



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

TEAM 2486 The CocoNuts Present Our 2024 Impact Award Submission “We Can Do Hard Things!”

- 1. Describe the impact of the FIRST 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 FIRST programs as mentors/sponsors.**

Being a CocoNut changes lives! FIRST led Nuts to internships at JPL, TGen, NAU labs, and SASA. In the last 3 years, AlumNuts have been offered \$3+ million in scholarships to NAU, UA, ASU, Columbia, EmbryRiddle, UCSD and UNM. Our graduation/college acceptance rate is 100% compared to grad rates of 83% (CHS), 75% (AZ) and 60% (the Rez). 1/3 of AlumNuts are 1st generation college students. 95% of Nuts are in STEM fields. We have 14 Dean’s List Finalists. 1/3 of AlumNuts stay in FIRST as volunteers.

- 2. Describe your community along with how your team addresses its unique opportunities and circumstances.**

Flagstaff is a STEM City and a small university town but by contrast, only 53% of the population has a four-year degree. There is a plethora of STEM programs available, but not everyone has equal access. In schools on the adjacent Navajo Nation, there is little STEM encouragement, programs or teachers with expertise. We go the distance to develop new STEM programs in areas of high need across AZ, with emphasis on our forgotten indigenous communities. This is our home, our Family.

- 3. 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?**

We’ve been in the media 30+ times in 3 yrs. Our Junkyard Robots Challenge develops critical thinking and perseverance. We created 2 STEM fairs that cater to the special challenges of underprivileged groups. We’ve done 100+ outreach events, workshops and presentations in 3 yrs reaching over 47,000 in person. To sustain our efforts, we’ve created written instructions on STEM activities, how to recruit and retain partner organizations, and mentored apprentice Nuts to take the lead in future years.



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4. Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.

2486 is diverse, empathetic, generous, and silly. We're not perfect, but we strive to model consistency, reliability, family, approachability, and determination, to every person at every event everywhere. Our team is 45% minority and 41% female, so anyone can look at us and see a STEM role model that looks like them. Making the biggest possible impact on our community shows our parents that the sacrifices they made to give us a better future has paid off, and now we are role models for them too.

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

In FLL in a Nutshell, Nuts teach coaches the basics of starting, running, and sustaining successful teams and how to build and program bots. NAU and FUSD provide stipends and PD hours for participating. Nutshell started 21 teams in the last 3 yrs. Nuts virtually and in person mentor 16 local teams. We presented 5 workshops at FTC kickoff and 3 at FRC kickoff on outreach, programming, and more. Our CocoNut Registration Grant has sponsored 19 FTC teams for a total of \$2700 in the last 3 years.

6. 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?

We partnered with NAU to host the Lunar Legacy Invitational: a summer event for FLL and Artemis ROADS teams from all over the US. We designed an unique FLL game celebrating Flagstaff's role in the Apollo missions. Teams launched rockets, created lunar landers, visited Lowell Observatory, and heard from USGS scientists working on the Mars rover. The winner earns a trip to NASA in Houston! ROADS grew this season from 34 AZ teams to 68! ROADS is a FREE program, providing easier access to robotics.

7. 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.

Key partnerships allow us to grow FIRST Teams on the Navajo Nation. Navajo Transitional Energy Company (NTEC) had the dream of starting robotics teams and an event on the Rez. NTEC sponsored our training day for rookie coaches, purchased FTC kits for 12 rookie teams in AZ, NM, and UT, and sponsored our inaugural all-indigenous FTC qualifier, hosted by Diné College. Our partnership with NAU allows us to offer Professional Development hours for rookie teachers participating in RezBotics training.



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

RezBotics is our initiative to grow FIRST on the Navajo Nation. EDI grants from FIRST and AZ Center for Afterschool Excellence bought us 3 FTC kits for training. We trained 40 teachers to coach our 12 NTEC teams. We hosted video chats to support teams through the whole season, logistics to competition. At the Diné College qualifier in Tsaile, 84% of the volunteers were Nuts, the rest, indigenous professionals. We successfully petitioned FIRST to send the Inspire Award winner to World Champs!

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

RezBotics Year 2 is already in the works! Rez teams have been in numerous local and Navajo Nation media outlets. We're applying for a grant from the AZ Diamondbacks for \$5000 to sponsor workshops in more Rez locations. We are creating a week-by-week "RezBotics in a Nutshell" guide to address the unique challenges Rez teams face. We are collaborating with NTEC to recruit more sponsors for robot kits. We will be running a booth at the Navajo Nation Fair in September to recruit more schools.

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

Skills learned at the National Advocacy Conference created AZ Advocacy Day. We were given \$30,000 over 3 years from AZDept of Ed after meeting our Reps!

Calls to businesses, presentations and letter writing campaigns allow us to recruit, retain and thank sponsors.

Boeing, NARBHA, GKC Geosciences, Optimum, FIRST Employee Grant: \$15,500/yr

In-Kind: WL Gore (CNC router); FUSD (transportation); CHS (build space/event venue); Flagstaff Food Center (meal ingredients)

AZ Tax Credits: \$30,000+/yr (travel)



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

This season our team's concern was cohesiveness. We want every Nut to be invested in our mission. Since we pre-qualified for Worlds, we didn't want to "rest on our laurels" so we created a set of required criteria, including outreach, volunteering, and production time, for each Nut to earn a spot at Champs. To work on the connection between sub-teams, Impact combined spaces with Technical so we could work side-by-side, and we have weekly meetings to check in and share goals and accomplishments.

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

The Nuts are the Program Delivery Organization for AZFTC; we organize, sponsor, host, and run FTC across AZ. This year AZFTC had 21 rookie teams! We run a local FLL event and support FLL & FRC statewide. In 3 years, we've supported 35 and run 34 tournaments, kickoffs and scrimmages (69 total; 12,000+ hours). AZ Head Ref Rich said, "The Nuts are the FLL Volunteer of the Year! Your dedication to supporting all FIRST Programs is wonderful, keeps up the ethos of GP, and makes FIRST thrive in AZ!"

13. 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.

Our dedication to equity, diversity and change has been recognized by FIRST and many outside organizations including the Star Wars Force for Change and FIRST Inspire Blogs. This year, FIRST sent a team of professional videographers to document the circumstances of the Navajo Reservation and how we are changing the narrative. It premiered at the FIRST Inspire Gala. 11 Nuts have been Flagstaff STEM Student of the Year and the Nuts have been Finalist for STEM Community Partner of the Year twice.

14. (OPTIONAL) Please use this space to ask 1 question to your FIRST Impact Award Judges which will be answered after each event with feedback from the judges (250 characters maximum). Note: Questions asking what is required to win the award will not be answered.

What additional data or documentation would be beneficial to showcase our impact?

VIDEO LINK

<https://drive.google.com/drive/folders/1HQIZa6MB6FL4WQLJPMNDFtNbiSyqdX8I?usp=sharing>



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We are 2486 The CocoNuts from Flagstaff, Arizona. Our mission has always been to make STEM programs accessible to all. Innumerable barriers make fulfilling this mission...HARD. But with resiliency, reliability, dedication, passion, and enthusiasm, the Nuts have found that we CAN do hard things.

Our small town is nestled in mountains at 7000' on sacred ancestral indigenous lands, and is 2.5 hrs from the closest metropolitan area. FUSD students are over 70% minority and 7 of our 11 elementary schools are Title 1. Flagstaff is described as "poverty with a view," but by contrast it's also called "America's 1st STEM City."

Flagstaff prides itself on STEM programs, but we've personally seen that not everyone has the same access; the majority of Nuts come from Title 1 schools, and have experienced barriers due to ethnicity, gender, or income. We created the "También Lo Puedo Hacer (I Can Do It Too)" STEM fair at Killip, our low-income high-minority neighborhood elementary school, to demonstrate to young people that STEM is for everyone. "Tambien" has now been operating for 3 yrs; 31 diverse organizations, such as the Native American Ed Support Program and the Navajo Dept of Energy have participated. 400 students have had the chance to explore new potential. Killip Principal Gutierrez said, "On behalf of our students and families, THANK YOU! This event is complementary to our vision and goals. The community support is so greatly appreciated. You are AWESOME!" We are changing the narrative from "I can't" to "I CAN."

Many schools struggle to create STEM programs, so we created FLL in a Nutshell, which teaches new coaches strategies for running successful teams. Our partnership with NAU allows us to offer Professional Development hours for any teacher participating in Nutshell or workshops at FTC Kickoff. FUSD pays stipends to participating teachers. These teams have won the Lunar Legacy Invitational and 3rd place Champion's at the AZFLL Championship!

We are the Program Delivery Organization for AZFTC: the only team that runs a FIRST program in the entire world! This means funding, organizing, and running events, while also training new host teams statewide. We fill nearly every volunteer role, including inspectors, field crew, and CSAs. 40% of our weekends during this build season were sacrificed to running events! We stop at nothing to make sure every team has a successful competition. For example, at the Show Low Qualifier, FTC 24286 came with a robot made of illegal parts. In 1 hr, we helped them build and program a bot in time to play their 1st match! They said, "You made us feel welcome and went way above and beyond to get the students an opportunity to compete. We are going back with renewed vigor and enthusiasm."

Our team strongly believes in supporting all teams. To make AZFTC more accessible, we created the CocoNuts Registration Relief Grant, discounting entry fees for teams in financial need. At the 23/24 FTC and FRC Kickoffs we presented workshops such as "Swerve Drive in a Nutshell", "Impacter's Guide to Build Season", "Planning a STEM Fair", "Resumé Building using FIRST", "Volunteering at a FIRST Event", and "Advocacy 101". Our FTC Kickoff is one of the largest in the west; we recruited other teams to teach 20 other workshops to 450+ students and mentors. We run a 2-division, 48-team state FTC championship. As a result, AZFTC grew tremendously this year with 21 rookies and 87 teams statewide!



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For the past 3 yrs, we've attended the National Advocacy Conference (NAC) in Washington, DC to strengthen relationships with the offices of our Senators Sinema and Kelly, and Reps O'Halleran and Crane. The Nuts have been the only AZ team at NAC; we went as singular champions, fighting so everyone can have STEM opportunities. Our voices, combined with our fellow NAC teams from around the US, advocated successfully to fully fund the Every Student Succeeds Act and pass the CHIPs Act, providing funding to after school programs.

These victories on the National stage don't change the fact that Arizona is #48 in the nation for education spending per student and #44 for teacher salaries. We saw the need to get more teams advocating at the state level, so we created the Arizona Advocacy Conference (AAC). We trained 8 FRC and FTC teams, then met at the AZ Capitol for a day of robots on the lawn and meetings with policymakers. Education is always a hot topic in AZ, and we weren't sure what to expect...would they even listen to us? Surprisingly, not only did Rep Cook listen to our experiences and concerns, but he put \$30,000 over the next 3 yrs in the state budget for our team AND the same for 8087! This allows us to make larger long-term investments toward our mission. 7 FTC teams are now expanding on their first advocacy experience, and continuing the conversation with their elected officials. The 2nd year of AAC is in May.

It is hard to describe the Navajo Reservation (The Rez) to someone who has never been there. The Diné people are trustworthy, selfless, kind and generous. However, indigenous culture has been overwhelmed by relocation and strict assimilation policies. School experiences on the Rez are full of stories of abuse, neglect, and forced cultural change. Although many of these policies ended, school perception on the Reservation has been ruined. Rez kids feel less comfortable working with non-natives due to cultural isolation. Curriculum focuses not on creating a love for learning but on improving test scores so the kids can graduate. The overall graduation rate in Flagstaff is 83% but only 60% in many Rez schools. To say STEM is not encouraged on the Rez is an understatement.

Getting funds and permission to start a robotics team is a tedious process: school boards only receive funds if chapter elders approve it and the chapter can't receive funds unless it's approved by the Navajo government. The biggest barrier is a lack of STEM champions: reliable adults to coach a team, teach building and programming, and arrange logistics. According to the 2023 AZ Governor's Educator Retention Task Force, "rural communities disproportionately encounter challenges recruiting teachers." AZ already has one of the highest teacher attrition rates in the US; the Rez's rate is estimated to be 28% higher. The Native Science Report says, "Natives received only 0.4% of STEM degrees in 2020, and made up only 0.6% of the STEM workforce." This creates a cycle: students who never meet a STEM role model—especially one who looks like them from a similar background—grow up believing they can't succeed in STEM.

Then there's the vast size: to get from Flagstaff to Tsaile is 3.5 hrs. The average population density is 6 people per square mile! Mostly, it's a lot of empty space with the occasional hogan, trailer, or small group of homes. Tsaile's nearest Home Depot is over 1.5 hrs away!

To us, STEM challenges on the Rez are personal: over 1/3 of Nuts are indigenous. In order to bring STEM closer to the kids hungry for it, we created the "Diné People Are The Future" Fair in



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Leupp, 1 hr from Flagstaff. In the past 2 yrs we brought 16+ organizations, including 6 that are indigenous-serving, to 400 students on the Rez. Through this event, we were invited to demo in Kayenta, over 2.5 hrs away. That's where we met NTEC.

The Navajo Transitional Energy Company (NTEC) had tried for years to start robotics on the Rez; their dream was to have a tournament there. They donated kits to schools...but none ever competed. For rookie Rez teams, the thought of competing with more experienced, better funded teams often led to discouragement. NTEC had the funds; we had the expertise. Thus "RezBotics" was born!

Together, we started 12 teams on the Rez; NTEC paid for the robot kits and we got the FTC rookie grants for team registration. We ran a workshop in Window Rock for 40 Rez teachers; by the end of the day, everyone had successfully built and coded a working bot! As the FTC season went on, we created a communication network for all coaches, so they would never feel alone. Despite our efforts, many teams still didn't show up for their first events. But we didn't give up on them: we promised them that if they made it, even with just a box of parts, we would help them compete.

To set a precedent and demonstrate that RezBotics belongs completely to Native kids we hosted the first ever robotics qualifier on the Navajo Nation! This tournament was at Diné College in Tsaile for 150 indigenous students. By hosting the tournament in Tsaile, we reduced the travel time for Rez teams to compete by an average of 3 hrs one-way. The judges were all indigenous STEM role models: engineers, medical professionals, and educators. One judge said, "Thank you so much for your effort and endeavors to get robotics onto the Navajo Nation. It was such an inspirational event and gives me so much hope for the opportunities that lie ahead for those students!" TONKIS, from Shiprock, Captain of the Winning Alliance said, "A HUGE THANK YOU to the CocoNuts for hosting our team. Honestly, we would not have made it this far without you!"

We successfully advocated that FIRST allow the RezBotics Inspire winner to advance straight to WORLD CHAMPIONSHIPS to rally the Rez community behind robotics. A video about RezBotics premiered at the 2023 FIRST Inspire Gala: a story told through the experience of two Nuts and the hard things we've had to overcome to bring FIRST to our region.

"WE CAN DO HARD THINGS" is a mindset, but it's one that many CocoNuts haven't grown up with. Too many times it's easier to give up because of the barriers placed in your way. Race, gender, and family background can bar the way to choosing our own identities and futures. So many Nuts have found the encouragement and support to try their own hard things because of FIRST. WE are that Champion for so many others. WE DO HARD THINGS because we MUST. By doing hard things, we provide opportunity, and most importantly, hope for the future.