

FIRST Impact Award - Team 6413

2023 - Team 6413
Team Number
6413
Team Nickname
Degrees of Freedom
Team Location
Chandler, 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.
Many DoF students will be the first in their family to graduate high school, & DoF is proud to have a 100% graduation rate. Our alumni attending college for STEM degrees said that DoF gave them “hands-on technical experience before starting a STEM degree.” Alumni stay involved in FIRST by volunteering at competitions & mentoring our sibling FTC teams. One alumna, our 2019 Team Captain, mentors our sibling FTC teams, 18312 & 18445, as a way to give back to FIRST & DoF.
Describe your community along with how your team addresses its unique opportunities and circumstances.
Currently, in our community, 16,000+ students from 13 schools in a ten-mile radius do not have access to school STEM activities. We partner with local schools to provide opportunities for these students. DoF recognizes the diversity of our community & minimizes language barriers by welcoming multilingual & non-native English-speaking members who speak Spanish, Hindi, Gujarati, & Tamil, in addition to English. This also allows our team to assist non-English speaking FIRST teams.
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?
DoF uses different forms of media & outreach to spread FIRST. As a result of our community impact, local media such as FOX10 & The Arizona Republic have helped us tell our story. Our team diligently tracks our impact quantitatively through the Impact Documentation form. With social media, our students shared daily video recaps of our 2022 Championship experience, reaching 9,000+ people. Since 2019, DoF has spread the FIRST message to 244,000+ people through local news outlets & social media!
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
As a team that previously struggled as a low-resource team, we make an effort to share our resources with others. Last November, rookie FRC team 9059 wanted to compete at an off-season competition but did not have a robot to drive. DoF lent them a robot & showed them how to make it ready for competition.

We also helped them refine their image & wrote a team cheer for them. Similarly, we serve as role models for our sibling FTC teams by assisting them with imagery & their Engineering Portfolios.

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

Last May, MakersPlace in Ghana reached out to us asking for help starting an FLL program. DoF donated nine EV3 Kits & sourced four more on Chief Delphi & recruited FRC 1156, 1466, 2357, 2399, & 3735 to help MakersPlace mentor ten FLL teams they started with the kits we donated. This April we will host a virtual FLL competition for them because there are no official FLL events in Ghana. This season, DoF also visited FRC 4111 & 9091 to assist them with their technical needs.

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?

DoF works with our collegiate sister team, DesertWAVE, to adapt toys for kids with disabilities & has adapted 32 toys since 2019. Last September, we partnered with an Assistive Technology initiative, Magical Motors, to adapt 12V Jeeps. Using skills gained from FIRST, we rewired & adapted the Jeeps so that kids with cerebral palsy could drive them. After seeing the kids experience independent mobility for the first time, DoF was inspired by the impact they can make with their STEM skills.

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

We helped our parent sponsor, the Si Se Puede Foundation (SSPF), run an FLL competition in late 2022 by volunteering at the event. DoF also helped SSPF raise approximately \$180,000 in the last three years by speaking at sponsorship presentations about the impact of their support. This funding is allocated towards DoF & SSPF's STEM Center. The Center is home to DoF & the AZ FIRST Machine Shop, & DoF has helped SSPF construct a guest pit for other teams to use when visiting our space.

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

DoF emphasizes the acceptance & inclusion of everyone on the team. We encourage the sharing of pronouns by displaying them on Slack & having pronoun buttons available at competitions for fellow teams. Wearing white bows is a DoF tradition to show our commitment to supporting female engineers, & in 2022 we made Pride bows to show our support for the LGBTQIA+ community. DoF also has begun posting on social media in both Spanish & English to share our efforts with more of our community.

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

DoF is committed to cultivating a younger generation of SSPF FIRST students. This season, our prospective student orientation, led by DoF officers, recruited 38 students for the SSPF FTC & FRC teams. DoF's student leadership documents our engineering & outreach processes to serve as a resource for the team's future leaders. DoF started FTC 18312 in 2020, which now serves as a feeder team for DoF. We encourage FTC students to join FRC by partnering with them for outreach events.

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

past 3 years

DoF's reputation for serving our community helps us recruit sponsors who help support us in our mission to spread FIRST. One sponsor, GM, is committed to promoting inclusivity & we volunteer at their annual Geek Girls event to inspire Girl Scouts' involvement in STEM by giving a presentation & holding a robot demo. In 2022, we gave SSPF a copy of our Engineering Notebook, which they received enthusiastically & have used it to show potential sponsors our team's efforts!

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

DoF, while known for our community outreach, has not always been known for our robot performance. In the last few years, DoF has been determined to change that. DoF has attended eight off-season events in 2022 such as the AZ State Championship & most recently the Arizona Robotics League (ARL) off-season competition series. As a result of our efforts, DoF captained the 5th seed alliance at the 2022 AZ Valley Regional & captained multiple finalist alliances during the 2022 ARL qualifiers.

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

DoF fulfills the mission of FIRST by creating STEM opportunities for students of all backgrounds. By not requiring that students pay dues or travel fees, students are not missing STEM experiences due to financial circumstances. DoF encourages new students to be active in leadership, with six rookie officers in the last two years. 83% of our student officer board are minorities in STEM, demonstrating DoF's commitment to fulfilling FIRST's mission with the power of diversity.

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.

In the past three years, DoF dedicated 1,200+ hours to STEM & non-STEM outreach. In 2022 we ran two food drives with Matthew's Crossing Food Bank, one at Sanghi State Champs, collecting a total of 393 lbs of food. Pre-pandemic, DoF volunteered at Solterra, a local senior living center, & during the pandemic we could not volunteer there. Last February, we held a Palentine's celebration, by making care bags for the residents to re-establish a partnership with Solterra. This year we did it again!

Essay

Degrees of Freedom (DoF), instills students with the empowering beliefs that "I am enough" & "STEM is for everyone." From the moment they step through our doors, we work to create a narrative that counters societal barriers & affirms that anyone can pursue STEM. Founded in 2016, DoF promotes a culture of

inclusivity & accessibility to provide our students with more degrees of freedom to pursue their passions & achieve their goals.

In our community, 16,000+ students from 13 schools in a ten-mile radius do not have access to school-run STEM programs. According to the latest census data, 42% of Chandler, AZ residents are racial minorities. Georgetown University reports that nationally, 19% of engineers are underrepresented racial minorities & 16% of engineers identify as women. DoF proudly embraces students from all backgrounds & has long been a team primarily made up of minorities, helping inspire a community that looks like us. On our team, 78% are racial minorities & 48% identify as a gender minority in STEM.

We use our FIRST skills to help those in need. In 2020, there was a shortage of Personal Protection Equipment (PPE) for medical workers nationwide. DoF's digital presence made it easy for FRC 1108 to reach out & ask if we could help produce PPE for Oasis Pavilion Nursing & Rehabilitation Center. We also heard a neighboring Indigenous community, the Navajo Nation, needed PPE. With the help of our collegiate underwater robotics sister team, DesertWAVE (DW), we used technical skills like CAD to design ear savers & face shields. We then used a laser cutter & 3D printer to develop the parts. This allowed us to produce PPE faster & at a lower cost, making it more accessible during the PPE shortages. We produced & distributed 300+ ear savers & shields to Oasis & the Navajo Nation Department of Health, along with hand-written thank-you notes.

DoF uses robots to provide interactive demonstrations that showcase FIRST, reaching 1,300+ people through robot demos since 2018. In February 2022, we participated in a city-wide annual STEM event, the Chandler Innovation Fair. We spread the FIRST mission to 342 people with robots & adapted toys. Our enthusiasm for STEM & FIRST at the fair was recognized by the mayor, who presented us with the Passionate Award & \$500 that we put towards more outreach. Our demo at the fair was widely regarded, & we were invited back & participated in late February 2023. ICAN is an afterschool program aimed at students that come from families of low socioeconomic status. Their students receive little STEM exposure in school, so we used a Snap Circuit kit to teach 30 children basic electrical concepts. DoF then donated a Snap Circuit Kit to ICAN, ensuring they could continue to learn on their own.

DoF realizes that learning about STEM is a privilege & that people's basic needs must be met first. To combat this barrier, DoF partnered with Matthew's Crossing Food Bank to organize two food drives in 2022, raising nearly 400 lbs of food for the people of Chandler. We also ran a formal attire drive & donated the clothes to the Salvation Army. By helping people meet their material & social needs, we reduce the barriers stopping them from fully engaging in STEM opportunities.

Over the years, we have garnered a reputation for always being eager to support the FIRST community. In January 2023, FRC 3019 invited us to participate in their inaugural Valley STEM Festival, where we spoke to 33 people about FIRST. In February 2023, we participated in Family Day at the Chandler Farmers Market to engage children in our community who may not encounter STEM regularly. We partnered with our sibling FTC Teams, 18312 & 18445, to demo our robots & talk about FIRST, reaching 204 people.

In 2018, DoF was introduced to Assistive Technology (AT) when we visited ACCEL, a school for children with disabilities. During our visit, we spoke to their occupational therapists & learned that the children did not have any adaptive or interactive pool toys when using the pool for physical therapy. Once we had gained more insight into how the team could adapt toy submarines for their kids, we made the subs with

PVC pipes & adapted the wiring in such a manner that we could place large external buttons for submarine control.

In 2019, FRC 4118 began their #FIRSTWithAT initiative. This initiative aimed to equip other FIRST teams with the skills necessary to create AT. 4118 had the opportunity to give an AT workshop at the 2022 FIRST Championship & one of our students joined their presentation to share their experience creating AT on DoF. DoF's enthusiasm for AT made us 4118's inaugural #FIRSTWithAT Ambassador. We also spoke at the AzTAP AT conference in July 2019. In 2022, DoF introduced AT to our sibling teams FTC 18445 & 18312 by adapting 12V toy Jeeps for children with cerebral palsy. Off the shelf, these toy Jeeps require a child's full range of motion to operate via foot pedal, so we added an easy-press button on the steering wheel instead. By adapting these Jeeps for children with physical disabilities, DoF provides access to affordable mobility. The Jeeps also gave these kids a chance to be more independent, increase socialization, & play like a kid.

Since 2018, DoF has devoted 2,600+ hours towards FIRST volunteering. In December 2022, we helped our parent sponsor, the Si Se Puede Foundation (SSPF), run their first FLL competition. DoF students devoted 50+ hours preparing the fields & volunteering at the event. In January 2023, DoF volunteered at the AZ FTC Red Rock State Qualifier & cheered on our sibling FTC teams that competed at the event.

DoF understands the importance of supporting other FIRST teams. Since 2021, we have shared our STEM Center's equipment & practice field with nine FIRST teams. During the off-season, DoF gave rookie FRC team 9059 our old robot so they could compete at an off-season competition. We also invited them to the STEM Center & shared imagery advice. During this build season, DoF visited rookie FRC team 9091 & taught them how to wire, build, & program their robot chassis. Later, we visited & helped FRC 4111 work out some programming issues they were facing. This season we also supported FRC 498, 1165, & 4565.

DoF's ability to assist goes beyond the United States. In 2022, we assisted teams globally via Zoom, such as FTC 20327, 19196, & 19197. In February 2022, we spoke to Mexican FTC team 20327, providing them with guidance in Spanish on ways they can stay organized, develop a social media presence, & create an Engineering Notebook. Student leadership on DoF maintains an Engineering Notebook & Impact Documentation Form, to capture processes throughout the year, as well as a way to quantitatively measure our progress. Later in 2022, we spoke to FTC 19196 & 19197 from India, & shared our experiences in FIRST with each other. In May 2022, FTC 18335 in Colombia reached out to us & wanted to learn more about DoF. We met with them virtually in September & after learning about their financial circumstances, DoF students created a pitch asking our mentors if we could donate an FTC kit to them. As a result, we were able to raise the funds to donate & deliver one.

DoF's social media has expanded greatly over the years. Because of student efforts, in the last three years, our following has nearly doubled & our content has been viewed by 70,000+ people globally! In 2022, DoF held our first Robot Reveal for 60 attendees, including family, friends, & sponsors, & live-streamed it on YouTube to 161 people. Our 2022 Robot Reveal also served as a way to recruit new members into SSPF's FTC teams.

Students are the driving force behind DoF's fundraising initiatives. DoF students have run five fundraisers at local restaurants since 2019. After qualifying for the 2022 Championship, DoF ran a web fundraising campaign to fund our travel so no student had to pay for the trip. DoF takes pride in providing

a free FIRST program, meaning that our students & mentors do not pay to participate. This campaign ensured that students who traditionally may be limited by financial constraints could attend the championship. DoF students heavily advertised the fundraiser by sending emails to sponsors, local companies, family, & friends, & sharing on our social media to help us raise \$20,000+ in two weeks!

Since 2019, DoF has consciously developed team branding & imagery, which allows DoF to uphold a known presence in our community & at outreach events. We began to improve our imagery by working with our mentor on a team cheer. "Wings Up! Hearts Out! Reach High! Degrees of Freedom!" This cheer shows our commitment to take action in our community, be compassionate towards others, & always strive to improve. An iconic part of our logo is a dove, which symbolizes peace & freedom. DoF wishes for our community to have the freedom to choose their own paths, by dismantling social barriers & exploring STEM. DoF's traditional white bows are proudly worn by our team members no matter their gender, showing our enduring commitment to supporting femininity in engineering.

Engineering is a field that thrives on diverse perspectives & creative solutions. Without a wide range of voices & experiences, we risk overlooking important solutions & limiting our potential for innovation. DoF opens up the world of STEM to people who might otherwise be left out, & gives them the tools & support they need to make a difference. Our team is committed to fostering a community where everyone is welcome & has the opportunity to succeed, regardless of their background or circumstances. In doing so, we strengthen the engineering field as we add new voices & perspectives, expanding our community's degrees of freedom.

Wings Up! Hearts Out! Reach High! Degrees of Freedom!;

