

***FIRST* Impact Award - Team 498**

2024 - Team 498
Team Number
498
Team Nickname
The Cobra Commanders
Team Location
Glendale, 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.
Cobras work alongside mentors in a safe space, learning to advocate for themselves with self-confidence and professionalism. 80% of Cobras report increased confidence after joining. 50% will be the first in their family to attend college. 100% graduate high school and 100% of current Cobras will attend college with 86% in STEM degrees. 6 team alum are 498 mentors and more volunteer at Arizona Robotics League (ARL). 3 mentors became certified teachers at Cactus High School (CHS) because of 498.
Describe your community along with how your team addresses its unique opportunities and circumstances.
We're from CHS, located in the desert metro of Phoenix, AZ. Arizona ranks 48th in education funding per student and 75% of public schools are Title I. At CHS 62% of students are low income and 19 other teams in Arizona are Title I. Being Title I offers its own unique circumstances: limited resources, diverse students, and education disparities. We remove barriers for students, provide a second family, and develop targeted resources to ensure the sustainability and retention of AZ Title I teams.
Describe the team's methods, with emphasis on the past 3 years, for spreading the <i>FIRST</i> message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?
We founded 3 classes and an internship using FTC materials and FIRST principles, providing a FIRST experience to bridge disparities in hands-on learning for low income students. After success at CHS, we expanded to Peoria HS; both hired full time robotics teachers. We recruited a mentor to teach, Cobras to TA, and new students at STEM nights. We track enrollment (552), the percent of Cobras who join 498 from classes (36%), and the percent of students who pass the CTE exam (up from 32% to 66%).
Please provide specific examples of how your team members act as role models within the <i>FIRST</i> community with emphasis on the past 3 years.
We model a balance of professionalism, competitiveness, team spirit, and care for others. We assisted 65% of current Arizona FRC teams with our Tech Support Team at events, scouting workshop, practice field, and open shop. We lead in FIRST by volunteering at competitions, setting up/tearing down the field

at 21 events in the last 2 years in CA, AZ, and TX, and training 74 new volunteers at ARL. We host our ARL Twitch show celebrating Arizona FIRST teams and history for 8,333 viewers.

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

13 of the 33 teams we assisted in the last 3 years were at Title I schools. We mentored 8 FRC teams including 3 at Title I schools: 1165, 2375, 2449, 3588, 6833, 7703, 7755, & 8745. We assist FRC teams through visible, accessible, and reliable initiatives like Duel in the Desert, the Charged Up Initiative, and our AZ FIRST Community Discord forum with 318 members. Duel is Arizona's only preseason scrimmage. Since 2023, 8 teams bought 52 batteries via our Charged Up Initiative and saved \$3,328.

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?

At K-8 outreach events, we provide interactive robotics activities and teach about direct pathways to becoming a STEM professional through Career & Technical Education (CTE) courses. In 3 years, we reached students at 18 schools. We facilitate hands-on learning opportunities in our community. For Boy Scout Troop 531 we demoed our robot, discussed STEM careers, and assisted scouts in earning robotics badges. We taught FLL curriculum to elementary students at the library which led to a new team.

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 partnered with the Diamondbacks to fund ARL in 2022. Because we connect our sponsors and other teams, we got the Diamondbacks to provide \$18,000 in funding for 9 Arizona teams attending the 2023 FIRST Championship. Together we provided outreach opportunities for 8 ARL teams at 2 MLB games: STEAM Sunday & Science of Baseball Night. BatteriesPlus became a sponsor in 2023, donating batteries to us. We wanted to share this resource with teams, so we partnered to create the Charged Up Initiative.

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

In 2022 we wrote an EDI Plan to identify and improve team practices and outreach. 55% of Cobras are low income and face obstacles like food insecurity, financial barriers, lack of transportation, and increased home responsibilities. We waive team fees, organize carpools, provide meals, and host online and evening meetings to include Cobras with obligations at home. Within FIRST, we hand out Pride and Women in STEM buttons. We do local outreach at Title I schools, demoing at 26 events in 3 years.

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

We need Money, Members, and Mentors. We cultivate diverse funding sources and maintain a Business Plan. We train Cobras with workshops, a buddy system, and offseason robots. This year we recruited and trained 14 new Cobras. We recruit mentors from ARL and our junior mentor program for alum. We recruited 12 new mentors since 2021. We wrote an Outreach Plan to ensure our initiatives align with our mission and are sustainable over time. We use Stop/Start/Continues and SWOTs to evaluate initiatives.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

We recruit sponsors who have similar missions and collaborate on initiatives. We focus on mentor employers, local companies, and grant applications. 10 mentors work for sponsors and most of our sponsors have local offices. We retain sponsors through reciprocal relationships: we demo at their events, invite sponsors to ARL, give shop tours, and deliver presentations. We feature sponsors on our shirts, website, socials, and robot. 38% of our 2023 sponsors were new and 62% were legacy sponsors.

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

We wanted to work on implementing consistent organizational practices. We improved documentation by publishing our code, creating an outreach log, keeping meeting notes, and maintaining a technical binder. We formalized manufacturing and design training, ran day-long Mock Kickoffs to prepare for the season, and held workshops to develop communication skills. We started scheduling consistent team building events like an End of the Year party, Pumpkin Carving, Friendsgiving, and PJ's & Pancakes.

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

We started, host, and run ARL, a free 6 month offseason league for FRC teams. ARL inspires teams to continue in FIRST and provides student, mentor, and volunteer training. 29 Arizona teams have joined ARL, impacting 600+ students. 92% of teams report more technical skills and collaboration, 77% improved team sustainability, and 65% built soft skills. We created the ARL All-Star Award to recognize ARL students who embody FIRST. We trained 52 student and alumni volunteers, keeping them in FIRST.

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.

While we prioritize STEM outreach, we know there are many areas of our community that we better serve through volunteering. In Summer 2023 we packed backpacks with donated school supplies at OCJ Kids, a non-profit resource center for local youth in foster care. Afterwards, OCJ Kids reached back out to ask if we could return to teach a STEM Summer Camp in 2024. We volunteer at Feed My Starving Children annually, packing food boxes for children experiencing hunger globally.

Judge Feedback

Who/When

Feedback

Mar 02,
2024
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How can we better communicate our impact through our presentation?
An area the team has an opportunity to improve.
Something that really impressed the judges.

Essay

We are fostering a reliable, inclusive Cobra family. 498 started out as a small club in a school closet and has grown into a sustainable program that is known and respected throughout our district and state. We

built a network of support in our community by demonstrating our value as a program that changes students' lives at our diverse Title I school. Today, our mission is to form and maintain reciprocal relationships with sponsors, schools, and community partners, provide assistance for FRC teams state-wide, and create robotics education opportunities for students in our community, with an emphasis on Title I schools. Our team is made up of 22 students in grades 7-12 from 6 schools across Peoria Unified School District (PUSD). We meet online and in person year-round to work toward our mission in 5 subteams, each with a student lead and specialized mentors. Through education initiatives, providing resources for FRC teams, and Arizona Robotics League, we ensure everyone has a home within the Cobra family.

As we formed a family within our team, we built a STEM family that embraces low income students throughout PUSD. Cactus High School (CHS) is a Title I school where 62% of students are low income. According to the National Math & Science Initiative, only "9% of students from low income families met ACT college-readiness benchmarks in math and science compared to 33% of students from high income families." To bridge the STEM education gap for these students, we founded an Automation & Robotics CTE Pathway using FIRST values and hands-on education. We were on the board to create the robotics state standards with the Arizona Department of Education (ADE). In 2021, we founded the Pathway at CHS with Intro to Robotics and a \$100,000 investment from PUSD to upgrade our shop and new classroom. The classes later expanded to Peoria High School, a neighboring Title I school. 552 students completed the courses in PUSD and due to our maintained relationship with the ADE, we were awarded \$160,000 in class equipment in 2023.

We created a culture of STEM appreciation within our Cactus High School family. We are featured in school events and promo materials and generate excitement about robotics with our T-Shirt cannon robot at football games. CHS donated the venue for the 2023 Arizona West Regional, Duel in the Desert, and ARL. Our principal is an advocate for FIRST and 498, promoting the team to district officials, traveling to competitions, and personally touring new students through our shop. Because of the renewed focus on STEM at CHS, 2 additional CTE Pathway programs and 4 new STEM clubs have formed. In 2022, we presented to the PUSD School Board and received a \$3,000 grant. Last year, we demoed at the District Office for administrators and the Superintendent. Within our school and district, we have changed the perceptions of Cactus High School from underperforming to "the robotics school." This year, 60% of 498 students said they came to CHS specifically for our robotics offerings.

The Cobra family extends beyond our district, with our initiatives reaching 81% of active Arizona FRC teams. We focus on assisting Arizona teams to raise the competitive floor locally, improve FIRST accessibility for Title I Schools, and because we have the experience necessary to address the needs of Arizona teams. Our visible, accessible, and reliable initiatives include the only regulation size practice field in the state, tools and equipment for teams, funding and sponsor-sharing resources, outreach opportunities, technical assistance, and an online forum for teams to communicate.

In 2017, we began hosting and running Duel in the Desert because most local teams do not have carpet, space, or field elements to test their robots effectively. Duel is a Week 0 scrimmage with a full field and Mock Inspections with an official FRC inspector. We want to ensure Arizona teams do not miss matches at events due to failed robot inspections. Since 2017 we assisted an average of 12 teams through Duel each year.

Founded in 2023 with BatteriesPlus, the Charged Up Initiative reduces team operational costs. We never

want a team to miss a second of a match due to a bad battery. Previously, many Arizona teams had few or old batteries because they did not have funds to purchase multiple new batteries each year. This is dangerous and leads to missed matches. The retail cost for a 12V battery is \$119, but we sell them for \$55 each through BatteriesPlus, saving teams \$3,328 so far. After this success, we looked for other partners to achieve similar money-saving results for Arizona teams. Locally, there is a lack of manufacturing resources available to teams. In January, we were 1 of 14 programs selected to join the inaugural #TeamFabworks, allowing us to provide a discount for sheet metal manufacturing to FRC teams.

Through Arizona Robotics League, we bring together our FIRST family. In the last 5 years, Arizona has lost an average of 10% of FRC teams annually. The high cost of FRC, lack of resources, weakened team network, and minimal on-field success has resulted in high rates of team atrophy. In 2022 we founded a league of our own to level the playing field and create a more sustainable environment for teams. ARL is a free series of offseason competitions that is entirely unique to FIRST. Teams continue to compete with their FRC season robot over 6 months at our regional-quality events that facilitate student, mentor, and volunteer training in a low stress and collaborative environment. ARL includes 5 qualifiers and a Championship from May to October, giving teams room to develop their program with fewer financial and competitive barriers as compared to a regular season. Because teams can compete with multiple robots, students explore new roles at competitions and new technical experiences throughout the offseason. A mentor from team 1165 wrote “ARL was an excellent resource for our team of mostly new students to learn how to design, build, and program a robot while giving them an idea of what a competition environment was like.” 85% of teams reported that ARL changed their approach to the offseason and many began meeting year round because of ARL. A student from 9059 wrote that “ARL helped my team because it helped us retain and teach new students with a goal they could see used in action by the end of the month.” At ARL we increased the size and quality of the local volunteer pool. With 102 ARL volunteers so far, we have trained 74 in new roles or as first-time volunteers.

Arizona Robotics League is more than a competition: it is a way to celebrate our FIRST community. We celebrate teams, students, and volunteers with awards, like the ARL Volunteer of the Year Award. The 2022 Volunteer of the Year was a first time FRC volunteer at ARL and is now an official FTA. Last year, we created the ARL All-Star Award to recognize a student at each event who embodies FIRST values as nominated by their peers. We livestream events and ARL talk shows on our Twitch Channel to get people excited about ARL and highlight Arizona teams. In 2 years we distributed \$3,200 in materials and gift cards from 15 suppliers as team giveaways at the ARL Championship.

At ARL, competitiveness and collaboration go hand in hand. The league cultivates Gracious Professionalism, where teams “compete intensely while treating each other with respect and empathy.” A student from 6479 wrote that “ARL is a great program because it not only builds up individual teams but the bond within Arizona FIRST. The community has never been more connected. Likewise, I think it will greatly help to elevate the level of competitiveness in Arizona. At our first competition this year, we were not even picked, and yet by October we were state champs. I think this improvement is owed to ARL.”

Overall, 29 of Arizona’s 44 FRC teams have joined ARL, with 65 robots competing in 2 years. In 2023 we ran our largest qualifier yet with 32 robots, a 300% increase from our first qualifier in May 2022. Of the league, Dustin Payne, Director of the Arizona Diamondbacks Foundation, said “the name of our department is Community Impact, and the word that I keep thinking about in regard to ARL is Impact. To see teams and volunteers that you assembled from all over the Valley, and the genuine buy-in from

everyone involved is amazing.” In 2 years of ARL, we have provided \$1,009,053 in match value through 382 matches at no cost to teams. In a state where almost half of teams attend only one regional, ARL stretches their dollar and season. A mentor from 6413 wrote that “it is really great that ARL gives us the opportunity to continue using our robot from the same season. A lot of time and effort goes into building it and to only have it compete a few times would be sad. ARL allows us to keep playing with it and also improving it along the way.” Before the 2023 ARL season, FRC 7755 had never won an elimination match. A student from their team wrote “competing in ARL has completely changed our lives in robotics. The team building and experience that ARL has given us is something I can say I will never forget. I greatly appreciate ARL for what it has been able to do for us and for FIRST as a whole.”

With the Cobra family, there is always room at the shop. For years, 498 has provided a safe haven for students where they know they belong. In our district, we show students that they have a place in STEM, regardless of socio-economic background. With unconditional support and care for those around us, we have made teams feel at home in FRC and created a league where teams reach their potential in FIRST. We dedicated over 9,200 hours to running ARL events in 2023 alone. The Cobra family will always answer a call, lend a tool, or assemble a field. We will always be there to help when things go wrong, and there to celebrate when things go right. With each step, we ensure the work we do today will have an impact for generations.;

