and past communities and perspectives.

Interview with Robert Barry, then president of National Council of Teachers of Mathematics.



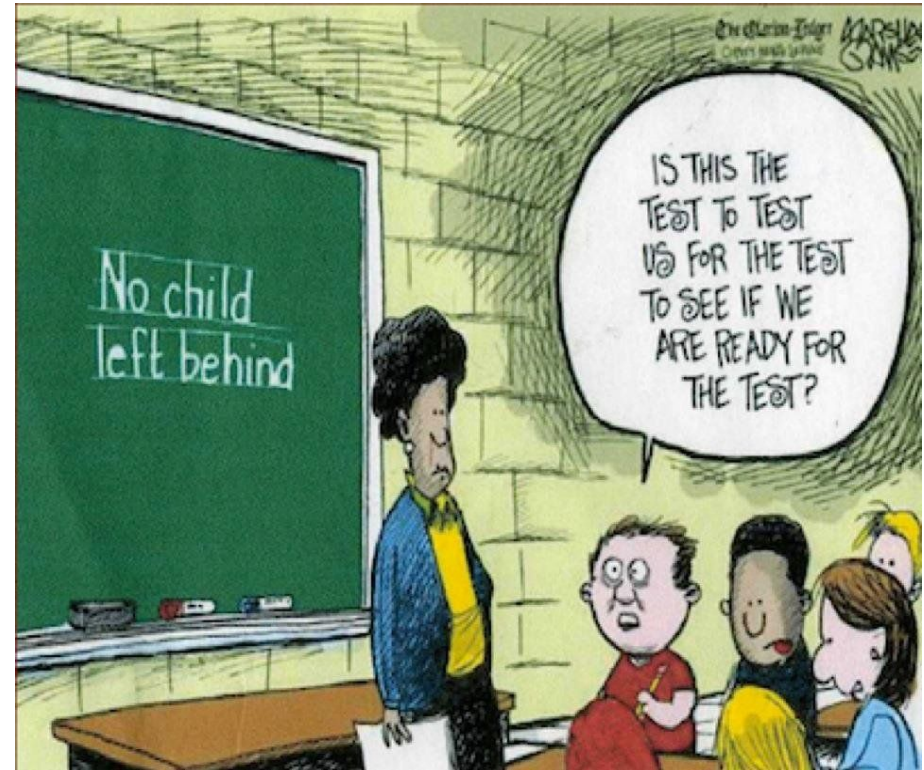
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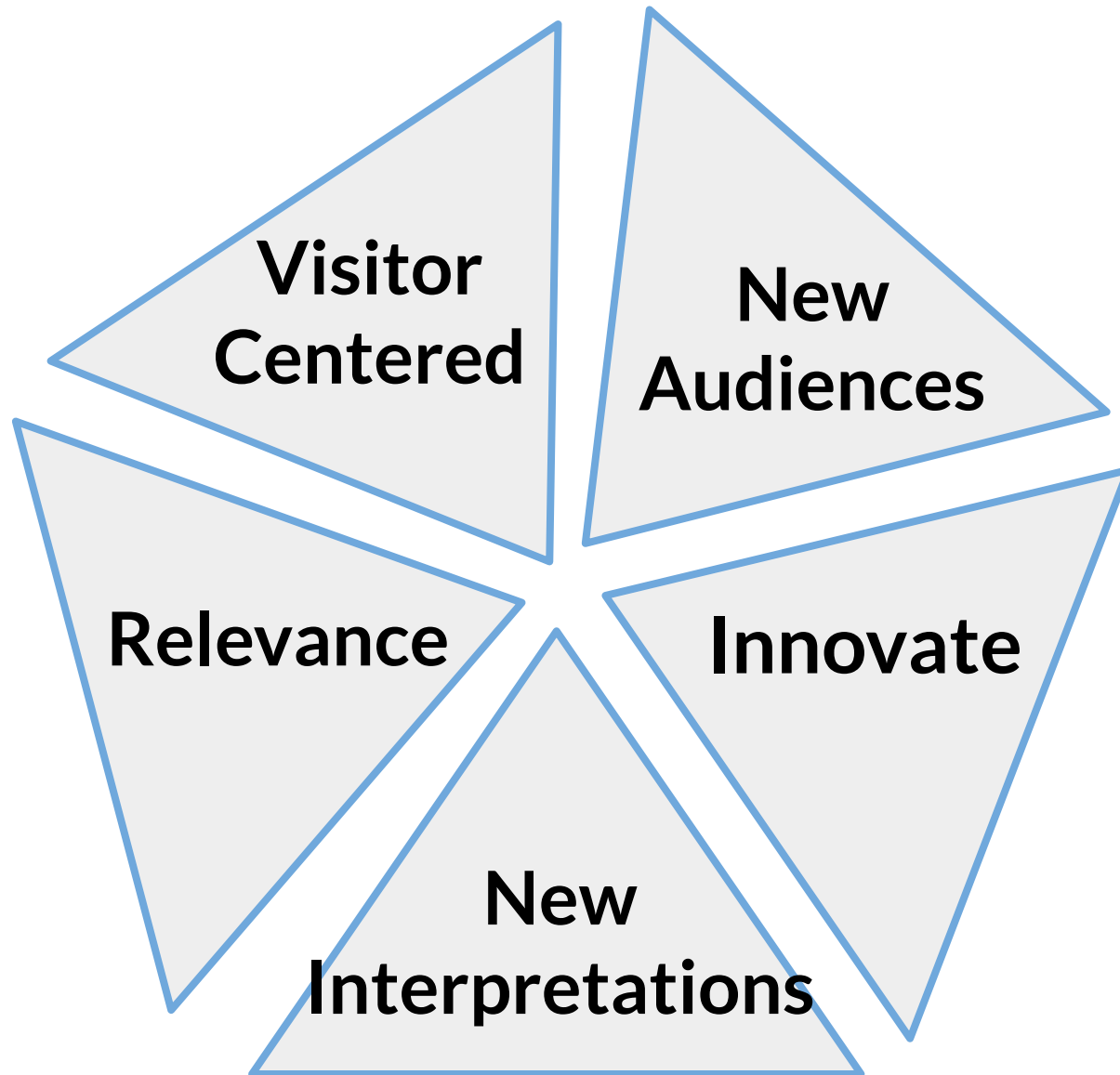
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Why Combine Museums & Math?

STEM
STEAM
STREAM



Making a Case for your Museum



Making a Case for your Museum

"Thank you so much for showing us your exhibits and La Belle. It was pretty cool learning about the history, which surprised me because I usually don't like history. Thanks for teaching me something new and cool."

Dear mathhappens, thank you for letting me look at math from a new perspective. I thought it was really cool to see how math was associated with the LaBelle.

Dear Math Happens,

I loved doing the activities with the parallel rulers and learning about cartography. The activities were so much fun because we got to hear stories and read them in funny voices. I learned how the parallel rulers work, which is really cool because I always see people in criminal minds using them! Thank you for making this trip possible!

Incorporating Math Activities At Jourdan Bachman Pioneer Farms

- 1800's Texas Living History Park in Austin Texas
- 96 acres of walking trails and historic sites
- Primarily volunteer run



Start where you are.



Try Self-Guided.



**Add to what
you do well.**



Keep it Simple.



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Make and collect activities and artifacts that illustrate math concepts for history museums.



Opportunities for Students



Math undergraduates staff events to explain mercator maps to visitors.

Interactive Field Trips



Team of “sailors” navigating a “ship” from port to port.

Unconventional Communications



Shadow Puppet Theater to explain how to find longitude from observation of a lunar eclipse.

Make a Math Tool



A compass rose.



Learning how to make and use a navigation tool: the quadrant.

Use the Physical Features of the Museum

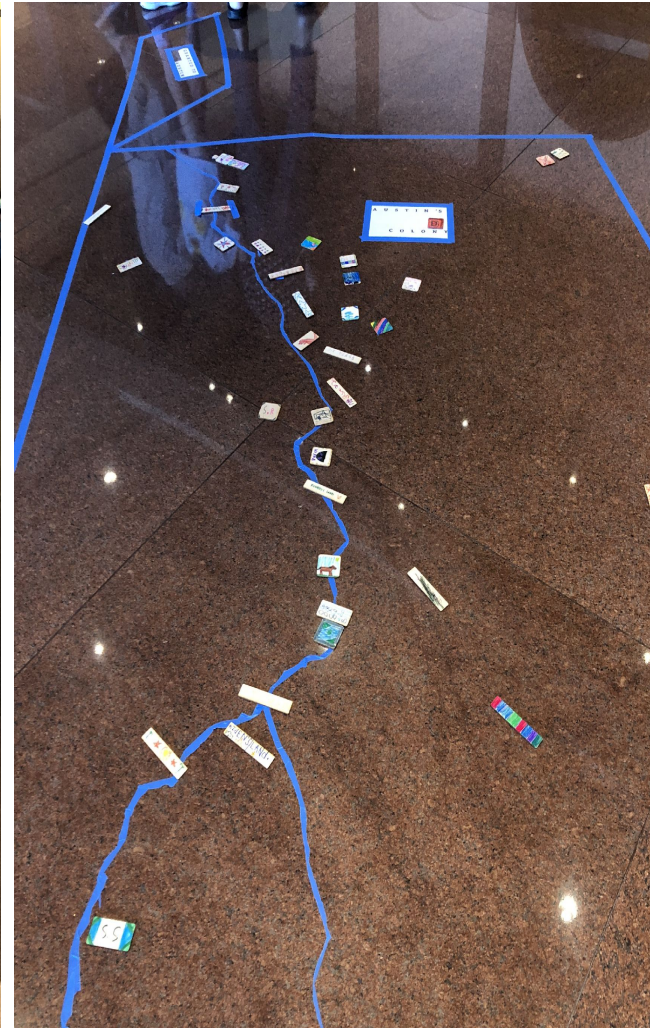
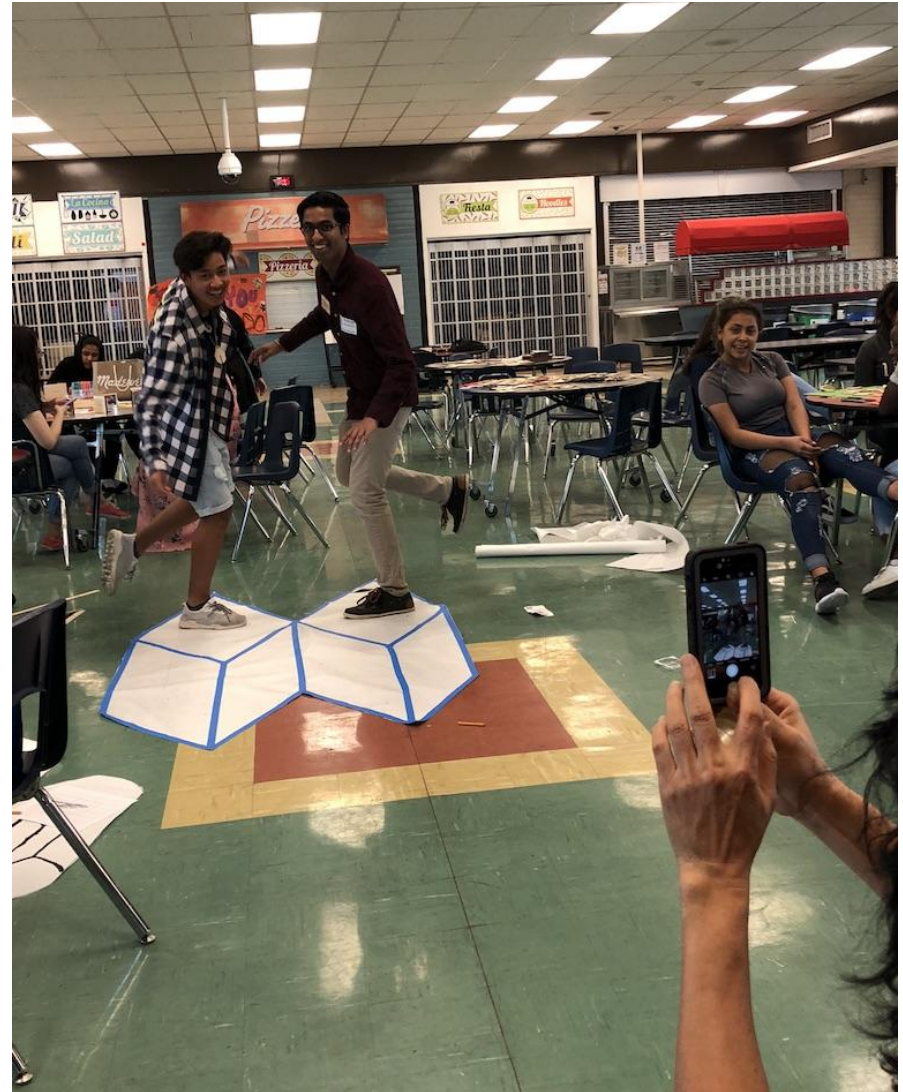


Photo Op-tical Illusions



Conversation Carts



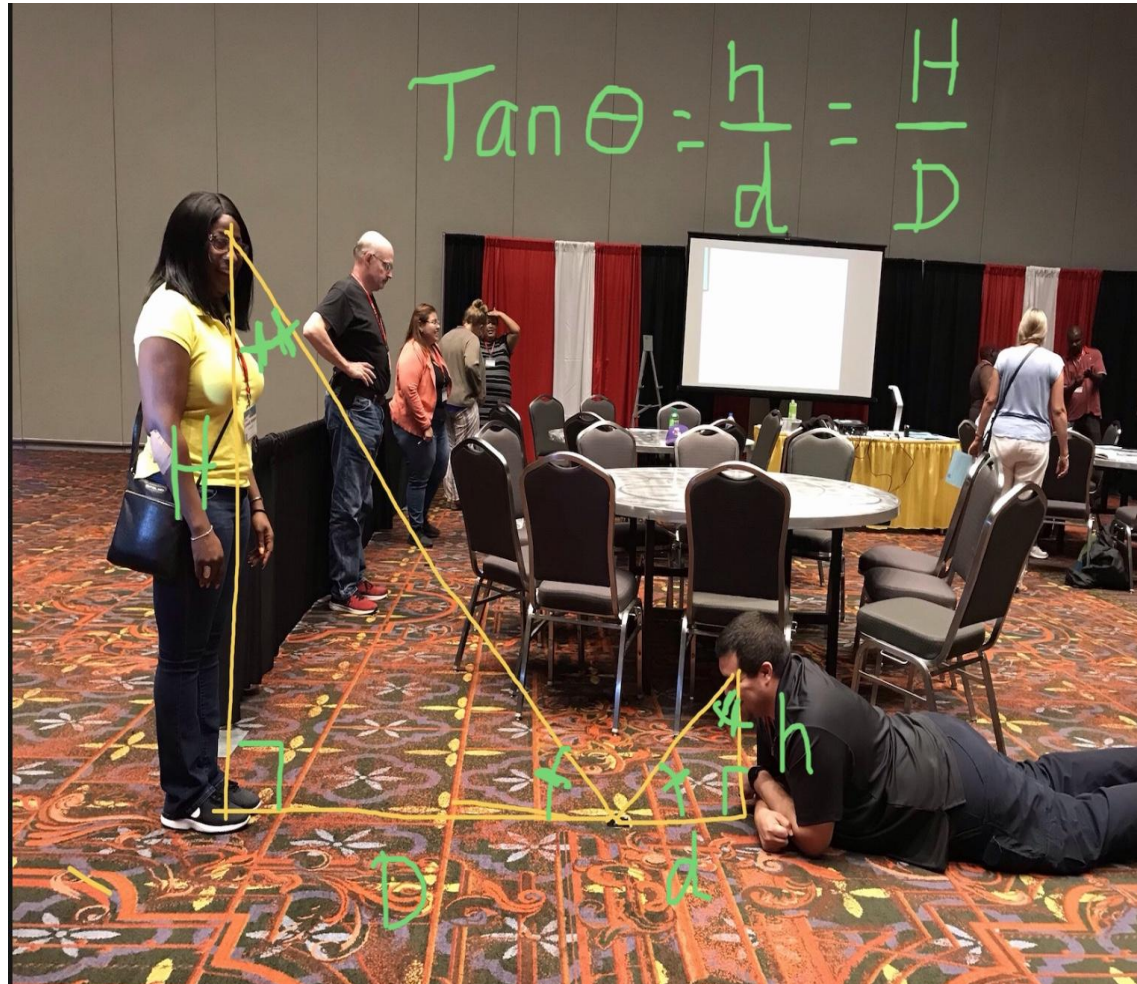
Math Sculptures



Outdoor installations at the Neill-Cochran House Museum.

Look into my eyes!

Similar Triangles with Mirrors

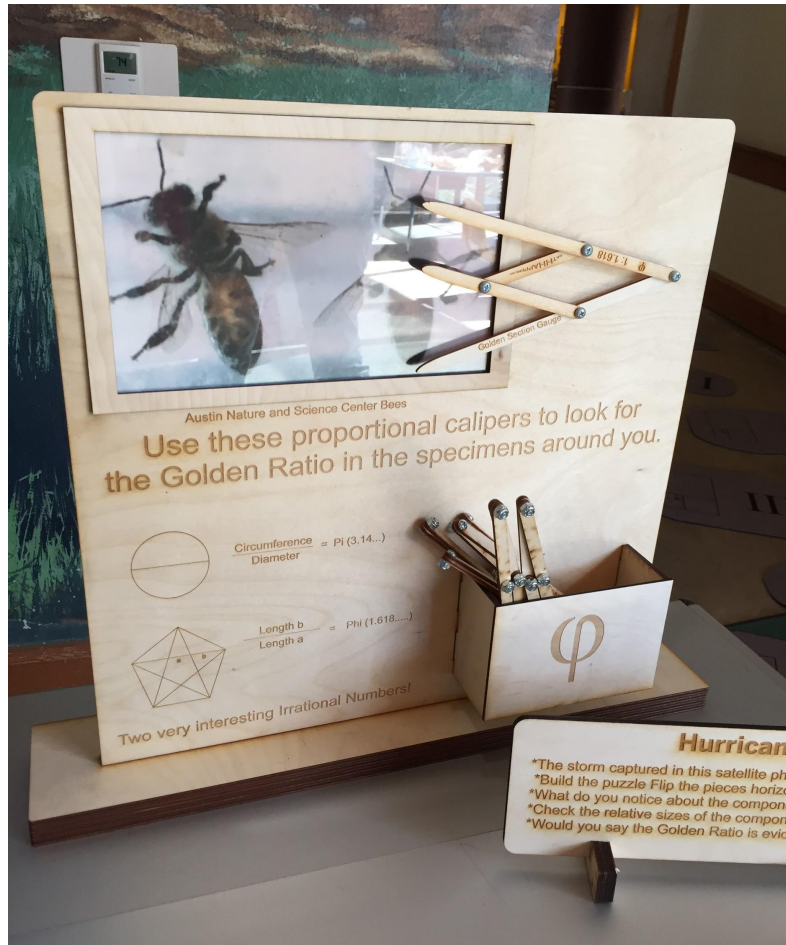


Participants look into each other's eyes in a mirror placed on the ground.

Creative Modeling



Make Permanent Interactive Exhibits



Austin Nature & Science Center - Golden Ratio Calipers

Same concept, different critter.



For a North Carolina Nature Center we adapted to reference local crawfish.

Provide Active Experiences



Installing a Human Sun Clock at the Austin Nature and Science Center.

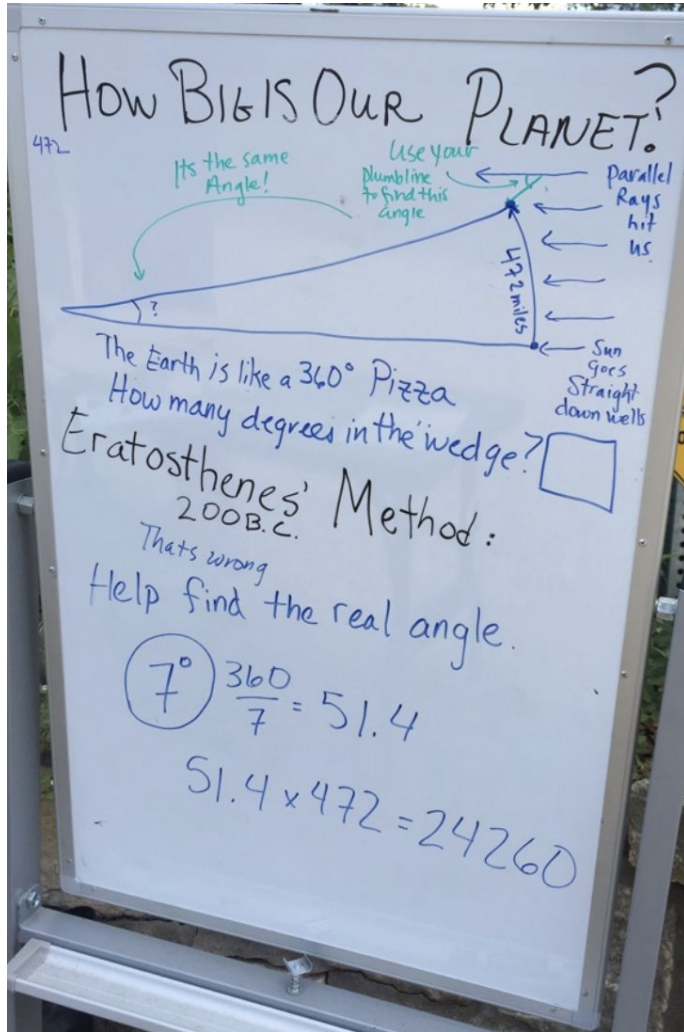


Artistic Interpretations



Tessellations, art and quilting.

Get Outside!



Tackling problems from 200 B.C. at the Austin Nature and Science Center.

Find Inspiration in Primary Sources



Model created of Lewis Carroll problems at the Harry Ransom Center.



Make it Fun!



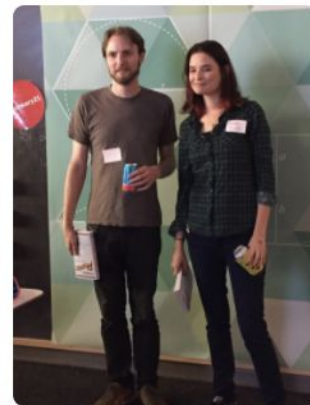
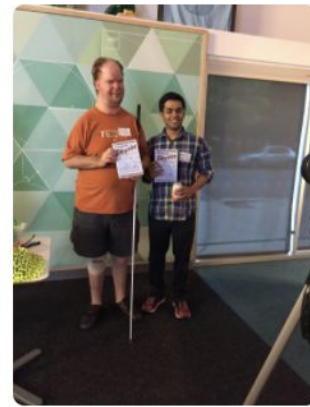
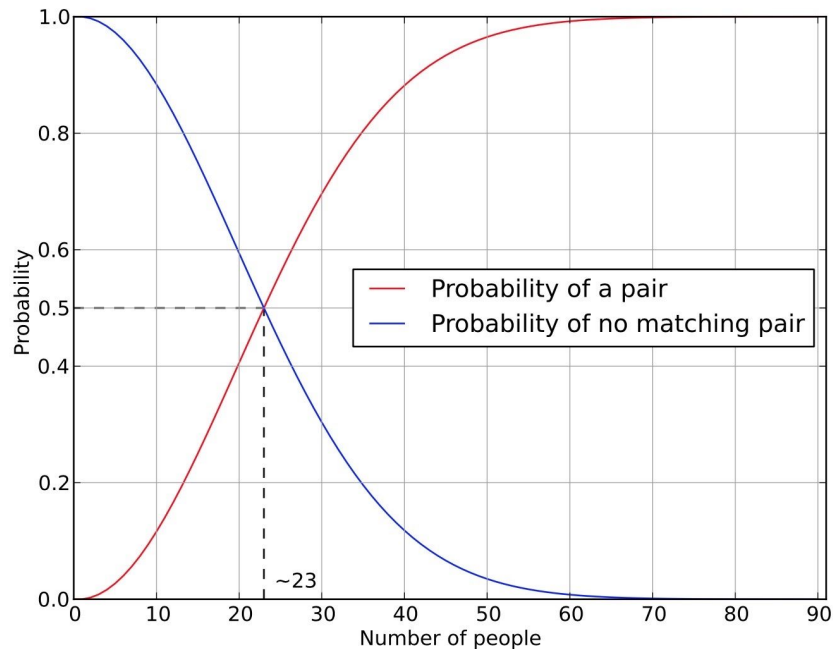
Got Cannonballs?
Cannonball frames made
for ball pit balls.



Play a Game

The Birthday Game !

In a group of 100 people you will statistically find “twins” with matching month and day birthdays!

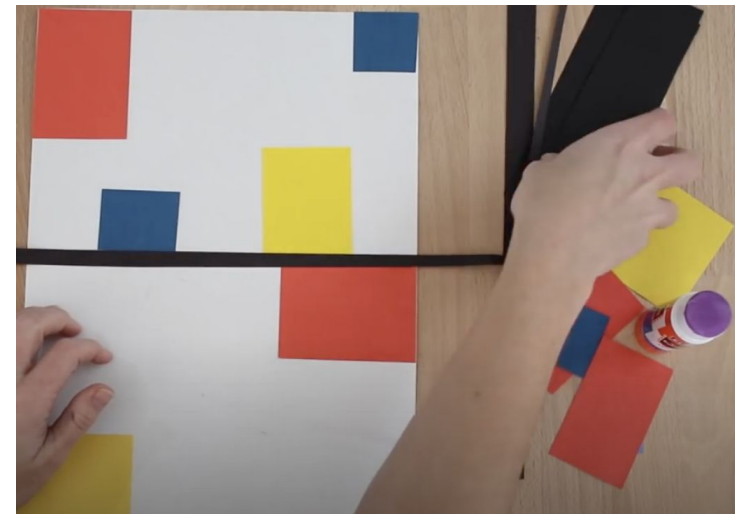
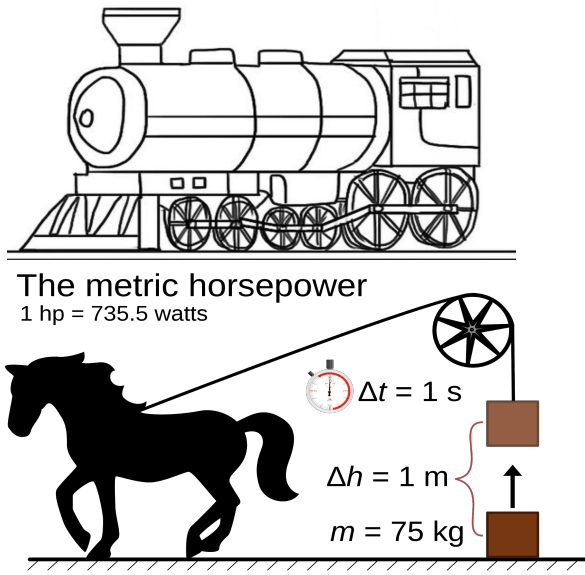
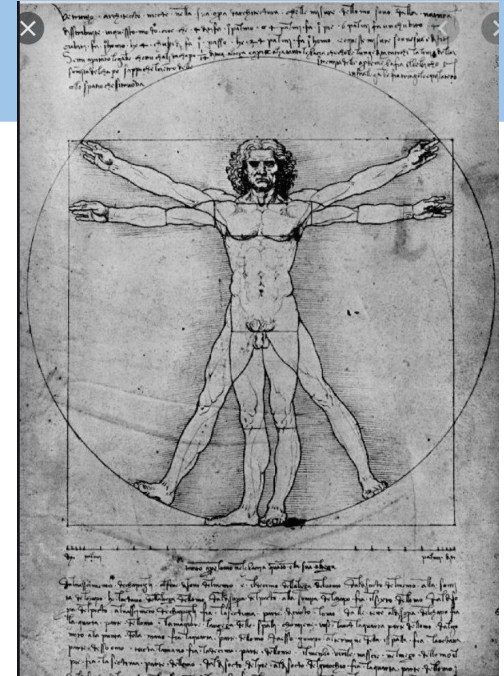
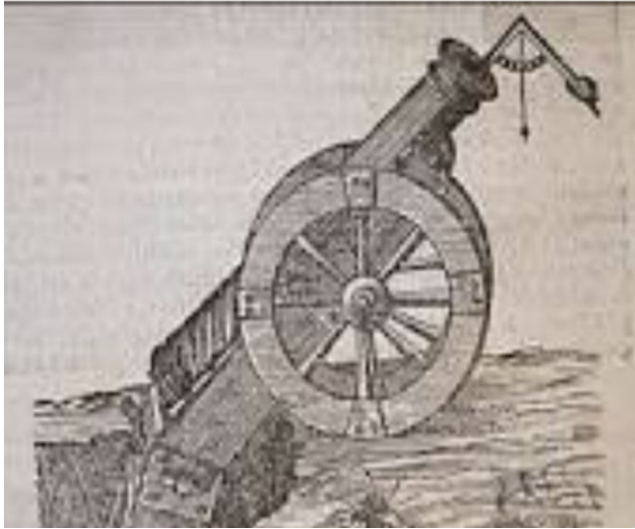


Oakwood Cemetery

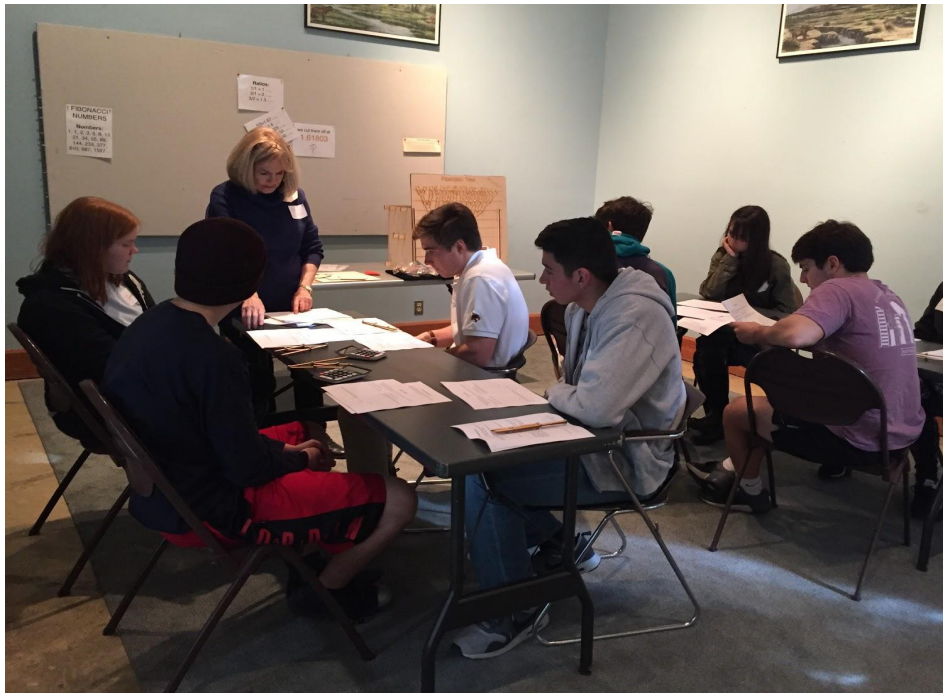
Understand cemetery conservation by measuring the tombstone tilts.



All that and more.....



Classrooms vs Museums



Learning in a museum is different.

- Positive attitudes prevail even toward entirely unfamiliar ideas
- Aesthetics, emotions and the intellect are engaged
- Learning is a choice
- All are invited to learn.
- Families can learn together.
- Returning reinforces and evolves understanding.
- Attaching experiences to knowledge reinforces comprehension and retention.
- Field trips enhance school programs

Museum Day 2019



MathHappens was interviewed by Univision about our activities featured at six Austin locations.

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Two Ways to Add Math

1. Use our completed projects:
 - a. See our website
 - b. Catalog
 - c. Our Blog
 - d. Examples from today
2. Create a custom project
 - a. Review your exhibits
 - b. Consider best practices for interpretation
 - c. Research the math
 - d. Create models, displays, and activities

...and make it fun.

Our Process at the Bob Bullock Texas State History Museum



Visit the Museum and Exhibits



Visit the Museum and Exhibits



12.7. Overall photos of the nocturnal: (a) nocturnal side of the instrument; (b) planisphere side of the instrument. (Photos courtesy of the Bullock Texas State History Museum.)

Navigational and Related Instruments

GREGORY D. COOK AND LOIS A. SWANICK¹

Nineteen artifacts make up one of the smallest and most specialized categories in the assemblage recovered from *La Belle*: the instruments and tools used for navigating the vessel at sea. Navigational artifacts recovered from *La Belle* include a nocturnal, two sounding leads, 12 dividers, a compass gimbal, elements of a

Tools of Navigation in the 1600s:

Quadrant
Mercator Map
Nocturnal
Parallel ruler

...all designed and manufactured by mathematicians.

Joutel's Diary:

One of the voyagers explains how they calculated longitude by observing a lunar eclipse.

Research innovative navigation tools made by mathematicians.



Pre 1500s (circles) map vs
Mercator Map which works
with a compass.



Parallel Ruler 1738 (top)
and today 2018.

Find or create models and activities



Find or create models and activities

Mercator Projection distorts
a sphere



Students make
their own parallel
ruler:



Collaborating with museum staff to integrate effectively.



MathHappens interns attending museum training



MathHappens interns ready to demonstrate at our conversation cart

Variety of programming at Texas State History Museum.

- Conversation carts - 5 to 10 minute gallery interaction.
- HEB Free Sunday - Make and Take activities for families
- Museum Day -demonstrations and activity
- Field trips - hour long suite of navigation activities integrated with exhibit viewing and dramatic film
- Teacher training/ Conference Sessions- we share primary source documents, maps and research into the mathematical connections and the creative communication techniques that underpin our field trip program.

Where can one artifact take you?

Varas and Chains as Subdivisions to the American Acre.

At the time the vara system was adopted by Texas, the majority of Titles and Land Claims were expressed in "Leagues, Labors, and square varas".

Since that time, the Mexican terms of Area "League, Labor, and square varas" have been abandoned by common consent, and all grants since made by the Government of Texas have been expressed in American Acres. At the same time however the law establishing the "Vara" as the Unit of lineal measure remained unchanged.

The great inconvenience and disadvantage of this mixing of Mexican measurement with American Measurement I will here attempt to show.

The vara is the Unit of a League and of a Labor.

5000 varas square is equal to one league of land.

25,000.000 square varas " " " " " "

25 labores is equal " " " " "

1,000.000 square varas is equal to one labor

1000 varas square " " " " "



Drama activity: Survey
Office Role Playing Game



Fine Arts Connection



Hands On Concepts



Make-and-Take It Tools



Supporting artifacts: real
Vara chains to use!



Solving historic survey
textbook problems



Maps, Maps, Maps!



Profiles of historical
surveyors

What's Next?

Survey your museum staff and also your community for expertise, ideas and partnerships.

Review the resources in the Handout and on our website in case an existing idea works for you also.

Let us know how we can support you.

We are eager to hear your ideas. Let's discuss!

Thank you!