



# STEM Circles Summer 2022 Report

## Executive Summary

Over the summer of 2022, STEM Santa Fe offered 6 sessions of our Summer STEM Circles program (formerly known as STEM summer camps) on 3 unique topics to 92 students rising into middle school and high school grade levels in Northern New Mexico! The STEM circles ran from June 6th to July 15, with some sessions occurring concurrently in two sections due to high demand. During the App Development and Building Laser Harp circles, we hosted a Friday showcase for family and friends where students showed their projects and practiced their presentation skills. We offered one circle for girls/nonbinary students only, and the rest were all-inclusive. The circle for girls/nonbinary students only was an Aviation and Aerospace session that was a new collaboration with the Women in Aviation International (WAI) Land of Enchantment Chapter and the Rio Grande Norte Chapter of The Ninety-Nines, Inc.

Thanks to the generosity of our sponsors and community partners, we were able to offer the STEM circles at a nominal fee to families, only a \$25 registration fee per week that was waived on request. Additionally, all registration forms and webpages were offered in both English and Spanish, and we had a total of 133 registrations. The STEM circles included catered lunch, snacks, and a STEM Santa Fe t-shirt which the students got to tie-dye at each circle!

In addition to the students we served, we engaged 36 adult volunteers, some of whom participated for multiple days and 15 of whom were STEM professionals who shared their expertise through presentations or workshops. Additionally, we had the privilege of having 4 STEM Santa Fe staff instructors leading the STEM circles. We hired two summer interns as well as a new Programs and Volunteers Coordinator. Every individual was vital in making the summer a success!

For a slideshow of photos from the STEM circles, please visit: <https://youtu.be/Ry-6nfCHkt0>



## STEM Circle Sessions

### Aviation and Aerospace for Girls: Sky is not the Limit

The Jet Center, Santa Fe Regional Airport, June 20 - 24



For the first time ever, STEM Santa Fe collaborated with Women in Aviation International (WAI) Land of Enchantment Chapter and the Rio Grande Norte Chapter of The Ninety-Nines, Inc. to offer a circle on Aviation and Aerospace exclusively for girls! Women from these organizations plus many other presenters from the Santa Fe Regional Airport, City of Santa Fe Fire Department, and Civil Air Patrol volunteered to share their experiences. Women are most underrepresented in these fields than they are across all STEM fields (only 9% of pilots and 18% of aerospace engineers are

women). Being that this was our only circle for girls/nonbinary, it was a great step towards increasing female representation in STEM fields.

The 10 students that participated were given talks by female Aviation and Aerospace professionals and did hands-on activities such as engineering paper planes and a simulator workshop. This was the smallest number of participants from all the STEM circles offered, which is also a reflection of the few women in the aviation industry as a whole. However, the small group size allowed the students to have a very personal experience. In fact, they had many great experiences, like



learning how a glider plan is assembled, how Scooper planes are used to fight wildfires, and meeting and receiving a signed book from CarolAnn Garratt who holds the world record for fastest speed flying around the world. Another big highlight is that the girls got to ride in a private plane as a finale to this week's session!





## **App Development: Gaming for Education**

**Santa Fe Community College, June 27 - July 1**  
**Instructor: Kate Sallah**

Our annual App Development circle's theme this year was Gaming for Education this year. Educational games are a growing industry, and our students love games so they had a great time coding apps to teach others about topics they are passionate about! The 16 students built apps in teams or individually for a total of 11 apps completed and submitted to the Congressional App Challenge 2022, CD3.

Students built their apps in Thunkable, a block-based coding software, and Airtable. They also created and included custom interactive quizzes in their apps. Topics ranged from learning about Civil War history to the Chinese language to the different forms of Art, reflecting the diversity of interests that our students pursue. In addition to Kate Sallah's general instruction on coding, Narmada Sambaturu, a postdoc at LANL, did a special presentation on how coding can relate to studying diseases. Visits to different departments on SFCC campus included visiting the Medical Simulation lab and the Aquaponics and Hydroponics greenhouse.



At the end of the week, they presented their apps to family and friends. The showcase presentation was especially fun because everybody got to take the quizzes that the students created! All of the students submitted their original app to the Congressional App Challenge 2022!



## Building Laser Harps with Arduino

Instructors: Edwin Felter, Esther Lescht, and Theo McDonald

The Laser Harp project was developed through our STEM Scaffold Santa Fe program. The harp consists of lasers that act as “strings” so that when the beam is interrupted, a certain tone is played. The harp is controlled by an Arduino linked to a breadboard. Students learned to code for Arduino and engineer the harp so that all components were wired correctly to produce the desired effects. Tinkercad, a free online 3D modeling program, was also used to design and reference the circuitry. All Laser Harp projects were developed in teams or individually, and at the conclusion of each Laser Harp circle, STEM Santa Fe hosted a showcase for family and friends where students showed their projects and practiced their presentation skills.

### → Santa Fe Indian School, June 6 - 8

We held this *Building Laser Harps with Arduino* session exclusively for students of Santa Fe Indian School, attended by 15 students. In three days, students built their laser harps and parents got to see these projects when they picked up their students on Friday.



### → Santa Fe Community College, July 5 - 8

Due to overwhelming interest in this topic, we held two sections of our Building Laser Harps with Arduino circle with 30 students attending at Santa Fe Community College. Students completed the Laser Harp project as described above, and received free tickets to Meow Wolf so that they could visit the inspirational Laser Harp room later. Friday afternoon witnessed a very successful showcase of students' projects.



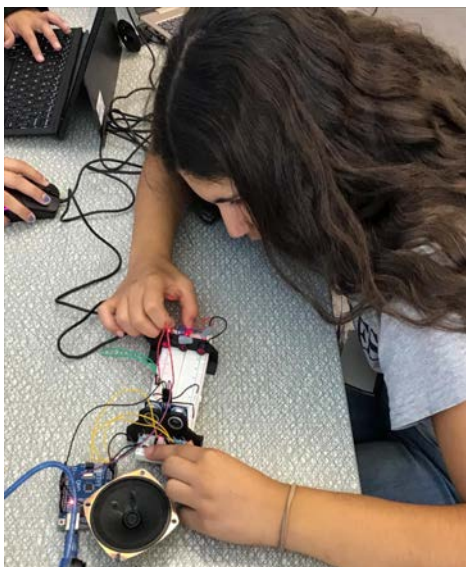
### → Northern New Mexico College, July 11 - 15

In order to reach more students in northern New Mexico, we held a third session of the Laser Harp circle at Northern New Mexico College, attended by 21 students. We were able to arrange a fieldtrip to Meow Wolf for this session so that students could see the inspirational Laser Harp room! They had a blast.





## By the Numbers

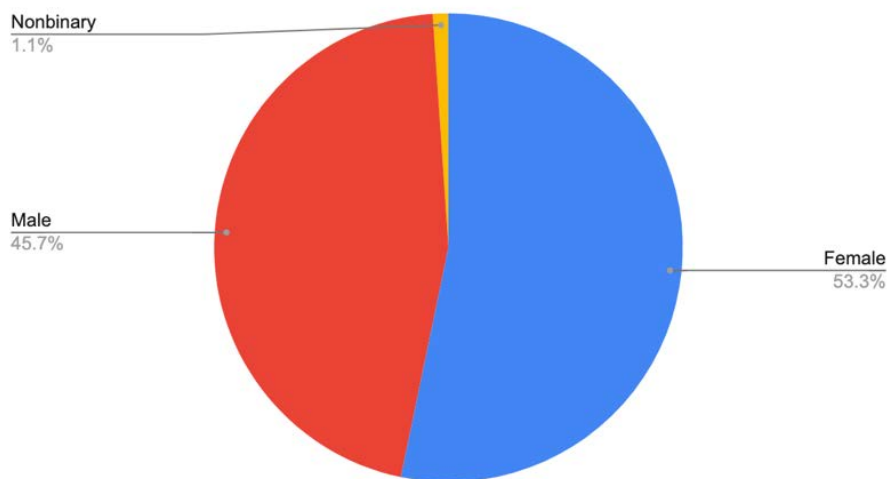


We served a total of 92 students rising into middle school and high school grade levels across all circle sessions, including the 15 students from our special session at Santa Fe Indian School. We collected demographic information from students' parents as part of their registration materials. We missed collecting some data from SFIS students as the registration process was internal to the school.

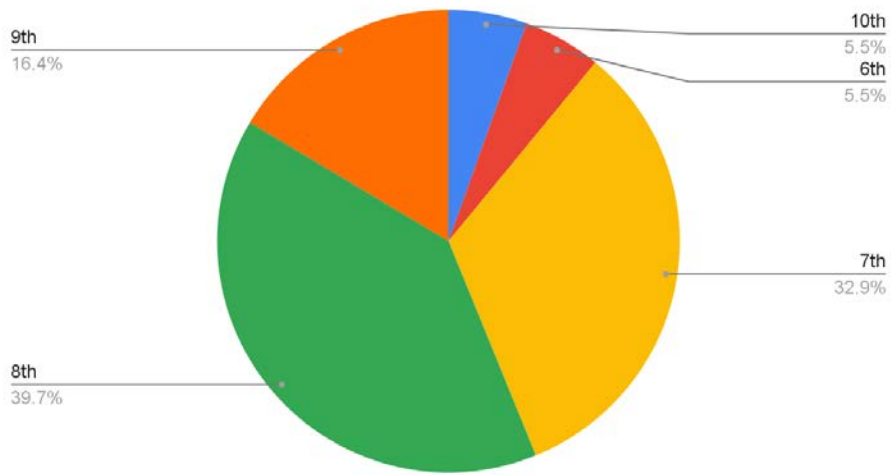
Since females and Hispanics/Latinos/Spanish are typically underrepresented in STEM fields, we were thrilled to serve slightly over half who were female (including SFIS students), 48% identified as “people of color” (including SFIS students) and 64% as Hispanic/Latino/Spanish (including SFIS students). 36% of students qualified for free or reduced lunch, and 25% would be first-generation college graduates if they complete a college degree later.

### Grade Levels and Genders:

What gender does your child identify as?

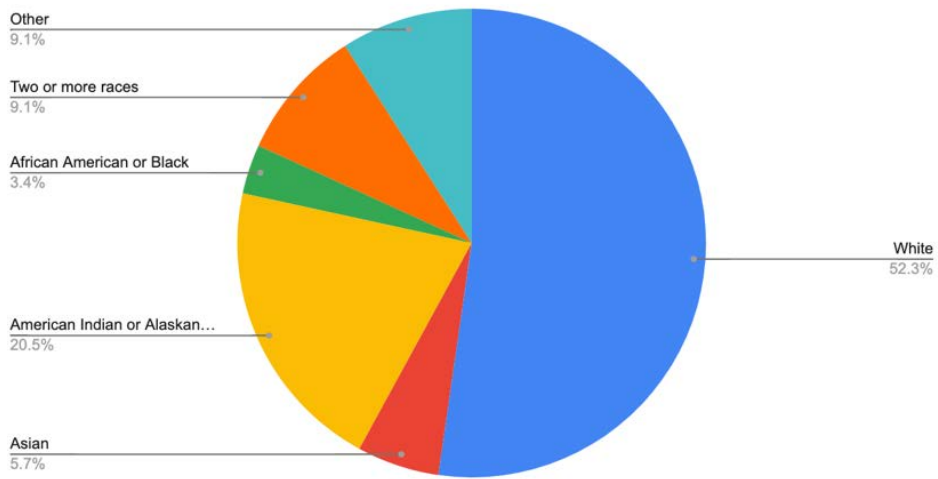


Grade rising to in Fall 2022:



Race and Ethnicity:

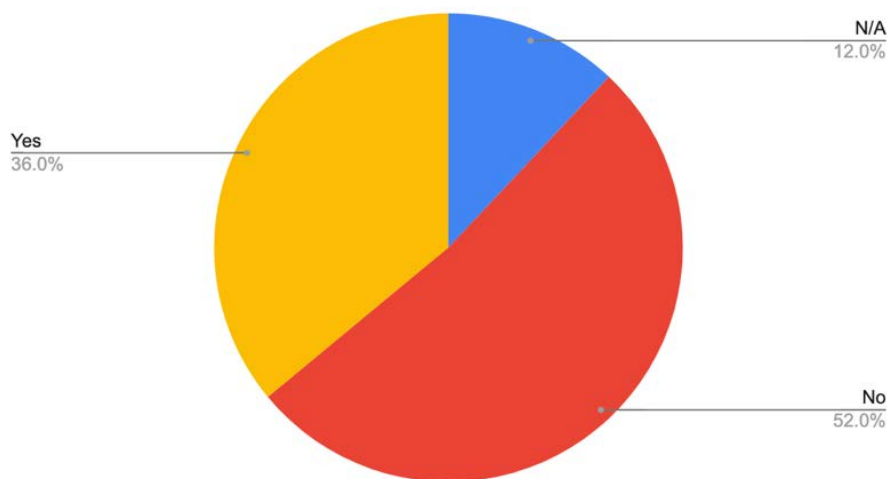
Race your child identifies with



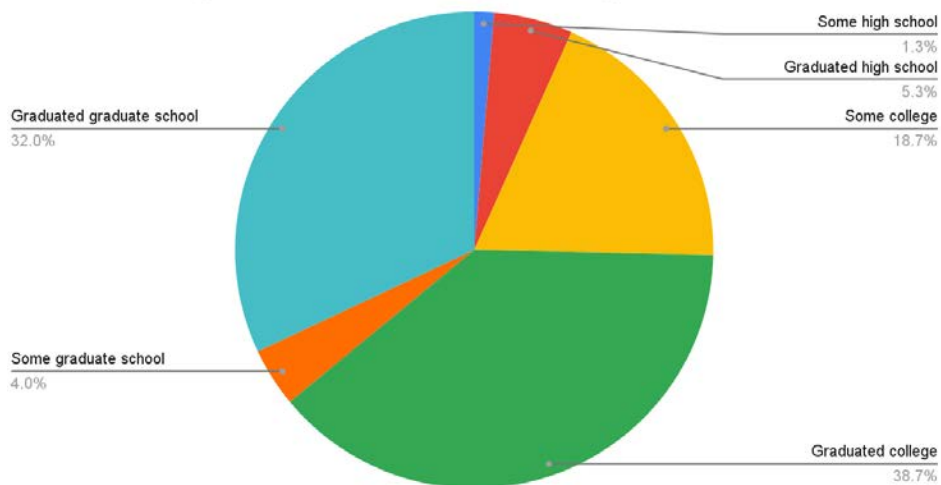
64% as Hispanic/Latino/Spanish

## Socioeconomic:

Does your child qualify for free or reduced lunch?



What is the highest level of education in the your household?



## Impact

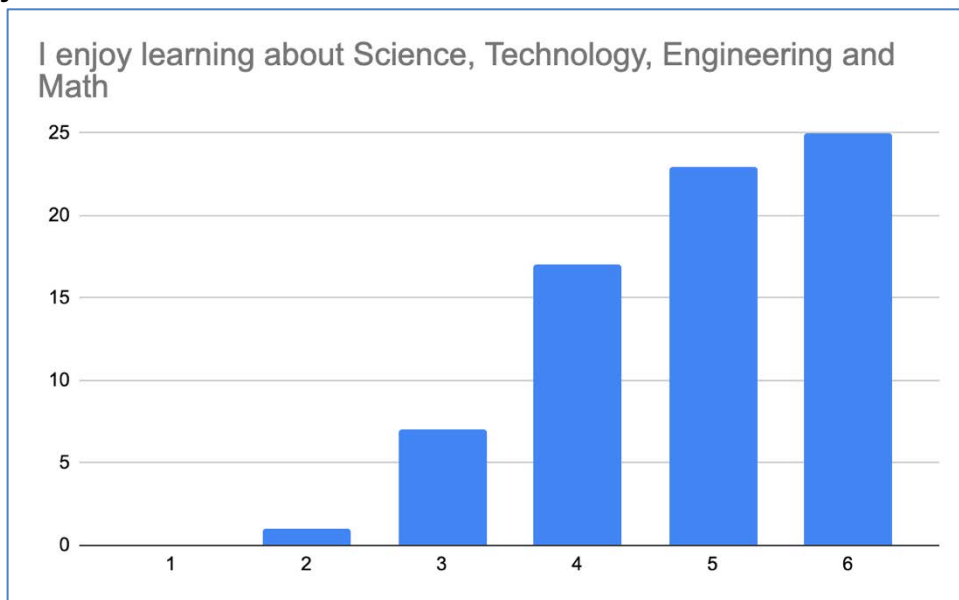
At the end of each circle, students were given an anonymous brief survey to reflect on their experiences. The following charts do not include the student participants of the Santa Fe Indian School session.

On a 6-point scale with 1 being “Boring” and 6 being “Awesome”, the average overall rating for the summer STEM circles as collected on post-surveys was 5.2!

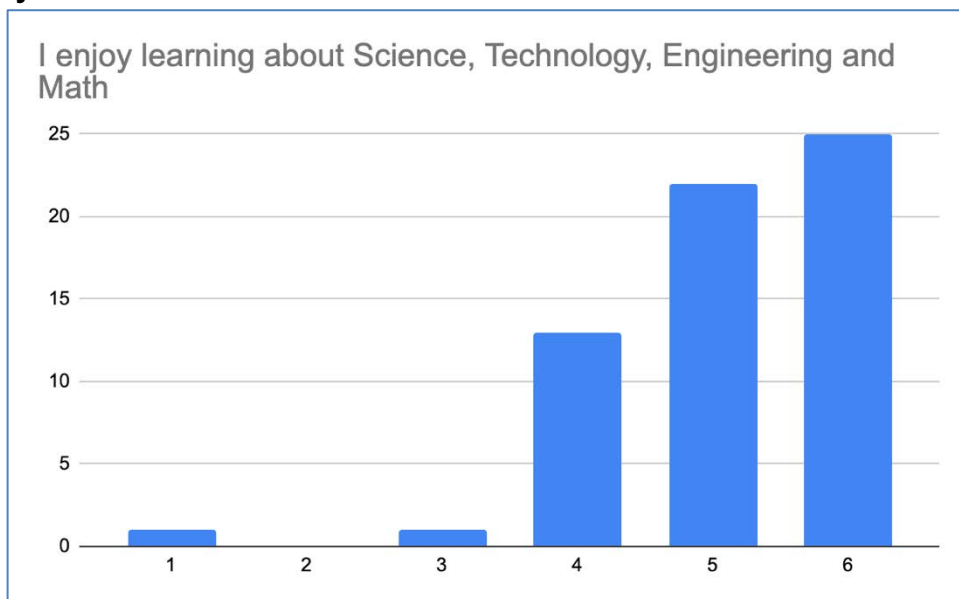
## Interest in STEM

Before the summer STEM circles, 66% of the students reported a positive attitude toward STEM, rating their interest at a 5 or 6. The average interest score was 4.9. After their circle sessions, 76% of students who responded to post-surveys reported that they had a positive attitude towards STEM. The average score jumped to 5.1 after the STEM circles.

### Pre-survey:



### Post-survey

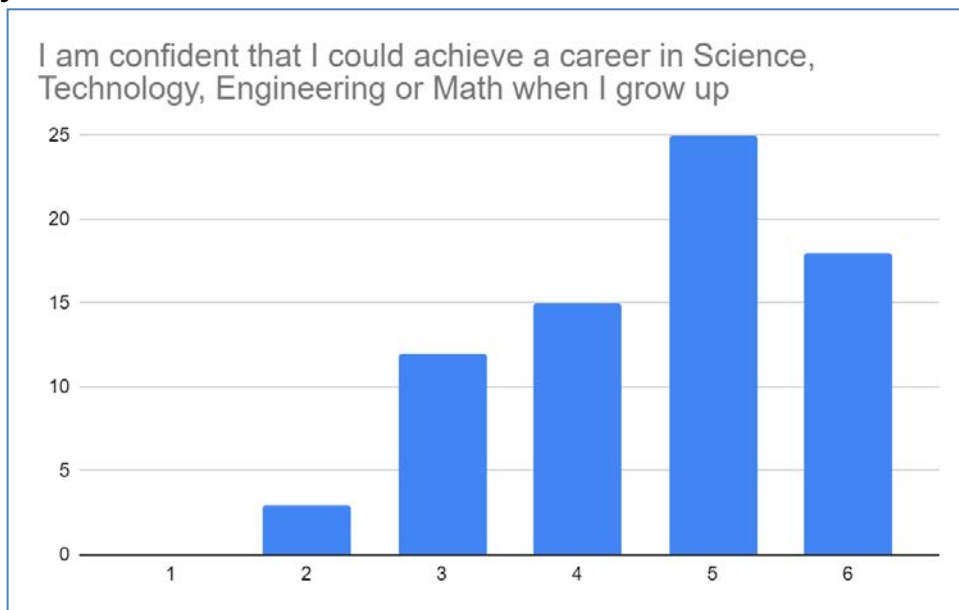




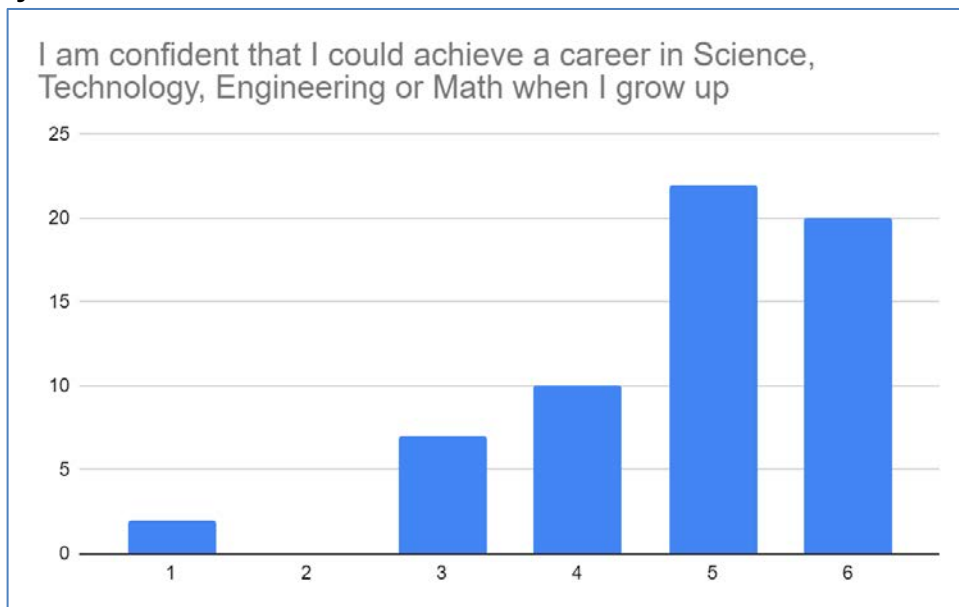
## Confidence in STEM

Before their STEM circles, 59% of students responded that they felt confident about achieving a career in STEM, responding with a 5 or a 6. After the STEM circles, 69% reported feeling confident about a STEM career. Before the STEM circles, the average confidence score was 4.6, and after the STEM circles, the average score jumped slightly to 4.8.

### Pre-survey:



### Post-survey:



## Testimonials (unedited)

"I loved the technical part. The coding on Tinkercad, and then actually building it in real life. I really liked that."

"[My favorite part was] Getting to know a lot of people I didn't know and becoming very close with them."

"My Favorite part was getting to go up in small airplane, flying to Cochiti lake and back. I sat in the front passenger seat near controllers and the Pilot let me fly for a few minutes, amazing!!!!"

"I really enjoyed meeting new friends and being able to come to this class"

"I think this project was perfect and I would like to do this again in the future."

"This is an awesome program!"

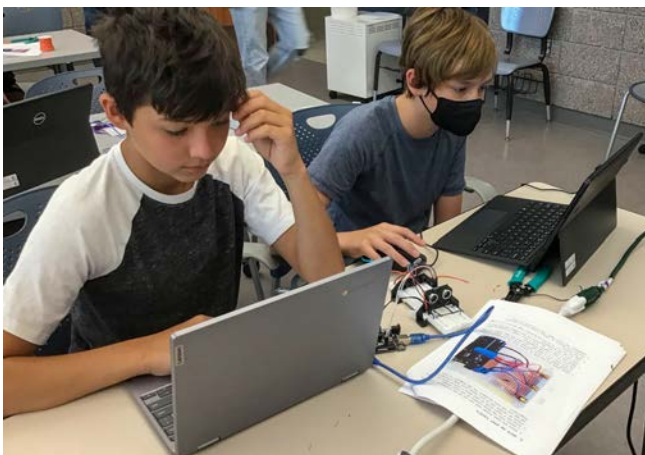
"I thought this program was really cool!!"

"Thank you for an awesome week!"

"I enjoyed STEM mostly because of the women who made space in their busy schedule, to teach us and to share their experiences, accomplishments, and the hardest challenges they faced in their career. My favorite program was Coding because we got to pick what kind of app we wanted to create, as well as presenting our apps to parents and friends. I love stem because we can meet new people and learn new things such as technology trends, math, science and more fun and amazing things."

"I enjoyed STEM a lot; my favorite camp was Aviation because we got to learn all the hard things women pilots have to study to become professional pilots. They took us around the Airport and showed us cool planes like a Scooper, which is used to put out forest fires. We also had an opportunity to fly on a real plane!"

"I also participated in the coding and the Laser-harp camps; they gave us free meow wolf tickets! I learned a lot in 3 weeks and I'm really happy i was able to be in every single camp. I recommend STEM to other girls who are interested in learning fun facts about technology and science."



## Making it Happen

Thank you so much to everybody who helped us make this summer a success!

**STEM Santa Fe Staff/instructors:** Lina Germann, Riva Merrill, Esther Lescht, Edwin Felter, Theo McDonald, Kate Sallah, Tricia Maslow.

**Summer Interns:** Valentin Ornelas and Iris Fonseca

**Presenters:** Angie Slingluff, Bobbi Huseman, Brittany Snyder, Capt René Larricq, Civil Air Patrol, U.S. Air Force Auxiliary, CarolAnn Garratt, Colleen Koenig, Connie Buenafe, Connie Smith, Debbie Post, Elizabeth Hunke, Jess Caskey, Jill Meyers, Marianne Francois, Michaela Mabee, Nancy Wright, Sara Lanctot, Scott McNeil, Susan Larson and Narmada Sambaturu

**Day-of-Volunteers:** Beatrice Montoya, Caroline Cavale, Eve Gasarch, Jean McLarty, Jenelle Mann, Jenny Banh, John Kuczek, Joshua Mitchell, Katie Wozniak, Kayla Molnar, Lien-Shin Wang Offermann, Lou Tilmont, Melissa Espinosa, Narmada Sambaturu, Raymond N. Greenwell, Sophie Coulson

**Hosts:** The Jet Center: Santa Fe Regional Airport, Santa Fe New Mexico Community College, Santa Fe Indian School, and Northern New Mexico College

Aviation and Aerospace STEM circle was majorly funded by ISTAT grant while the Laser Harp STEM circles was majorly funded by Anchorum St Vincent and Meow Wolf. Many thanks to the many individual donors and businesses who share our mission.



## In addition ... STEM Saturdays

We cannot forget to shine light on our STEM Saturdays program. STEM Santa Fe collaborated with the Southside branch of the Santa Fe Public Library, MathHappens Foundation, and New Mexico Museum of Natural History & Science, to offer workshops every Saturday throughout June and July. This was on a walk-in basis and attended by about 30 students and parents.



The activities ran for 2 hours and provided students a variety of activities focusing on math and biology. Students of all ages, even parents, were encouraged to participate and were able to choose between playing math games, building paper airplanes, exploring the world with microscopes and magnifying glasses, analyzing fossils, testing water samples, and even building models of novel hummingbird feeders!

Thank you to our volunteer Mathematician Tom Yuster for guiding this Saturday program and to our Operations and Outreach Specialist Tricia Maslow for running the “Be the Biologist” sessions. Also thanks to high school student volunteer Isaiah Montoya for helping out.

## Final Words by Lina Germann, CEO, STEM Santa Fe

We like it when we receive positive feedback from parents and the teens that attend our programs. However, there are times when the feedback is extra memorable. Two touching incidents from this summer. One with a parent of a teen from Española whose single mom told me that even though they are on the verge of homelessness and gas is expensive, it was worth it to drive her son down to Santa Fe every day to attend our STEM circles. Another touching moment came from one of the girls who spoke at the Friday showcase we always hold for parents and families. She said: “This week and this project (building Laser harp with Arduino) made me feel smart”. It totally melted my heart!





# 2022 STEM Santa Fe Summer STEM Circles



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