



Scientific Adventures for Girls 2020-21 Program Report



For more information, please contact us at admin@scientificadventures.org

Please note, due to restrictions on media releases this year in the virtual setting, we had very few pictures available to add to the report so we included past photos of SAfG girls in the afterschool programs.



Table of Contents

<u>Summary</u>	3
<u>Schools Served: 2020 - 2021</u>	3
<u>SAfG Impact Statement to Date</u>	4
<u>What is SAfG's Mission?</u>	5
<u>Why SAfG? The Problem</u>	5
<u>SAfG's Solution</u>	6
<u>How is SAfG Unique?</u>	6
<u>Who did SAfG Serve This Year?</u>	7
<u>SAfG Curriculum</u>	7
<u>SAfG Teachers</u>	9
<u>Cal State East Bay STEM Institute Scholar Program</u>	11
<u>SAfG Modified Role Model/Volunteer Teaching Assistant Program</u>	11
<u>Near Peer Mentor Program</u>	13
<u>SAfG Program Evaluation Results 2020-2021</u>	13
<u>Virtual SAfG Family STEAM Nights</u>	19
<u>Diversity Equity and Inclusion Training</u>	22
<u>SAfG Partnerships</u>	23
<u>SAfG Highlight #1: The Espinoza Family: Family STEAM Night Stars!</u>	24
<u>SAfG Girls Highlight #2: Superstudent Isarivi Gomez!</u>	25
<u>Community Outreach & Care</u>	26
<u>Thank you to our Funders, Partners and Supporters!</u>	26



Scientific Adventures for Girls After School STEM Program Report 2020-2021

This past school year during the Pandemic, when many organizations stopped offering programs or cut back programs, Scientific Adventures for Girls (SAfG) actually added and served more schools than we ever had before. SAfG staff and volunteers poured their all into taking our hands-on STEM program to the virtual setting. We kept it fun and engaging, and we provided the girls with a much-needed, synchronous learning hour each week during the academic school year. In addition, we added a number of new resources this year to make it easier for our parents and caregivers to support their daughters with STEM programming, especially during these difficult times. To achieve this, we added communication tools that met parents/caregivers where they were at. We delivered STEM kits to the students for all sessions so supplies were easily and readily available. In addition to our year-long classes, we also provided parents/caregivers and students continuous STEM resources and activities. These included virtual, monthly Family STEAM Nights (also delivering STEM Kits to them for the events) and monthly STEM resource emails with engaging, asynchronous educational and hands-on activities.

The goal this year was to attempt to normalize things as much as possible so the girls, despite so much change and difficulty in the virtual setting, still had the chance to fall in love with STEM each week and build their problem solving, critical thinking skills and confidence around STEM. As we move back to in-person learning in the Fall of 2021, SAfG will be there to continue the STEM journey with these girls. During this transition back into in-person learning, we will also be focusing our efforts in providing STEM programming that includes a focus on social-emotional learning.

The following outlines SAfG's programming over the 2020-2021 school year.

Summary

Here are the quick facts about this school year:

- **315 girls** participated in virtual afterschool programs during the 2020-2021 school year
- **17 afterschool programs** offered, serving **23 schools**
- **20 Female STEM Role Models** volunteered over **1100 hours** as volunteer assistants in 27 weeks of classes
- **14 STEM Near Peers** (middle school and high school students with a passion for STEM) volunteered over **300 total hours** as virtual Assistants in SAfG winter and spring sessions
- **Over 1600 children and family members** participated in our virtual Family STEAM Night series
- **280 girls and boys participated** in in-person camps at 5 Oakland, Berkeley and Richmond schools
- **24 girls** attended SAfG's virtual 4-lesson summer camps





- **1500+ STEM kits** assembled for girls to take home
- **1000+ calls and texts to parents and caregivers** throughout the school year to support families and girls through the program
- **60+ hours** of ongoing professional development on STEM, teaching strategies and DEI topics to maintain a high-level of quality in each lesson, and to continuously find ways to engage girls and families during the challenges of virtual learning
- Continuous, year-long volunteer training and ongoing volunteer assistant and Near Peer check-in meetings for continued teaching support

Schools Served 2020-2021

Programs were held once a week for one hour for the following elementary schools serving K-6th grade girls:

1. Anna Yates Elementary (Emeryville)
2. Washington Elementary (Berkeley)
3. Hoover Elementary (Oakland)
4. Sankofa Elementary (Oakland)
5. Martin Luther King Jr. Elementary (Oakland)
6. Esperanza Elementary (Oakland)
7. Korematsu Elementary (Oakland)
8. Grant Elementary (Richmond)
9. Chavez Elementary (Richmond)
10. Michelle Obama (Richmond)
11. Washington Elementary (Richmond)
12. Bay View Elementary (Richmond)
13. Tara Hills Elementary (Richmond)
14. Murphy Elementary (Richmond)
15. Downer Elementary (Richmond)
16. Sheldon Elementary (Richmond)
17. Coronado Elementary (Richmond)



As our classes were virtual, we were able to add additional girls mid-year from a number of additional schools, including Bayview, Dover, Fairmont, Montalvin, Ohlone, and Verde elementary schools.

SAfG Impact Statement to Date

Since its inception in March 2014, SAfG has served:

- **1311 unique girls** through its afterschool and summer camp programs
- **3000+ children and their families** through its Family STEAM program
- **1415+ students in nine different public libraries** in Oakland serving through their STEM-drop-in programs
- **300+ girls and boys** partnering with Emeryville Recreation Department summer camp

What is SAfG's Mission and Vision?

To remove systemic barriers to all girls' participation in STEM starting in kindergarten, engage them through hands-on learning, increase their positive attitudes toward STEM, and equip them with 21st century skills. SAfG envisions a more gender equitable society where women pursue and choose careers that provide them more economic freedom and opportunities to advance society.

Why SAfG? The Problem

- Women, especially women of color, are underrepresented in STEM fields: Although jobs in STEM are on the rise, women (50% of the US population) as well as Black Americans, Latinx peoples and Indigenous Peoples (who in total comprise 32% of the US population), are largely underrepresented in STEM fields, and opportunities for economic mobility are scarce due to systemic and structural gender, socio-economic and racial barriers.
- According to the National Science Foundation, in 2019, women represented only 26% of those in STEM fields, while Latinx (men and women) represented only 8% and African American (men and women) represented 7%.
- Women, Black Americans, Latinx peoples and Indigenous Peoples have the highest rates of poverty and unemployment in the US.
- According to the Bureau of Labor Statistics, there are many job openings in science, technology, engineering and math (STEM), yet there are not enough people to fill these jobs.
- Women are losing out on access to STEM jobs that pay more money and give them an opportunity to be economically mobile. According to the Bureau of Labor and Statistics, in 2019 the median annual wage for STEM-related occupations was \$86,980, while for non-STEM related occupations it was \$38,160, less than half of the STEM annual wage.
- Technology and Innovation are lacking the perspectives and the specific needs of women and underrepresented populations.
- Public education in the US varies widely, so not all children start on equal footing (funding, qualified teachers, course offerings, extra-curricular activities, social and emotional support).
- Elementary children in California only receive 0-60 minutes of science a week (on average 22 minutes and most often not hands-on science) . In addition, what is offered is often not relevant and misaligned with what STEM companies future needs will be. Accessible, engaging afterschool STEM programs are not typically offered at underserved elementary schools in the East Bay.
- Children in early elementary are already forming negative views about science and math.



SAfG's Solution

Theory of Change: If we remove systemic barriers to East Bay girls' participation in STEM activities at an early age, they will be more likely to pursue and attain careers that provide more economic freedom and opportunities to advance society.

These complex problems require a multifaceted approach:

- Starting STEM early
- Creating welcoming, nurturing learning environments
- Using girl-centric methodologies
- Bringing STEM directly to all girls
- Introducing girls to women in STEM who look like them
- Engaging families
- Engaging the entire STEM community to address these problems

Therefore SAfG:

- Creates developmentally appropriate out-of-school time programs accessible to girls (especially low-income and students of color) and engages TK-6th girls in the STEM content.
- Creates age-appropriate programs which address social and emotional learning as well as trauma-informed practices.
- Designs culturally sensitive, real world curriculum appropriate and appealing for girls of different ethnicities and socio-economic backgrounds, including educating and engaging their parents.
- Incorporates female and POC STEM role models and provides societal and cultural images and environments that promote diversity and opportunity in STEM.
- Partners with all stakeholders (industry, nonprofits, NGOs, Government) in the STEM Ecosystem to increase impact and reach.



How is SAfG Unique?

In Oakland, there are very few organizations offering accessible, i.e. free and convenient, STEM classes to children from TK–6th grade, specifically for girls. Through our use of evidenced-based best practices, SAfG distinguishes itself as follows:

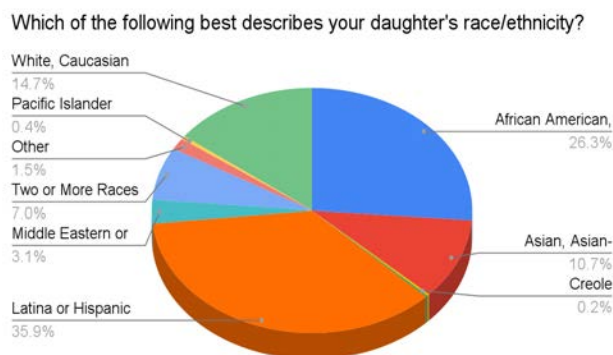
- Keeps class ratios small, no larger than 1:8 (teacher:student ratio).
- Invites female role models in STEM to classes to present the practical and social-impact of science and engineering and eliminate stereotypes.



- Hires its own seasoned, experienced and nurturing teachers who are trained to provide engaging, positive science experiences for girls.
- Utilizes near-peer mentors (girls in middle school or high school) in its classes, providing younger role models for the girls, as well as providing opportunities for the near-peer to sustain her interest in STEM.
- Engages parents - SAfG believes that to ensure girls grow confidence in STEM and pursue STEM for the long term, their parents also need the motivation and empowerment to support their daughters.
- Utilizes volunteers in our classes from local universities and corporations.
- Implements surveys to enable SAfG to track attitudes towards STEM.

Who did SAfG Serve this Year?

Over the past few years, Latinx students represent the largest ethnic group of SAfG's girls and their families. This year, Latinas accounted for 36% of our student body, followed by African American girls (26%) and Caucasian girls (15%). Asian Americans represented 11% and families that identify as "Two or more Races" represent 7% of our student population. At the schools SAfG served, 80%+ of children are eligible for the free/reduced lunch program.



SAfG Curriculum

SAfG's curricula enable our teachers to help the girls see themselves as part of a STEM community. Although all lessons were taught virtually this year, every single lesson offered a hands-on learning experience. Prior to the start of our program, every girl received a STEM kit with the materials needed for each of the three sessions. For the past years, our teaching philosophy has been based on building [Habits of mind: The 6 C's of Being a Scientist](#). Our student scientists were given guidance and space to be Curious, Creative, Confident, Collaborative, Committed, and Changemakers. This year, we moved deeper into Social Emotional Learning, and combined play-based learning with problem-solving techniques from coding and engineering. Our coding sessions' curriculum also addressed the digital divide and helped chaperone SAfG girls to be creators of digital content. Teachers helped the girls focus on the process of STEM in a community over needing to complete a product



June 2021



within a lesson's time. To ensure that our learners see themselves reflected in the curricular content, our teachers put equity and inclusion at the center of facilitation. Our girls also benefited from women scientists and engineers who volunteered as assistants, as well as from Near Peers (high school mentors) who supported the girls and demonstrated their enthusiasm for STEM topics.

SAfG's after-school programs seek to engage the families with after-lesson emails that show participants in action, summarize the lesson content and suggest follow-up activities or conversation topics related to the learning objectives as ways to bring science home. Families were able to follow week-by-week what their girls learned and were contacted by teachers at the end of the spring session for feedback on their daughters' growth. The following thematic curricula were used across our sites this past school year:

Creative Engineering

Creative Engineering offered three main STEM themes that spiraled throughout the lessons: *An Introduction to Engineering*, *Simple Machines*, and *Electromagnetism*. The curriculum also introduced basic computational thinking (step-by-step thinking) to prepare girls for the coding and robotics sessions that followed. The girls were encouraged to come up with their own designs, exchange their ideas and help each other figure out solutions to any of the design challenges.



Introduction to Engineering helped our girls focus on process and computational thinking over producing or replicating a teacher-defined product. *Simple Machines* and *Electromagnetism* introduced basic physics concepts in an intuitive way and built a foundation to better understand coding and robotics. Some examples of the projects include: Packaging a cookie, designing a windwheel, and constructing a balloon-powered car. At the end of the session, girls embarked on building their own simple machine out of household goods, some of the designs are displayed on our website [gallery](#).

Let's Code

Each lesson in *Let's Code* represented a triad of a social-emotional learning activity, a hands-on or unplugged activity and a coding session on Code.org. SAfG's Director of Education and Community Engagement developed a fun and easy-to-play paper-based [board game](#). This game was used in multiple lessons to teach three fundamental coding strategies. It allowed girls to create their own characters and play pieces as well as to define their own rules as a group. Other hands-on lessons included, making a coding bracelet and "debugging" the teacher's "buggy" marble run and then designing their own marble run and applying their debugging skills in the process. The overall emphasis in this session, next to learning how to code, was for girls to experience how debugging and problem solving skills are very similar, and to allow them to create a physical fun coding game and a digital game using code.

Unplugged: Creative Robotics and Engineering

The seven-week spring session represented the highlight and also the reward for all the previous, diligent learning about engineering, robots and their coding language! Girls learned how to build a racing spinbot out of a toothbrush, and an artbot to make beautiful gyrosopic pictures. The foundational introduction to electro- magnetism helped girls feel more comfortable with batteries and electric circuits. They also built bionic hands from recyclables and tested them to perform all kinds of daily tasks. All the social-emotional learning and relationship-building from the Fall and Winter had created a class bond strong enough to help girls get through frustrations and challenges as they built their robots by themselves at home with virtual peers and teachers.



SAfG Teachers

One of the most important components of the SAfG program is our excellent teaching staff. SAfG wants to ensure that girls get the attention and encouragement they need during their classes, therefore we have a teacher to student ratio of no more than 1:8. SAfG Teachers attend weekly, professional-learning, and community meetings. Respectively, they discuss how to best adapt and execute each lesson plan, how to include families into the learning process, other topics. They also attended a regional STEM conference for additional professional development. Teachers were in constant communication with parents before, during and after classes this year to support families as much as possible during these unusual times. SAfG has some wonderful, nurturing teachers. They are truly the backbone of our program!



Stephanie Lauenstein, *Director of Education and Community Engagement and Head Teacher*: Stephanie loves teaching and helping adults develop and apply their talent and skills. Stephanie coaches teachers to help them expand their skills and reach new goals. She has taught science, language and cultural concepts for over 13 years in urban bi-lingual schools in Berlin and the Twin Cities. She is licensed in life science, general science and ESL and has a M.S. in Molecular Biology from the Free University of Berlin. Prior to becoming a K-12 educator she worked as an independent consultant in healthcare, as a manager and corporate trainer in international clinical research and medical education at Medtronic Inc. and scientific publishing at the American Chemical Society and Blackwell Science Publications. Stephanie is an experienced curriculum developer. She is always excited to find new and effective ways to make STEM interesting and relevant to different learners.

Mariana Diaz, *Head Teacher and Program Manager*: Mariana grew up in Sacramento and graduated from UC Davis with a B.S. in Environmental Science and Management and a minor in Education. Her background includes working in environmental education at an outdoor school in Sonora and in Yosemite National Park. She's a strong believer in hands-on learning and creating a safe, fun learning environment for all students. In her free time she enjoys bird watching, IDing wildflowers on leisurely hikes, watching movies, and spending time with family and friends.

Karen Gamas, *Head Teacher*: Karen is a graduating senior at Cal State University, East Bay with a B.S. in Chemistry. Karen started out at SAfG through her Service Learning program in 2017. After her semester with SAfG, we hired her as an Assistant Teacher and in the fall of 2019 she became a Head Teacher. Her students love her!

Pinkie Young, *Head Teacher and Instructional Coordinator*: Pinkie is a science educator and grew up in the East Bay. She currently teaches virtually at SAfG and The Lawrence Hall of Science in Berkeley. She is a project geologist by trade, and graduated from Occidental College with a B.S. in Geology with an Environmental Science concentration. Throughout her career as an educator, Pinkie has striven to extend her passion of hands-on learning to her students.

Mo Henigman, *Head Teacher and Community Engagement Coordinator*: Mo Henigman is excited about all things science! While Mo graduated from UC Santa Cruz with a degree in biology, they are also passionate about physics, chemistry, and environmental science. Mo believes that the arts play an important role in any and all fields of science, and they love to get creative. As an educator, Mo wants every student to know that they are an important part of the class community.

Kayla Lim, *Head Teacher*: Kayla grew up in the Bay Area and graduated from Occidental College in 2021 with a Bachelors in Critical Theory & Social Justice and a minor in





Cognitive Science. She is passionate about education equity, community-based learning, and diversity within schooling. She believes that all students should have the right to equal education opportunities.

Chandler Lougee, Head Teacher: Chandler has a B.S. in Astronomy and Comprehensive Physics and knows how to make physical science really fun. She taught STEM related topics for the past two years to youth in Lesotho with the PeaceCorps and recently returned to her home state California.

Cal State East Bay STEM Institute Scholar Program

SAfG prides itself in collaborating with organizations, companies, universities and volunteers in the community to better achieve our mission and engage more children in STEM in the East Bay. In 2019 we started a Scholar Program with Cal State East Bay's STEM Institute where undergraduate STEM students are offered an internship as teaching assistants in our after-school program. This year the program was placed on a hiatus due to COVID-19 but we hired two former Cal State scholars as assistant teachers: Aracely Gomez and Safiya Barry. The collaboration has been mutually beneficial as the young professionals shared their passion in the classroom while gaining practical experience by teaching engaging, hands-on science in the classroom. Each of them will take these skills to their future jobs!

SAfG Modified Role Model/Volunteer Teaching Assistant Program

Our Volunteer Role Model Program is another major component in helping SAfG reach its goal of keeping children engaged in STEM for the long term and letting them know that they are welcome in STEM careers. Research shows that exposure to female role models in STEM early on can help change the way girls see themselves in the future. SAfG has developed relationships with representatives from numerous Bay Area companies and institutions through our Female Role Model and Volunteer Programs. Pre-Covid, our program invited female STEM professionals to visit our classes to discuss their career path, what they do, why they chose to pursue STEM, and why they love their work. We also allowed time for our girls to ask questions to give them a better understanding of the role model. Our hope is that our girls can see themselves in each of these women and become inspired to also pursue STEM careers.

Oftentimes, it is the first time our students are exposed to careers in STEM. We aim to eliminate any stereotypes they may have of STEM careers and normalize the notion that women also pursue this path. When our programming had to go virtual this year, we had the opportunity to invite these role models to volunteer on a regular basis and created a Virtual Volunteer Teaching Assistant program for female STEM professionals. To our delight, we had more women sign up than we had room for! We recruited **20 Assistant Teacher volunteers** this year who volunteered once a week for 27 weeks to support our Head Teachers in the





classroom. We are extremely thankful to these women for their work and dedication. Collectively, they **donated over 1100 hours** of time to SAfG during the school year. During the 2020-2021 school year, the following STEM role models volunteered their time. We wish to thank and acknowledge them.

1. Aden Kinne, *Sound Agriculture*
2. Aizah Khurram, *Lawrence Berkeley National Laboratory*
3. Anais Engel, *Integral Group*
4. Anna Lee, *Lioness*
5. Charlotte Young, medical assistant and medical student
6. Gracielle Malana, Lawrence Berkeley National Laboratory
7. Itxaso Garay, Sound Agriculture
8. Jessica Needham, Lawrence Berkeley National Laboratory
9. Kim Ong, Wells Fargo
10. Kris Klotzbach, Clif Bar
11. Lisa Claus, Lawrence Berkeley National Laboratory
12. Maria Zurek, Lawrence Berkeley National Laboratory
13. Marielle Malana, Lawrence Berkeley National Laboratory
14. Melinda Phan, green tech engineer
15. Molly Peterson, PG&E
16. Preethi Prabhakara-Shah, Lawrence Berkeley National Laboratory
17. Reem Al Makki, CityHealth Urgent Care
18. Shaunti Luce, Clif Bar
19. Shweta Kondvilkar, Juniper Networks
20. Steffany Aguilar, consulting geologist

"I really like and value the interactions I have with the girls. I'm constantly amazed at their level of knowledge in the different areas, regardless of grade or age. I often find myself thinking back on my own childhood and the lack of exposure I had to any STEM outside of required classes, let alone to women in science. I think it's really good for the girls to interact with women in all different types and stages of STEM careers. The benefits to the girls participating in this program will have long lasting effects on everyone involved." Shaunti Luce, Clif Bar.



Near Peer Mentor Program

As part of the SAfG Program we also bring girls and boys from middle schools and high schools to serve as “Near Peer Mentors” in the classes with our K-6th grade SAfG girls. This program provides a younger role model for the girls, as well as opportunities for the Near Peer to sustain their interest in STEM and develop leadership skills. During the 2020-2021 school year we had **14 Near Peers volunteering for over 300 total hours!**

“SAfG is an awesome program for girls interested in STEM. I'm so glad I got the opportunity to volunteer with them! I loved working with the kids and assisting them with coding, building their robots and even doing origami! While volunteering with SAfG, I was able to practice my effective communication and leadership skills. SAfG is a wonderful community and I'm so glad I got to be a part of it!”

Ava Dioli, High School Sophomore

“Sharing my passion for computer science and robotics was an extremely valuable experience, and it was incredibly fun to work with each and every one of the kids!”

Vatsala Nagarur, High School Junior

SAfG Program Evaluation Results 2020-2021

SAfG has three main goals:

- On an individual level: positively change the children's attitudes towards STEM and STEM identity.
- On a programmatic level: engage the girls with a robust program that appeals especially to girls, especially Black Americans and Latinx peoples in the areas that we serve.
- On a community level: engage with the families and educate them on the importance of early STEM education by sharing handouts or emails summarizing each class with photos of their children in action.





SAfG's philosophy is to equip each girl with the following behaviors and skills, so that by the time she graduates at 5th/6th grade she is prepared to stay engaged in STEM for the long-term. An SAfG program graduate will exhibit the following:

Behaviors/Attitudes

- She makes mistakes and understands it is okay and sees mistakes as an opportunity for growth
- She is persistent and determined to carry through a project
- She knows how to work within a group of people of different skills and personalities
- She is assertive and knows how to propose her ideas as well as listens to other people's ideas
- She knows that STEM is for women, too. She believes she can be a scientist or engineer.
- She has a parent who understands the importance of STEM and who knows how to access resources to support STEM learning

Technical Skills

- She is adept at using basic tools (screwdriver, drill, etc.)
- She knows how to present findings

SAfG returned to using the Partnerships in Education and Resilience Institute - PEAR (affiliated with Harvard Medical School) self-report survey for students called the Common Instrument Suite (CIS). This survey aligns well with the data SAfG aims to collect: STEM-related attitudes, STEM Identity and Social-Emotional/21st century skills that are highly correlated with achievement and interest in STEM including perseverance, critical thinking, and relationships with peers and adults. With assistance from the PEAR Survey researchers, we evaluated how we could best employ the PEAR survey this year virtually. According to the PEAR Institute, SAfG was one of the very first adopters of virtual CIS surveys.

Virtual Programming Evaluation 2020-2021

SAfG used two different types of evaluation tools for the families and girls who attended our virtual afterschool programs this year: 1) Our longstanding SAfG program experience surveys for girls, families and site coordinators; 2) The short version of the CIS survey to better understand girls' experiences, thoughts, and feelings about STEM in general.

SAfG served a total of 315 girls in the school year 2020/2021. Enrollment was lower than expected due to COVID and the challenges facing families, not only participating in after-school programming, but also programming during the academic day at the schools we served. All of our sites reported having much difficulty enrolling and keeping children in their afterschool programs.

June 2021





Absenteeism and young learners’ inability to log into virtual school sessions without adult support have been widely reported as obstacles to public education this past school year throughout California. According to data from School Innovations and Achievement (SIA), chronic absence rates in public schools increased by 39% from March 2020 to March 2021 across 18 counties in California. We were especially thankful to be able to compensate for the disruption in education during this year by offering STEM classes to our girls.

2020-2021 CIS Results for Girls:

SAfG staff had to learn quickly how to best administer the PEAR CIS surveys in a virtual setting without guidance, as we were among the first US organizations to virtually administer the CIS. The PEAR Institute informed all survey taking organizations that “data collected during this time may look different and scores may be lower or higher than what programs are accustomed to. Recognizing that scores may be atypical, we will be sure to highlight this when reviewing/reporting findings and encourage you to do the same.”

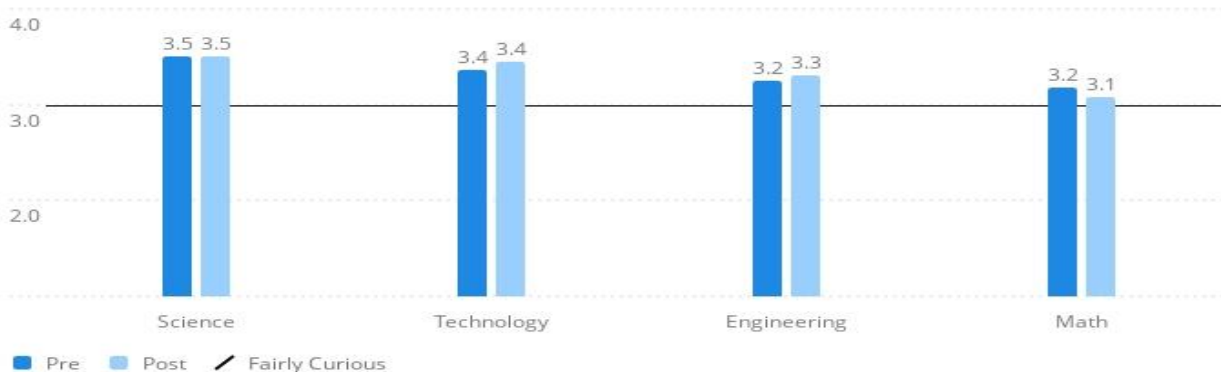
STEM-Related Attitudes and 21st-Century Skills 251 Responses



The data above on STEM-related attitudes shows that girls joined our Fall lessons with an already fairly high level of STEM engagement. Further analysis comparing engagement levels by grade could have led to interesting insights but were not available to us. We wanted to understand if our annual program would further increase the already high level of STEM engagement of our participants, but the data did not show this: the engagement level pre- and post remained the same. During this difficult year, it is possible that our site coordinators who are the ones selecting girls for our programs may have chosen to select mostly girls who were already quite “bought into STEM.”

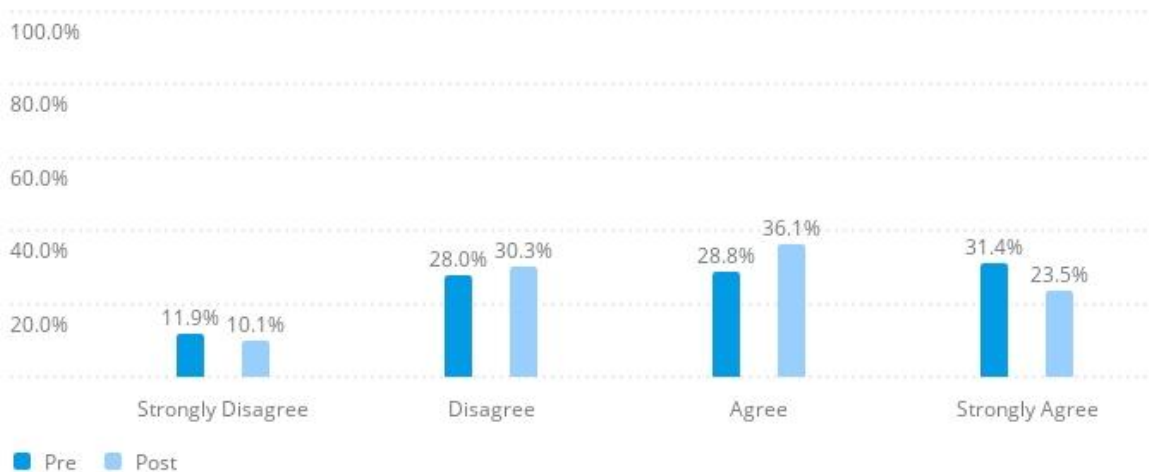
Since this year’s curriculum focussed on engineering and technology, it was interesting to analyze differences in girls’ curiosity for these two topics pre- and post and to also compare them to curiosity levels around math and science which were not taught nearly as extensively. The data below show that interest levels stayed mostly high with a slight uptick in curiosity for engineering and technology, and a slight downward trend for math.

Average Youth Curiosity Toward STEM Domains 244 Responses



We were further interested in understanding how our programs may change the girls' thinking about a future profession in STEM. At first glance, the below data set seems to challenge the notion that our program gets girls excited about a future STEM career. However, when combining the two positive and two negative responses and comparing them in the pre- and post survey, they end up being more or less identical, meaning that our program didn't change girls' mind about their future aspirations. This is an area where we will want to set new goals for our programming next year. It will be an important challenge for us to find out how important it actually is to our girls to think about their future professions. SAfG teachers will be more deliberate about engaging girls in their future career dreams and hopes and help them discover the key professions for the next school year: chemists, engineers, and environmental scientists.

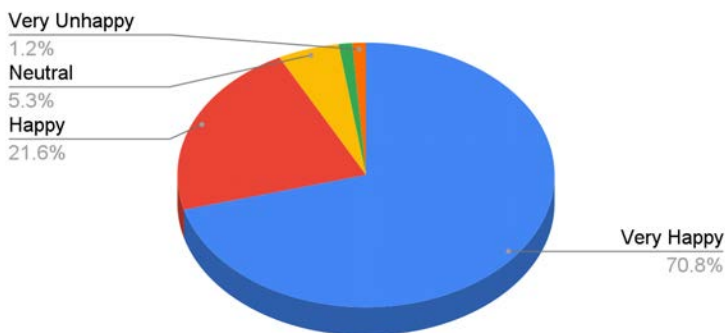
Youth Responses to "I want a STEM job in the future" 237 Responses



2020-2021 Outcomes: SAfG Surveys of Girls

SAfG has been conducting program experience surveys since 2015, and satisfaction levels have been 77% and higher overall. The chart below represents the sum of participants' level of satisfaction about the virtual Fall and Winter sessions with a total of 290 responses on a Likert Scale from 1 (very unhappy) to 5 (very happy). **Ninety-three percent felt either happy or very happy about their experience.** Reasons for girls to feel unhappy or very unhappy (four percent total) were related to not liking technology or engineering. An analysis of satisfaction differences between younger girls (1st grade to 3rd grade) and older girls (4th grade to 6th grade) showed no significant differences. We were positively surprised by our attendees' high levels of satisfaction, given the more difficult learning environment.

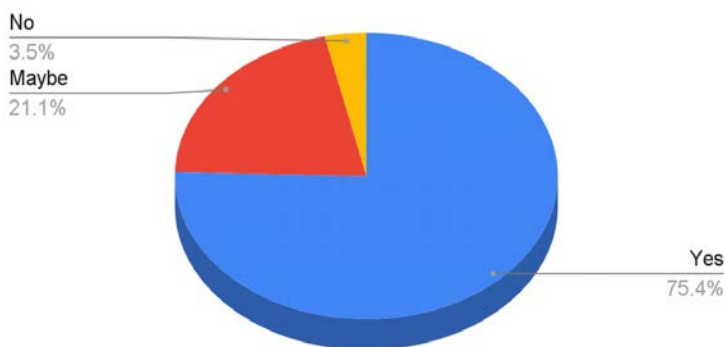
How happy are you with the SAfG lessons?



The data in the pie chart (*shown right*) shows the interest level of the girls in additional virtual science lessons at the end of the winter program 2021.

Seventy-five percent were interested in additional sessions and twenty-one percent said "maybe". Given the fairly large sample size of responses, we feel certain that most girls experienced SAfG lessons as valuable, despite the virtual settings' drawbacks, such as increasing emotional and social isolation during the pandemic, unstable internet connections, lack of manual support when building, lost STEM kits and other challenges.

Would you like to return to another virtual SAfG program?



2020-2021 Outcomes: SAfG Surveys of the Families

SAfG administered an English and Spanish language survey at the end of each virtual session 2020/21. Of the 315 participating girls and their families, we received a total of 187 individual surveys from the families. The chart shown on the right shows the result on a Likert scale from 1 (very uncomfortable) to 5 (very

comfortable). **Ninety-six percent felt that their daughter felt either very comfortable or comfortable in SAfG classes.** This response on the perceived comfort level of the respondents' daughters represents a significant improvement over last years' responses in our in-person classes.

Eighty-three percent of respondents stated that their daughters were either very interested or interested in technology and engineering, and only 2% felt their daughters were not very interested (data not shown). This outcome is very consistent with the responses of site-coordinators on their girls' perceived interest levels (data not shown).

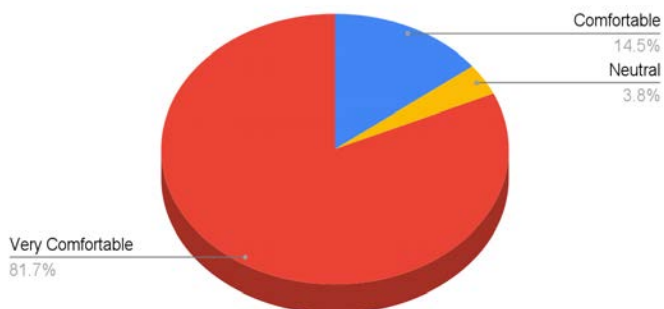
Teachers sent descriptions of each week's project ahead of the lesson that included conversation questions and regularly texted families to remind them of lesson start times or to follow up on a concern or question. The teachers also connected with families at the end of the year to comment on girls' strengths and areas of growth. The chart to the right reflects the level of family engagement and interest in STEM throughout the year: **Seventy-six percent of responding families talked either often or very often to their girls about our lessons** and only 1% did not discuss them at all. **Seventy percent of families reported they always read our weekly emails,** and seventeen percent sometimes read them (data not shown).

Overall, **94% of families felt that SAfG's STEM program was a success** for their daughters. Three percent expressed that in-person instruction was better, and another three percent didn't feel the program was successful for them or met their expectations (data shown below).

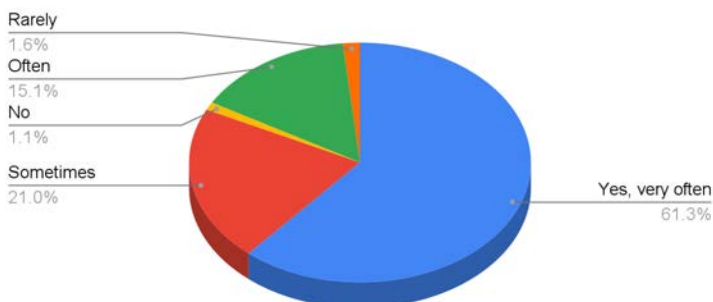
Ninety percent of families stated that their daughters would like to continue with our program and **ninety-four percent would recommend** the program to others (data not shown).

"You all did a fabulous job! I'm absolutely impressed! Your system, attention to detail, thoughtful provisions and expressive style would be an asset in any classroom. My only wish is that there was a way for your

Overall, how comfortable did your daughter feel in the class?

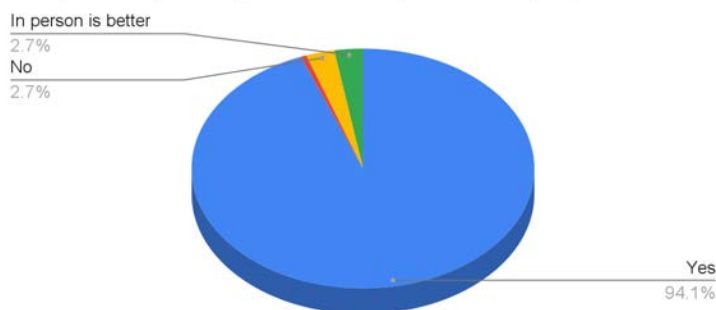


Did you and your daughter talk about the projects together she did during our class?





Do you consider the virtual STEM classes a success? Did you and your daughter experience what you were hoping for?



program to partner with our entire elementary school to bring this wonderful opportunity to all students.” Gallagher Iverson, Parent of SAfG student.

“My daughter absolutely loves her coding class. She was always so eager and excited the day that class would be that she would constantly talk about it. She enjoyed learning the basics of coding and had an overall blast in class. She absolutely loved her teacher and admires and appreciates all that she has taught her.” Carolina Lopez, Parent of SAfG student.

Virtual SAfG Family STEAM Nights

Though our Spring 2020 Family STEAM Nights (FSNs) were postponed due to the pandemic, SAfG found a new virtual rhythm in the Fall! We hosted **6 virtual Family STEAM Events** throughout the 2020-2021 school year and served over **800 individual families and 1600+ participants (many families had 2-4 members participating.)**

We were fortunate enough to partner with several incredible organizations, schools, and companies to put on our events. This school year, we worked in partnership with **Sandia National Laboratories, Chabot Space and Science Center, Stanford University, Lawrence Berkeley National Laboratory, Lawrence Hall of Science, Self-eSTEM, Community Resources for Science, and Martin Luther King Jr. Elementary** to virtually bring science activities into homes in the Bay Area and beyond. Our attendees joined us virtually from all over the Bay Area, California, Georgia, Illinois, Hawaii, New Mexico, and more!

Our 6 virtual events each had a unique theme that corresponded with the time of year:

- October, **Spooky Science** with Chabot Space and Science Center and Stanford
- Late January, **Groundhog Day** with Lawrence Berkeley National Laboratory
- February, **I Love Science** with Chabot Space and Science Center
- March, **Building the Future: Women in STEM** with Sandia National Laboratories and Stanford University
- April, **Celebrate Earth Day** with Lawrence Berkeley National Laboratory and Community Resources for Science
- May, **Learning Through Nature** with the Lawrence Hall of Science and Self-eSTEM

Our goal for these events was to generate excitement around STEAM subjects and to encourage families to partake in STEAM engagement at home. Our virtual events consisted of hands-on, interactive STEAM activities (made possible by the kits we distributed to the registered families), live and exciting demos, and

June 2021

www.scientificadventures.org



interesting science videos! Many of our events were made available on our [YouTube channel](#) after the live event!

For each of our events, we created kits complete with the materials required to follow along with the FSN activities at home. We made these kits available for pick-up to our SAfG and Bay Area families. For registrants who were not local, or who could not pick up their kit, we provided a list of materials for them to prepare at home so they could follow along with us.

Each event was staffed by SAfG Teachers along with staff and volunteers from our partner organizations. For our April event, rather than holding a Family STEAM *Night* open to the public, we organized a daytime event for the students and families of MLK Jr Elementary. We partnered with Community Resources for Science and Lawrence Berkeley National Laboratory to bring two hands-on science activities to the students during their regular school day. During the event, our team of **18 staff and volunteers visited 17 Zoom classrooms** and worked with approximately 200 students!



During our evening FSNs, which were presented as Zoom webinars, we were able to collect survey responses from some of the families who attended. The following data represents over 300 families who responded.

- After our first Virtual FSN, **77% of attendees reported that it was their first virtual science event ever!**
- Overall, **91% agreed that attending the FSN made them like science even more!**
- Overall, **95% of respondents would recommend** our Family STEAM Events to others.
- Overall, **91% reported that their family would be interested in attending another virtual FSN.** Only 0.3% expressed that they would not be interested in attending.

When asked what they liked about our **Learning Through Nature** Virtual Family STEAM Night, our families responded:

“Everything! My daughter loved seeing the chinchilla, and had fun doing both of the art projects.”



"It's super interesting to learn about nature from a kid's point of view. I loved that there was an art project as a hands-on activity. My daughter was super excited to see [her SAfG teacher]."

"I enjoyed it because all the teachers were VERY nice and helpful! My daughter loved it!"

The feedback that we receive through our surveys provides us with invaluable data for understanding each of our registrants individualized interests and needs. We can use this information to more carefully target the work we do, so that we engage as many students and their families as possible.

Our Virtual Family STEAM Nights were such a wonderful success during the 2020-21 school year that we are looking forward to offering more virtual events in the 2021-22 school year. The virtual setting allows us to reach more families—not just from the East Bay, but from all over the country. In the upcoming school year, we are happy to announce that we will be partnering with **Sandia National Laboratories to offer 8 virtual Family STEAM Nights** from October 2021 to June 2022.

SAfG Summer Programming

This summer, SAfG's Summer Programming is reflective of the transitional time that the country is in with regard to COVID-19. We offered two virtual, remote camps to our students while also offering COVID-cautious, in-person programming at **five East Bay elementary schools**.

Our virtual camps were offered at a sliding-scale price, depending on household income, and met once a week for four weeks. *Little Kitchen Chemists*, offered to our 1st-3rd grade students, guides the kids through chemistry experiments with simple-to-find household materials. For our 4th-6th grade students, we offered a class called *Electrifying Circuits*. In this virtual class, the students are building simple and safe circuits using the supply kits we provided them.

For in-person Summer programming, SAfG is working with Esperanza Elementary (Oakland), Stege Elementary (Richmond), Washington Elementary, Sylvia Mendez Elementary and Rosa Parks Elementary (Berkeley). Through these programs, we bring hands-on engineering activities to the students at each school site, regardless of their gender. While our school-year programming focuses on empowering young girls to gain confidence and interest in STEM subjects, we open our summer programming up to children of any gender. Over the course of 5 weeks, SAfG teachers have reached approximately **280 students** across these





sites. These in-person classes are being conducted in accordance with district guidelines for COVID-19 safety (masked teachers and students, social distancing precautions, limited class sizes, and daily teacher health checks). Our Summer programming has given us an opportunity to look ahead at what our Fall programming might be like. As we look forward to the eventual return to in-person learning for all Bay Area children, SAfG is excited to safely meet with our students again!

SAfG Learning Journey: Diversity, Equity, and Inclusion

In January of 2021, SAfG staff embarked on an intensive, 5-month learning journey in Diversity, Equity, and Inclusion (DEI) to deepen their commitment to social and racial justice, to further SAfG's mission of changing the face of science and to bring culturally responsive practices to our classrooms and family events. This journey lasted through May 2021, and is expected to be continued in the following school year. A key to culturally responsive practice is self-reflection and a willingness to acknowledge what we don't know about another person's or community's languages, values, customs, local history, ways of knowing, and ways of communicating. Initially, staff worked with two seasoned outside facilitators* and engaged in self-reflection, journaling and group discussions on the meaning and impact of intersectionality, diversity from the inside-out and growing through mistakes. This first step in acknowledging our shared humanity, along with our differences across race, gender, language, religion, geography, and nationality created enough safe space and trust to openly explore how we can relate to one another and how each teacher could reach their students in a more intentional way.



During these DEI meetings, staff connected the content back to situations in the classroom, to the teacher-student and teacher-family relationships. Through this process, each staff gained a strong sense of increased mutual trust and a growing understanding and appreciation of each other's differences and similarities. This progress in trust building allowed us to enter the second phase without a facilitator where staff explored and discussed topics of gender and generation, perceptions of private and public matters as well as interracial friendship. For each meeting, one staff member volunteered to be the facilitator and at the last meeting, the facilitating staff member even provided the resources used during the last DEI meeting. This progression represents a substantial step forward in SAfG's organizational development: we started out as reliant on outside facilitators and progressed to holding the DEI meetings independently, which shows that the DEI journey practice has been firmly established within our organization. The need for continuing this work remains high, as societal change towards interracial peace and appreciation is going very slowly, and at times is going backwards.

*Tatyana Fertelmeyer, Principal of Connecting Differences, LLC in Chicago, IL and

June 2021

www.scientificadventures.org



*Dr. Sherri D. Tapp, CEO of Cultural Communications Consulting and Professor of Education, Oral Roberts University, Oklahoma, NE.

SAfG Partnerships

As a guiding principle, SAfG seeks opportunities for significant shared value creation through strategic partnerships with community STEM organizations and STEM corporations which prioritize embedding corporate social responsibility in their business models. We want to support all organizations working towards the goal of engaging more girls and boys and families in STEM. SAfG currently collaborates with, partners with, shares costs, receives funding from or supports the following organizations:

Type of Partnership	Who
Cost Share with SAfG	<ul style="list-style-type: none"> • Bay Area Community Resources
Funders for 2020-2021	<ul style="list-style-type: none"> • Nancy P and Richard K Robbins Family Foundation and Wareham Development • Warriors Community Foundation • Ross Stores • Corning • Grifols • Wells Fargo • Richmond City ECIA Grant • Kaiser • Pixar • Lockheed Martin • Lawrence Berkeley National Laboratory • Clif Bar • American Eagle Outfitters • West Contra Costa Unified School District • Berkeley Unified School District • Matson • Port of Oakland
Volunteers, Role Models, Teaching Assistants and Near Peers assisting in SAfG classes	<ul style="list-style-type: none"> • 20+ Bay Area Companies (Lockheed Martin, PG&E, Clif Bar, LBNL, Integral Group, Sound Agriculture, etc.) • Cal STATE East Bay Community Service Learning • Institute for STEM Education at Cal State University East Bay • Bishop O'Dowd High School and Bay Area High Schools • Boundless Brilliance
Community Partners offering Shared Programming	<ul style="list-style-type: none"> • Chabot Space and Science Center • Lawrence Hall of Science • Lawrence Berkeley National Laboratory • Stanford University X-Labs • Community Resources for Science • Sandia Laboratories • Self-eSTEM • Yes Nature to Neighborhoods
School District Partners	<ul style="list-style-type: none"> • Oakland Unified School District • West Contra Costa Unified School District • Emery Unified School District



	<ul style="list-style-type: none"> • Berkeley Unified School District
STEM Committee Participation	<ul style="list-style-type: none"> • East Bay STEM Network • Bay Area STEM Ecosystem • Alignment Bay Area
Organization Memberships	<ul style="list-style-type: none"> • Alliance for Girls • National Girls Collaborative • National Afterschool Association • East Bay Economic Development Alliance

SAfG Highlight #1: The Espinoza Family: Family STEAM Night Stars!

The day after SAfG’s *Learning Through Nature* Family STEAM Night, Mrs. Espinoza called to express her gratitude for the SAfG Virtual FSN Program. She explained that during this very challenging year, the Family STEAM Nights have been an opportunity for her whole family to come together, have fun, and try new things. Mrs. Espinoza told us that the FSNs were a welcome change from their normal quarantine routine and that each member of the family—her 4th grade child, 8th grade child, and spouse—enjoyed the activities!

This year, the Espinozas attended three out of our five FSNs that were open to the public. Their first FSN was our Groundhog Day event in late January. Mrs. Espinoza and her husband liked that the events gave them an “opportunity to watch and learn along with the kids.” They even did some of the activities with them.

Neither of the Espinoza kids are involved in SAfG’s after school programs, but the family learned about our Family STEAM Nights through the METAS program—a free program that helps to prepare students of all ages in the Contra Costa County area for their eventual entry into higher education.

The Espinoza kids say they like *everything* about science, but they truly enjoy the hands-on projects which are a part of the science learning. When asked about their favorite subjects, they replied: “Science, Math, History, and we like Coding!” They also said that they really liked watching their parents learn with them during the FSNs.

We appreciate that the FSNs were fun and engaging for both of the Espinoza students, despite their age difference. Our goal is to make our events exciting for a wide audience. We were also very excited to learn about the Espinoza kids’ goals for their futures. One of them is hoping to be a lawyer someday or to “work in some sort of engineering job” and the other would like to go into Business Management for sports or broadcasting. Whatever they choose, their futures are looking bright!

We couldn’t be happier to learn that our FSNs had a positive impact on the Espinoza family. We are glad that they are a part of the SAfG Community now and hope to see them at our 2021-2022 FSNs starting in October.

SAfG Highlight #2: Super Student Isarivi Gomez!

Meet Isarivi Gomez, one of our brilliant SAfG students. Isarivi, or Eevee for short, who is heading into 3rd grade next school year. Prior to the 2020-2021 school year, Eevee had not taken a SAfG class. She adapted to remote learning wonderfully, and says her school year “was the best!” Eevee says that this year “it felt like I was in school except I was sitting on my couch.” She brought enthusiastic and excited energy to the virtual classroom every week, and had stellar attendance throughout the Creative Engineering, Let’s Code, and Robotics Unplugged sessions.

When asked what she likes about science, Eevee replied: “I like that it is teaching me cool things—new things that are interesting to me.” Eevee appreciated that SAfG classes offered fun, new things every week. She shared: “I liked that everything wasn’t just the same. There were different projects to do.” Many of Eevee’s classmates felt similarly. The students often said that their favorite part of class was that there was always something new to learn and explore.

Eevee clearly has a bright future ahead of her. When asked about what she might want to do when she gets older, she says “*I would like to be a dentist, a veterinarian, doctor, or police.*” We are glad to hear that Eevee has wide interests and is drawn towards some awesome STEM fields! For Eevee, her favorite SAfG class was Robotics Unplugged. The Spinning ArtBot was her favorite project because it was “*really cool and fun.*”



Isarivi’s mother, Carolina, says that Eevee thoroughly enjoyed her time in SAfG classes. According to Carolina: “She would constantly be excited for her next class.” She also let us know that she has seen Eevee’s interest in science increase. Carolina explains: “*She learned so much during the program[...] She completely loves science and all the different projects that were shown to her during her time.*”

Eevee’s science excitement wasn’t just limited to the class Zooms. Carolina shares: “*She would constantly talk about what she learned in class that week and overall throughout the program.*” We were delighted to hear that Eevee shared her science enthusiasm with her family members. At SAfG, we encourage our students to share their school experiences at home, and we know how valuable it is for students to be able to connect with family about their passions. Eevee took full advantage of the remote learning experience and even brought her younger sister to class occasionally so that she could enjoy the STEM fun, too!



Eevee is an amazing STEM student. We were glad to have her bright, positive energy in class this year. It brings us great joy to know that she enjoyed the program and deepened her passion for learning and science. Carolina says, *"I could not have asked for a better program for her."*

Community Outreach and Care: Going the Extra Mile in a Challenging Time

The pandemic was hard on everyone, and we felt deeper gratitude than ever for our students, families, volunteers, and partners for continuing to invest their time, energy, and resources into our program and mission. We felt that it was important to find ways to support each other, connect as a community, and celebrate our achievements during a very isolating and challenging time.

During our school year, **we sent weekly emails to our families** to let them know what their student could expect in class that week, how they could prepare their workspace, and what time to meet in the Zoom. When students were absent, teachers went the extra mile and sent a check-in text message to parents and caregivers to give a reminder about the class time and which link to use to enter. SAfG teachers provided **1000+ calls and texts to parents and caregivers** throughout the school year to provide support. We know that distance learning has been incredibly difficult for many families, and we appreciate the effort put in by our families to manage their child's daily Zoom schedules, troubleshoot tricky internet and tech issues, and help prepare their student's workspace. At the end of our Fall Creative Engineering program, our **teachers reached out to the families we served to give praise and compliments to their students**, and to give thanks for helping their children to log in to our virtual classes each week.



At the end of the school year, **we sent out personalized digital certificates to students** who continued learning with us throughout their school year. We felt that the students and families deserved something to represent the dedication and enthusiasm that they put into their STEM education over the year.

Thank you to our Funders, Partners and Supporters!

In conclusion, SAfG's goal is to engage children, especially girls, for the long term in STEM. We are very proud of our work this past year. Even in the virtual setting, we engaged children in the East Bay Area in STEM by introducing concepts through hands-on activities that motivated them to take risks, learn how to talk about STEM, problem solve and collaborate, learn it is ok to make mistakes and overall promoted a joy of discovery, which is important for all future scientists! SAfG continues to grow each year and reach more girls and boys in the East Bay. In 2021-2022 we will be back in-person at our schools. We will be continuing our partnerships and adding new ones this coming year to increase our impact. We want to thank all of our wonderful, generous funders and supporters for making SAfG a success!