



STEM PATHWAYS FOR GIRLS PROGRAM

2022/2023 Report (Fall 2022)



STEM Santa Fe Pathways for Girls Conference Summary Report

November 5th, 2022



STEM Santa Fe coordinates an annual STEM Pathways for Girls Conference every fall. The conference is filled with inspiring female speakers, female STEM professionals leading hands-on workshops, and inquisitive 5th through 8th grade female and nonbinary students interested in science, technology, engineering, and math. The conference allows the students a chance to meet STEM role models, like-minded peers, and expand their knowledge of what STEM careers are all about.

Process:

With COVID-19 state restrictions now eased, this was the first STEM Pathways for Girls Conference held exclusively in person since 2019. We opened registration virtually and accepted students on a first-come, first-served basis. We offered 8 hands-on workshops that were paired in 8 separate groups. The groups, labeled Group 1-8, were named after famous women in STEM and were led each by an adult group guide.



Upon check-in with their parents, students would select their preferred group and meet their group guide. Then they would acquire their STEM Santa Fe t-shirt and swag bag and head over to the large conference room for the keynote address. Group guides would later take their group of students to their selected workshops. After the two workshops for each group were completed, the girls gathered together to enjoy a catered lunch and enjoy a raffle contest where winners would receive fun STEM prizes.

Finally, after lunch and raffle prizes had finished, the students were back to the large conference room to participate in the STEAM Fair, with exhibitors from local organizations. It is at this time that the parents or guardians of the students were able to reunite with them and enjoy the STEAM Fair together. Parents or guardians were also able to check-out their children at this time.

Results:

Overall, even though we were prepared for 120 students to attend, eventually 113 female and nonbinary students registered and 93 students actually attended and participated in the conference. 48% of all students registered were of Hispanic, Latino, or Spanish origin and 96% identified as female. We asked for a registration fee of \$25 per student but families could easily request a waiver during the registration process. Approximately 26% of registered students requested a waiver and 4.5% were going to have their fees covered by their school (New Mexico School for the Deaf or Santa Fe Indian School).

Students were asked to complete an anonymous survey on both the workshops they participated in as well as the conference altogether. The conference survey received 89 responses and of those responses received we learned that the average rating of the conference was a 5.5 (out of a 1-6 rating scale). Nearly 70% of the students had participated in a STEM Santa Fe program prior to the conference. 40% stated they plan on participating in additional STEM Santa Fe programming in the future and only 4% stating they do not.

Every workshop was performed twice with a different group of students for each session. On a scale of 1-6, 1 being boring and 6 being awesome, the workshops averaged a score of 5. We also asked students to rate the difficulty of the workshop on a scale of 1-6, 1 being too easy and 6 being too difficult, the workshops here averaged a score of 3.1. Conclusion: Workshops were rated as very interesting and the difficulty just right!

Conference Schedule for students:

8:15-8:45: Girls Check-In & Ice-Breaking Activities, Campus Center

9:00- 9:50: Welcome & Keynote Address, Jemez Rooms

10:00-11:15: Workshop Session I

11:15-12:30: Workshop Session II

12:30-1:30: Lunch and Raffle,
Campus Center

1:30-3:30: STEAM Fair, Jemez Rooms

3:00-3:30: Girls Check-out



Keynote Speaker:



Dr. Olivia D. Underwood Jackson was our Keynote Speaker for the day and performed a riveting speech to the students. The speech itself was inspiring but also emphasizing the hard work it takes to reach the professional level she has attained. The students were captivated and asked a plethora of wonderful questions for Dr. Underwood Jackson to answer.

Dr. Jackson became the first African-American to receive her Ph.D. from the Materials Science program at The University of Alabama in Huntsville. She has had the opportunity to broaden her engineering mindset and approach

through a breadth of work experiences at a number of large and well-known companies and laboratories, including Los Alamos National Laboratories. She has been with Sandia National Laboratories since 2015.



It was a wonderful experience for the girls to see a successful woman of color speaking to them on a personal level. Dr. Underwood Jackson stayed after to speak individually with some of the students as well as pose for pictures and sign autographs.



The Workshops:

A) Brain Games! *Presented by Marina Phillips*

Join Marina Philip, a former chemist and now educator at Explora Science Center and Children's Museum to investigate a mysterious and puzzling box. Next, step into the shoes of an educator and learn how puzzles and similar activities are used to make science engaging and fun. Take a behind-the-scenes look into how science museums turn learning into play!

Average rating of fun (1-6): 4.6

Average rating of difficulty (1-6): 3.3



B) Roller Coasters, Engineering, and Fun with Physics, *Presented by Debra Post*



Be a Civil Engineer for a day and design your own roller coaster for marbles! And have fun with physics, learning about potential energy, kinetic energy, friction and gravity. You will build your own marble accelerator ramp to transform potential energy into kinetic energy. Then, design a roller coaster with a loop, managing your marble's energy to get to the end.

Average rating of fun (1-6): 5.4

Average rating of difficulty (1-6): 3.2



C) The Secret Code of Computer and Robots, *Presented by Teri Roberts*



Students will have the opportunity to learn about binary encoding/decoding, binary logic of circuits, visual coding, and textual coding. Their new skills will then be applied to control robots!

Average rating of fun (1-6): 4.5

Average rating of difficulty (1-6): 3.2

C) Microbes: The Good, the Bad, and the Ugly, Presented by Jerilyn Timlin and Kimberly Butler

In this workshop the students will learn about microorganisms (bacteria, fungi, and viruses) with an emphasis on their small size and unique characteristics. After discussing the variety of ways microbes help and hinder us in our daily lives, the students will use microscopy to identify an unknown bacterial sample. The students will then use an antimicrobial solution to kill bacteria and assess its effectiveness.

Average rating of fun (1-6): 5.3

Average rating of difficulty (1-6): 3.1



D) Building Self-Propelling Bots, Presented by Divya Banesh and Desiree Dominguez

This engaging activity combines the topics of potential and kinetic energy, electronic circuits, and robotics to build a mini self-propelling robot. Students will build a mini robot by attaching a battery to a motorized propeller sitting on top of a toothbrush head. We will then discuss how the concepts learned with the mini robot can be used to build real world objects, like motor boats.

Average rating of fun (1-6): 5.7

Average rating of difficulty (1-6): 3.1



E) What Starts Wildfires? Presented by Theresa Rigby and Susan Haggerty

Have you ever wondered how fire investigators figure out what starts a wildfire? After all, it is usually something small and black, in the middle of a lot of black stuff. Participants will learn the basics of wildland fire behavior, indicators of fire direction to track and find the origin, and learn about different causes of wildfires. To put their new skills to the test, students will analyze a scenario and evidence left in the "origin" of a fire.

Average rating of fun (1-6): 4.5

Average rating of difficulty (1-6): 3



F) Get Excited for Electrons! Flame Tests and Emission Spectra of Atoms, Presented by Joann Latorre

Students will use sterno flames to test the ions produced by excited electrons in an atom. Then they will use diffraction glasses to view the spectral lines of the excited electrons present in gas molecules.

Average rating of fun (1-6): 5.6

Average rating of difficulty (1-6): 3.2



G) Is Climate Change Melting Sea Ice?! Presented by Alex Jonko and Erin Thomas



This workshop demonstrates how ocean warming, as a result of climate change, leads to melting sea ice. The students will take part in a hands-on demonstration to quantify the impact of ocean warming on sea level rise.

Average rating of fun (1-6): 4.6

Average rating of difficulty (1-6): 2.5

STEAM Fair Presenters

| | | |
|----------|----------|---|
| Kelly | Trujillo | Santa Fe Community College |
| Jee Hyun | Seong | MIT |
| Dawa | Seo | Los Alamos National Laboratory |
| Destiny | Crawford | New Mexico Tech Mechanical Engineering Department |
| Asis | Gonzalez | Santa Fe Children's Museum |
| Marina | Philip | Explora Science Center and Children's Museum |
| Sydney | Donohue | UNM Center for Water and the Environment |
| Caitlin | Bannan | OpenEye, Cadence Molecular Sciences |
| Sofia | Roybal | LANL Student Programs Office |
| James | Wernicke | Los Alamos National Laboratory |
| Jessica | Baca | US Forest Service |
| Meghan | McDonald | Society of Women Engineers - Central NM Section |
| Celia | Einhorn | Supercomputing Challenge |
| Frank | Currie | Santa Fe Community College |
| Joe | Barela | National Society of Professional Engineers |

By the Numbers:

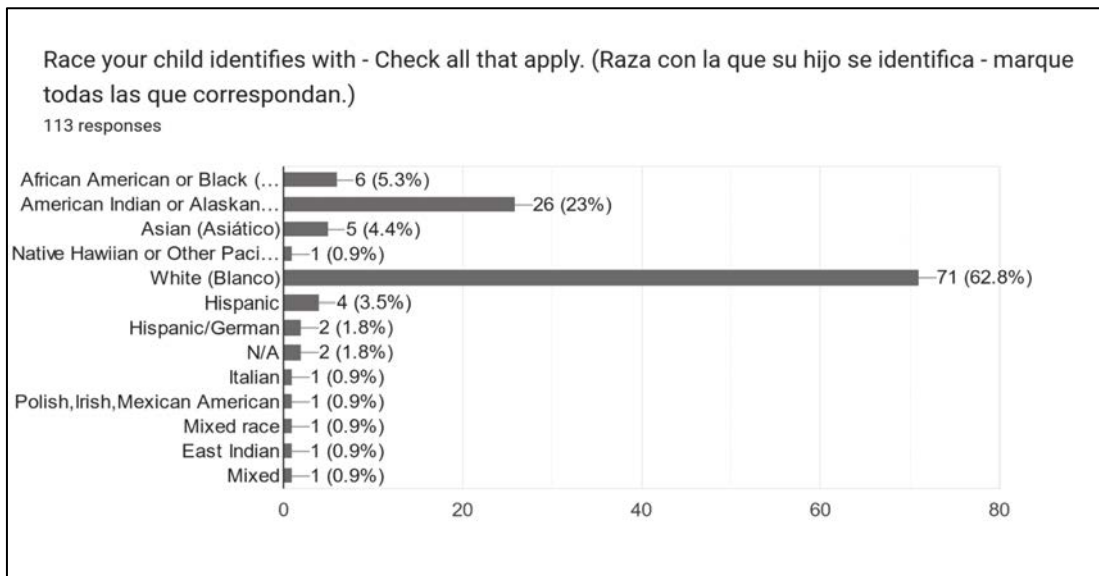
Based on Registration Data:

Students Distribution by Schools:

| | | | |
|---------------------------------------|----|---|---|
| Academy for Technology & Classics | 3 | Milagro Middle School | 2 |
| Amy Biehl | 2 | Monte Vista Elementary | 1 |
| Anansi Charter School | 3 | New Mexico School for the Deaf* | 3 |
| Atalaya Elementary | 2 | Nina Otero Community School | 5 |
| Carlos Gilbert Elementary | 5 | Ohkay Owingeh Community School | 1 |
| Chaparral Elementary | 1 | Ortiz Middle School | 2 |
| Crownpoint Middle School | 1 | Pinon Elementary School | 5 |
| Desert Sage | 1 | Pojoaque Middle School | 4 |
| El Dorado Community School | 11 | Pojoaque Valley 6 th Grade Academy | 1 |
| Eutimio Salazar Elementary (Española) | 2 | Pojoaque Valley Intermediate School | 1 |
| Fayette Street Academy | 1 | Salazar Elementary | 1 |
| Holy Cross Catholic School | 1 | Santa Fe Girls School | 4 |
| Homeschool | 1 | Santa Fe Indian School | 5 |
| James H. Rodriguez Elementary | 4 | Santa Fe Prep | 1 |
| Jemez Valley Middle School | 3 | Sierra Vista Elementary School | 2 |
| Kearny Elementary School | 1 | St. Michael's High School | 1 |
| Los Alamos Middle School | 3 | Tesuque Elementary | 1 |
| Mandela International Magnet School | 2 | Turquoise Trail Charter School | 1 |
| May Center for Learning | 2 | Wood Gormley Elementary | 1 |
| McCurdy Charter School | 2 | | |

*Many Thanks to Santa Fe Community College for providing ASL interpreters at the conference.

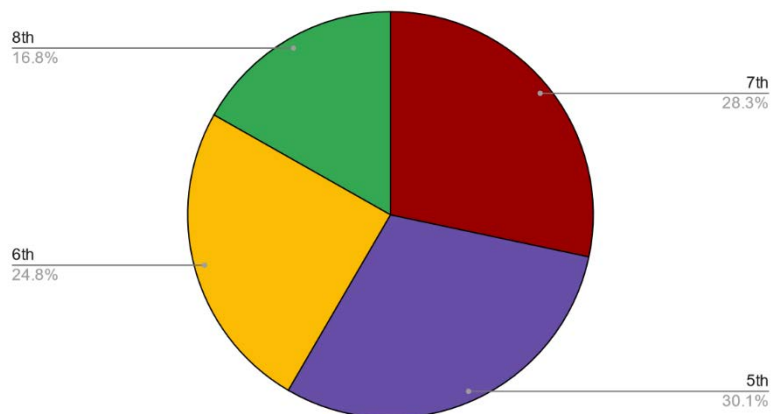




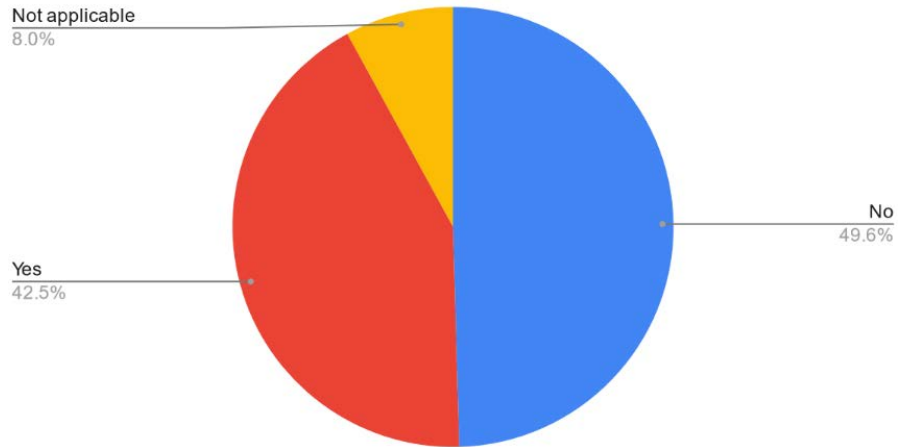
Please note: On the registration form, we had a separate question whether you are Hispanic or not. 48% of all students registered responded that they were of Hispanic, Latino, or Spanish origin.

There was another question on race. The bar chart above shows 63% of the participants were white, but this includes some of the students who answered yes to the Hispanic ethnicity question.

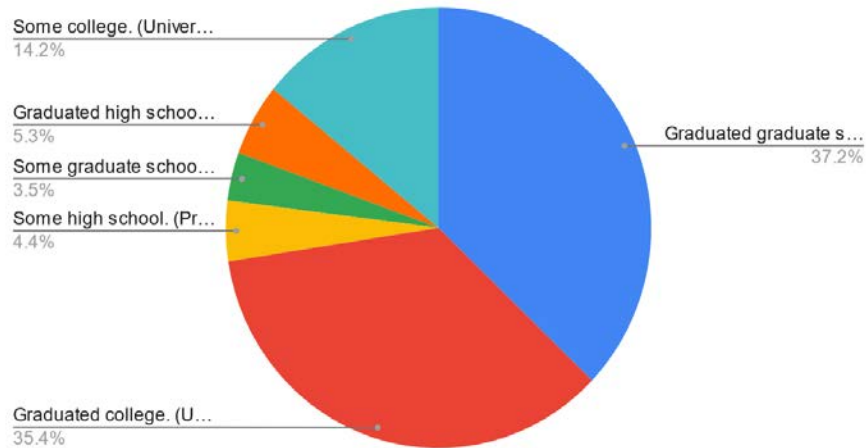
Grade Level (Total Registered)



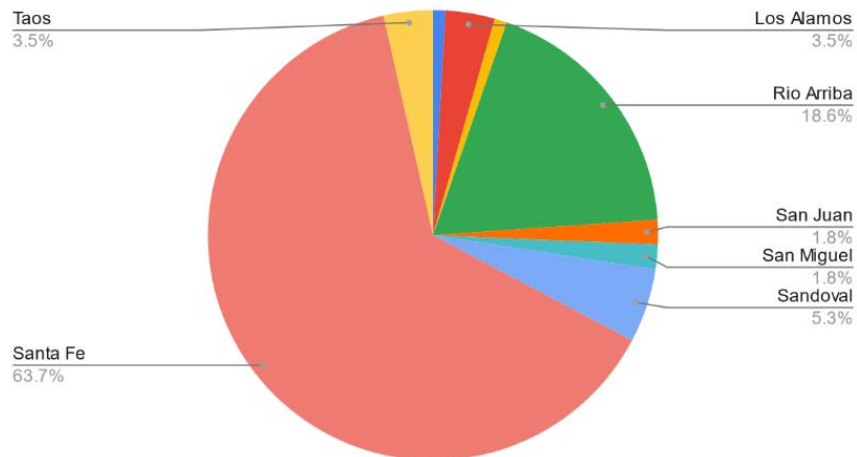
Count of Does your child qualify for free or reduced lunch? Total Registered



What is the highest level of education in the your household? (Total Registrations)



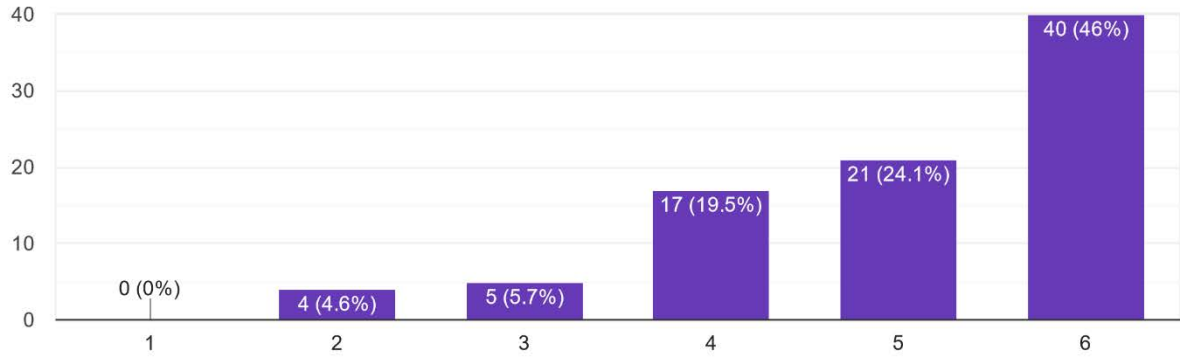
County (Total Registered)



Based on Survey Results:

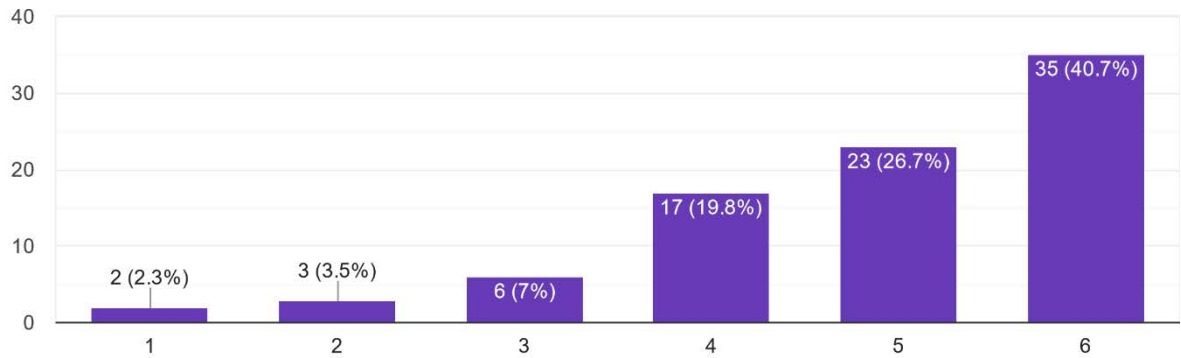
I enjoyed the gathering today

87 responses



How interesting was the Keynote Address?

86 responses



Words from the Students (unedited):

What surprised you today?

“New friends and people”

“That we got to build stuff”

“It was more fun than expected”

What is one topic/sentence you will share with your friends and family about the conference?

“That I can be the first one to get a Phd certificate, by trying hard”

“That I ment New people and I had lotes of fun.”

“there are good people here to help us”

Anything you'd like to share? Comments, suggestions, etc.?

“This was really cool and I'm glad I came”

“I would like to share to other people to join because it is lotes of fun heare.”

“Everything was perfect I love the motivation!”



The STEM Pathways for Girls Conference is never an easy task and requires hard work from a multitude of people. STEM Santa Fe would like to thank everybody who was involved and supported this conference, either financially or physically.

Planning Committee:

Lina Germann, Chair and Santa Fe Community College Logistics

Caroline Cavalie, Treasurer

Kara Luitjohan, Workshops Coordinator

Chelsea Wren Neil, STEAM and College Fair Coordinator

Erin Blair, Volunteers Coordinator

Patricia Maslow, Registrar

Marissa Corely, Outreach

Eve Gasarch, Group Guides Coordinator



Volunteers:

There were 45 volunteers (in addition to 12 workshop presenters and one keynote speaker) who donated their time to make this event a success. Six of these volunteers were part of the planning committee and another six were High School students. Two members of the planning committee are employed by STEM Santa Fe and were not part of the final volunteer count.



Erin Blair, MaryBeth Brady, Laurent Cavalie, Caroline Cavalie, Jazmin Cazares, Elizabeth Coleman, Marissa Corely, Brent Delbridge, Ruby Estrada, Jennifer Fullam, Sindhuja Madabushi, Eve Gasarch, Elsie Jang, Sandy Juarez, Kate Kennedy, Amanda Koronkiewicz, Zoe Ledbetter, Brenda Linnell, Ashly Lovato, Kara Luitjohan, Monica Marquez, Beatrice Montoya, Andreana Nourie, Denise Peralta, Renee Popp, Candice Reyes, Jimmy Rodriguez, Nicol Romero, Tamioka Ruiz, Monica Sanchez, Jenna Schambach, Kabita Sen, Elizabeth Tafoya, Gina Trujillo, Blas Uberuaga, Rose Uberuaga, Lisa Van De Graaf, Erica Velarde, Alegria Vierra, Erykah Vigil, Ginger Whalen, Carrie Wood, Katherine Wozniak, Chelsea Wren Neil, Rebecca Zappe

Finally, a massive thank you to all those who had donated not only monetary donations but also the in-kind donations that were used as raffle prizes for the students, Santa Fe Coffee Bar and Cafe for catering the food and beverages for students and staff, Santa Fe Community College Security and Santa Fe Community College's Facility Department who provided us a safe space to create a day of inspiration for the students. You all went above and beyond what we could have asked of you!



What the STEM Pathways for Girls Program is:

STEM Santa Fe's STEM Pathways for Girls Program is an inspiring monthly program dedicated to girls and nonbinary students in 5th-8th grade. The annual conference is the flagship event of this program. The day-long conference is held for 100-150 students, usually on a Saturday, and augmented by monthly in-depth workshops and summer camps led by professional women in STEM. The girls experience new hands-on STEM activities in small groups and engage in a friendly, safe environment to make long-lasting friendships.

The current workshops for the 2022/2023 STEM Pathways for Girls Program so far:

June 20-24, 2022, Sky is not the Limit - Aviation and Aerospace Summer Camp

This week-long camp was open to girls and nonbinary students that were rising into 7th-12th grade in the fall. The students learned about different careers in Aviation and Aerospace with hands-on activities, demos and presentations by professionals and pilots from the aviation industry and in collaboration from the local members of the two organizations: Women in Aviation International (WAI) Land of Enchantment Chapter and the Rio Grande Norte Chapter of The Ninety-Nines, Inc.

September 17, 2022, Be a Biologist! Fisheries and Plant Biologist by Patricia Maslow

In this workshop the students role played as two different professional biologists: Fisheries and Plant Biologists. As a fisheries biologist they needed to assess the body of water their fish population lived in that had been contaminated by a chemical spill from a nearby factory fire. They worked in teams to review their fish species and population numbers, used critical thinking to hypothesize the amount of damage from the chemical, and tested water samples to help them conclude what areas required the most support from the professional skills. As a plant biologist, the students explored the outdoors and looked at the surrounding greenery to help them conclude which plants around them naturally thrive in the Northern New Mexico environment.

October 15, 2022, Wonderful Medicines by Jean McLarty

In this workshop, students acted as Biomedicine scientists who were working on creating their own medicine. Students worked in teams and made their own independent decisions on how their teams' medicine would be created and processed. Using beads and mathematical formulas the teams made choices that would determine if they wanted to focus on creating more medicine with the risk of it having lower purity or less medicine with higher purity. At the end of the workshop the students were able to create necklaces with the beads they used during the workshop to take home with them.

December 3, 2022, Fun with Fluids by Therese Lujan

In this workshop the students learned about fluid behaviors and potential careers related to fluids. They made three different products from various fluids like vegetable oil, borax, corn starch, water, food coloring and glue. At the end of the workshop the students had created oobleck, slime, and lava lamps. Students were able to customize and take home the slime and lava lamps by adding their own color and glitter combinations.

More monthly workshops are planned for January-May 2023.



STEM Pathways for Girls 2022 - 2023

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