

***FIRST* Impact Award - Team 4146**

2024 - Team 4146
Team Number
4146
Team Nickname
Sabercats
Team Location
Scottsdale, AZ - USA
Describe the impact of the <i>FIRST</i> program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in <i>FIRST</i> programs as mentors/sponsors.
In the past 3 years, all seniors have graduated and chosen to pursue STEM majors at a 4-year university. Sabercats are trained with skills that allow them to intern for STEM companies, such as Axon and Luminosity Labs. With the expertise learned at these internships and in college, many of our alums have decided to return to FIRST as mentors. Notably, 2022 alum Natalie Foster has continued working with the FIRST community by coaching the Navajo RoboBUFFs FLL team.
Describe your community along with how your team addresses its unique opportunities and circumstances.
~25% of Saguaro HS students are on the Free and Reduced-Price Program. Sabercat Robotics lowers financial barriers by not charging dues, travel fees, or team merchandise, ensuring that interest in STEM is the only factor in robotics participation. Our business team works diligently to secure sponsorships and grants, along with promoting Arizona Tax Credit donations, to ensure that the program stays free for years to come.
Describe the team's methods, with emphasis on the past 3 years, for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?
Sabercats use social media and news outlets to spread our work and values. 4146 has increased engagement from ~120 views to ~550 per video. To expand our audience, we have taken a more humorous approach through Instagram reels. Our team and its initiatives have been featured in the SUSD Source, The Scottsdale Progress, ASU Full Circle, KJZZ, and more, reaching over 100,000 people. We measure success by community interest; if the news is interested, so are the people.
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
Through the Sabercat-run Scottsdale FLL Qualifier, 57 volunteers demonstrated Gracious Professionalism and cooperation to ~300 students and parents. Noticing the outdated FLL match

software, a Sabercat rewrote the program which had not been updated in 4 years. They made the updated software public to make future events more effective.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

In the past 3 years, we have started 2 FLL teams at Mohave Middle School and Kiva Elementary School. In total, we have mentored 6 and assisted 3 FLL teams, 3 of which are from Title I schools. Through FLL mentoring, we teach students hard skills and core values, as they learn to incorporate each others' ideas and face competition with determination and a smile. At FRC regional competitions, we assisted 5 teams and hosted FutureShock (a Chinese Taipei team) at our Innovation Center.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

Through our flagship youth initiative Sisters in STEM, Sabercat volunteers lead engaging STEM experiments and activities. In 2021, we started the SiS Roadshow by hosting a STEM Celebration at Navajo. From 2022 to 2023, the number of participants more than doubled (~510/year to ~1370/year). In 2023 we attended 6 roadshow events, the most attended in SiS history, some of them specialized cybersecurity readings, keeping students safe online.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

Through our collaboration with Luminosity Labs, Sabercat Robotics has machined 8 parts for classified projects, and many employees mentor our team. Their expertise provides valuable insight and our machinery can increase their efficiency. They also provided internships for many of our team members each year. We also work with ASU to provide resources for 4 FLL teams to help young people become involved with STEM.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

In the past 3 years, the percentage of minorities in STEM has increased by 31%. This year, our team leads consist of 72% minorities in STEM. Our positive, welcoming environment, both inside our shop and at competitions, encouraged members of our school to join. Having a member of another team become a Sabercat after feeling underrepresented on a different FRC team, we extended our team enrollment outside of Saguaro.

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

By having 7 sophomores and juniors in leadership positions, we ensure that our team remains organized for future years. We create educational resources on code practices, design intent, tool usage, etc., and update them for later reuse. Our initiative boards include a variety of classes. This year, SiS expanded their leadership from 2 to 6, with 3 being underclassmen. We keep an organized Google Drive which includes resources for experiments and past events to teach incoming leadership.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the

past 3 years

Our team is grateful to have support from 9 sponsors, sending thank you letters and care packages signed by all team members. During competition season, Sabercat Robotics sends weekly newsletters talking about what was done during the week, complete with progress updates and team-bonding pictures for social media and sponsors. This year, we improved our website design to allow possible sponsors easy access to communication with us and demonstrate our professionalism.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

4146 is a jack of all trades, master of none. This season, our team aims to become more focused to excel in one or two areas, instead of being just adequate across the board. To do this we have reorganized our priorities, directing energy to specific aspects of design and business. We have also shifted the way we train students, having them work alongside upperclassmen, not just learning from online programs, to see how decisions are made for the better of the team.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

Sabercat Robotics' motto is to "inspire and encourage a lifetime of curiosity." This year, we launched Melody Makers, an initiative aimed at teaching STEM and music concepts at Title I elementary schools in our community. The students' enthusiasm for music blends into engineering concepts, encouraging them to explore interests in all areas of STEAM. As our volunteers share their passions with the next generation, a classroom of students lights up with bright smiles and even brighter questions.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

4146 has resulted in many other STEM clubs and achievements at Saguaro, including CyberPatriot, Ecology Club, Science Olympiad, and the Real World Design Challenge. This year, the CyberPatriot team placed 1st in their state division. We have donated both materials and tool use to both the Ecology Club and Science Olympiad. Robotics students placed 2nd nationally in the Real World Design Challenge in 2023.

Judge Feedback**Who/When****Feedback**

Mar 18, 2024
01:53:14 PM
EST

How have you seen FIRST core values impact alumni?

An area the team has an opportunity to improve.

Something that really impressed the judges.

Essay

Scientists thought the Sabercats went extinct. Luckily for us, FIRST enabled us Sabercats to evolve. This year, we began a new outreach initiative, deepened our connection with Arizona State University, doubled Sisters in STEM outreach, and expanded our FIRST Lego League mentorship program. As a team, we are devoted to inspiring others to embrace FIRST values. We aspire to create a long-lasting

impact in our community.

This year, our team began a new initiative, Melody Makers. Melody Makers travels to elementary schools with lesson plans created to inspire and educate students on the connection between music and STEM. The founders are engineers and musicians, who are dedicated to sharing their passions in both areas. Melody Makers President, Jake Weiss, says, "FIRST has taught us to think analytically, and our experiences with music have taught us to embrace creativity. Through Melody Makers, we pass these skills on, helping to inspire the next generation of problem-solvers. The smiles on students' faces serve as a testament to spreading and discovering new interests." Our volunteers' efforts combine creativity and ingenuity, as they motivate students to explore the interdisciplinary connection between STEM and the arts.

Through Melody Makers, we have distributed over 100 3D-printed recorders, demonstrated the wide array of possibilities available in STEM, and encouraged creative problem-solving. Through their lessons, Sabercats guide elementary students through industry-standard CAD tools, culminating in designing their own pet rocks (forming their own pet rock rock band). Our members instill FIRST values—discovering new skills, spreading curiosity, and collaborating to solve problems—as they interact with students. Since October 2023, we have presented to 120 students at two Title I Schools over three visits.

Melody Maker's leadership includes a variety of dedicated Sabercats, from freshmen to seniors, so that we can ensure Melody Maker's legacy and train its next generation of leaders. Additionally, we have cultivated relationships with teachers and school administration to ensure the quality of the project long after the founding group is gone. As we expand our lessons to new topics—including AI, building synthesizers, and acoustics—we will strengthen our existing relationships and spread the FIRST message to a wider audience.

We keep our tradition of promoting equality in STEM alive through our first and largest educational initiative, Sisters in STEM. From extracting strawberry DNA with at-home ingredients to creating centripetal force with just an office chair, SiS allows young minds to explore all areas of STEM. SiS was created to equip young girls with the skills necessary to pursue STEM careers, demonstrating their capability to excel in traditionally male-dominated fields. Our dedication to growth has nearly tripled the number of attendees from 2021 to 2024, marking 100% growth year to year—not quite as fast as bacteria, but we're still proud.

This year, SiS was invited to the Barrett-Jackson & SciTech STEM Fest. Barrett-Jackson sees over 125,000 attendees per day; our booth saw over 520. Not only did we introduce kids to new scientific concepts, but we also struck a chord with multiple parents who shared the experiences of their daughters in STEM. To them, our work is a mark of progress.

SiS was also invited to The Ultimate Playdate, hosted by the Scottsdale Public Library, which saw 3000 attendees. There, Sabercats taught elementary school students about chemistry through a new titration experiment using only lemon juice and turmeric—prompting great reactions from the kids (wink wink). We introduced many new experiments this year, like Tunes Tubes, built from spare PVC pipe and wood, adding an interactive musical element to our program. They were constructed by new Sabercats to introduce them to our machine shop. Our homemade approach to STEM experiments allows young minds to realize that STEM can be found everywhere, encouraging them to explore STEM resources in their community and in their schools.

Sisters in STEM also found a niche in cybersecurity lessons. When one of our SiS founders wrote a children's book about how to be cyber-safe, we decided to take the book and its lessons on the road. We read to eight classes of 3rd through 5th graders at two schools, as well as a local Girl Scout Troop. This initiative sparked the creation of our experiment teaching the creation and decoding of shift ciphers—these playground spies just leveled up a notch.

SiS was invited back to local elementary schools' STEM nights to spread our passion for STEM education and the FIRST Core Values—which are STEAM-rolled into Sabercat pride (nudge nudge). Over the past two years, we have attended five STEM nights at Navajo, Hopi, and Tavan Elementary, with a total of 500 people reached. The Sisters in STEM President, Delia Riley, says, "The most touching part of our work, to me, is having parents and students come up to us at Roadshow events and say 'We went to your big event and it was the best!' or talk about how they still have stuff from old experiments, you know you have really made a difference."

In addition to our in-house educational initiatives, our team actively cultivates partnerships with ASU. Many Sabercat alumni currently attend ASU and work at The Luminosity Lab, giving us access to incredible resources and opportunities. We serve as a bridge between ASU and FLL teams, who generously donated FLL kits and game tables to five of our teams in need of parts. We also have the opportunity to machine parts for projects at Luminosity, one of which is classified—but we're pretty sure it's cool. This relationship allows the Sabercats to have an impact on real-world engineering.

In 2021, the Sabercats revived a middle school team that unfortunately dissolved during the pandemic: the Mohave Wildcats. The following year, we revived another team, the Kiva Cougars. In total, the Sabercats mentor six teams and assist three others. We have accumulated 156 volunteer hours for these teams, out of a total of 1061 STEM-related volunteer hours (over 44 days—that's 14 trips to the moon!) this school year, at the time of writing. Our team is beyond grateful for the partnerships we have kindled with the nine teams, and we hope to create many more!

In the beginning of December, Sabercat Robotics ran the 10th Annual Scottsdale FLL Qualifier. Twelve teams attended, five of whom we mentored. Nikhil Sethi, a Sabercat senior and the FLL Student Tournament Director commented, "It was a wonderful experience to host and organize the FLL Qualifier. We hope that we can push these students forth in their FIRST journey and jumpstart their development into the creative engineers of the future." To make this event possible, 57 members of our Sabercat community, including nine alumni, came together to volunteer. Many of our current Sabercat team members worked together to learn new software, plan out the event, and manage volunteers. Our Student Event Director took a great lead in making sure all the buildings and volunteers were set for the day without much assistance from mentors. The event had over 300 participants and over 100 spectators, even attracting the mayor! Running and hosting this event strengthened our bonds with the FLL teams, allowing us to improve our communication and gracious professionalism skills. Marking the end of our busy season with FLL, the Sabercats hosted workshops and kickoff for the 2024 FRC season. Sabercats love this two-year tradition and the opportunity to meet high school competitors from Flagstaff to Mesa, connecting the Sabercats to the larger AZ FIRST community. Three of our team members prepared and presented workshops on programming and design. Many of our students also volunteered to ensure that the kickoff and the workshops ran smoothly.

The Sabercats are beyond proud of our growth over the past three years. The impact we have made this

past year is a testament to our commitment to outreach and fostering a passion for STEM within our community. From creating new educational initiatives like Melody Makers, where music and STEM intersect, to the remarkable growth of Sisters in STEM, our largest educational program, we have reached new heights. As we revived FLL teams at Mohave and Kiva schools and hosted the 10th Annual Scottsdale FLL Qualifier, we showcased our dedication to mentoring and community engagement. We look forward to building upon these foundations for seasons to come, so the Sabercats live on! ;

