



# Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

**FIRST ROBOTICS COMPETITION TEAM 2486 "THE COCONUTS"**

**PRESENT OUR 2020 CHAIRMAN'S AWARD**

**"IGNITING HOPE"**

## EXECUTIVE SUMMARY QUESTIONS

**Briefly describe the impact of the FIRST program on team participants within the last five years.**

In the last 5 yrs, 100% of AlumNuts have gone to college: half are 1st generation or minority, 91% are in STEM fields from architecture to software engineering to deep learning (AI). We have 9 Dean's List Finalists. Being a 'Nut provides opportunity to learn technical skills, explore future careers, & participate in summer programs that prepare us for college. More importantly, we become role models that exemplify empathy, humility, grit, passion, generosity, enthusiasm, charity & perseverance.

**Describe the impact of the FIRST program on your community within the last five years.**

As the flagship & model program in "America's 1st STEM City," we are "an asset to the town & a beacon for youth to look toward exciting STEM careers."

We partnered with the City, NAU & Lowell Observatory on a year-long celebration of Flagstaff's Lunar Legacy (LL). Our scale Rover headlined the '19 Sci Fest, which drew 10,000+ people. LL earned state & national acclaim for community impact. Robot teams from all over the world came to our Invitational to "test their bot where NASA tested theirs."

**Describe the team's methods for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative.**

We've done over 360 outreach events reaching 236K people in person! We have 2 favorite engagement tools. Our "Junkyard Robot" challenge tasks audiences from kids to teachers & business executives with building a moving LEGO bot without wheels! They experience FIRST via the triumph of accomplishing something that seems impossible. Our Lunar Rover is a great conversation starter. It's portable, instantly recognized & easy for kids to drive while we share FIRST info w/ parents & potential coaches.

**Describe examples of how your team members act as role models and inspire other FIRST team members to emulate.**

Teams at all levels see us as role models. We're generous, indefatigable, willing to leave before dawn to rescue a team or event at a moment's notice, joyful, GP, dedicated to the success of every team, "the heart and soul of every event."

"The encouragement the CocoNuts have given to our students has been a huge help." (Cornerstone)

"They are everything our team wishes to be one day, and we look to them for inspiration in all we do!"

(9743) "My FLL team wants to grow up to be Nuts." (Killip)



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## **Your teams' initiatives to help start or form other *FIRST* Robotics Competition teams**

In collaboration with NAU's Center for Science Teaching & Learning & sponsored by Microchip's Steve Sanghi, we started the FRC in a Nutshell Professional Development course. Based on FLL in a Nutshell, our focus is building sustainable teams, especially in rural Northern AZ. We provide constant long-distance & in-person support all season. 1st cohort: 6546, 7620 & 7897. 2nd: 8087. We hosted an official FRC Kickoff to provide individualized training, brainstorming, and strategy sessions.

## **Describe the team's initiatives to help start or form other *FIRST* teams (including *FIRST* LEGO League Jr., *FIRST* LEGO League, & *FIRST* Tech Challenge).**

FLL in a Nutshell is a comprehensive guide & hands-on professional development for new coaches. Additionally, Nuts are hired to teach the program. In northern AZ, this has spawned dozens of FLL & 2 FLL Jr. teams. Our 4-program Kickoff in Sept. helps FLL teams graduate to FTC and FRC. By connecting FLL & FTC prospective coaches with rookie grants to start teams in AZ. This summer, we're assisting San Miguel FTC start new teams in Tucson by helping develop camps through a STEM equity grant.

## **Describe the team's initiatives on assisting other *FIRST* teams (teams (including *FIRST* LEGO League Jr., *FIRST* LEGO League, & *FIRST* Tech Challenge) with progressing through the *FIRST* program.**

We livestream all AZFTC events through our blog; each has 100's of views. We're hosting AZ's 1st Robot Rumble to showcase FLL & FTC at AZ North FRC. Over 30 Chairman's Exchanges were run in '19 alone, providing teams practice & feedback. Our Chairman's Guide has been downloaded 10,000+ times! In 13 years we've run 72 FIRST kickoffs, tournaments, scrimmages and assisted 100 more events to reach over 65,000 people. "It is safe to say that the CocoNuts are synonymous with Arizona FIRST." (13309)

## **Describe how your team works with other *FIRST* teams to serve as mentors to younger or less experienced *FIRST* teams (including *FIRST* LEGO League Jr., *FIRST* LEGO League, & *FIRST* Tech Challenge).**

It's been a tradition since '08 for 'Nuts to mentor northern AZ teams, totaling hundreds of hours annually. For 11 years, a 'Nut has been named Outstanding Youth Mentor at the Flagstaff FLL Qualifier. Many 'Nuts return to mentor the teams they started on- continuing the cycle of previous CocoNuts. We mentor many rural FRC teams both in-person and remotely, including 6546, 8087, 7897. "The students were overjoyed and proud to have former Killip students come back to mentor them." (Killip Coach)

## **Describe your Corporate/University Sponsors**

Long-term sponsors: GKC Geosciences, Altice, NAU & WWT  
Earned \$3000 from Boeing for the past 2 years  
\$2100 from NAU for running Lunar Legacy  
WL Gore, APS: donates materials, mentors, volunteers  
FUSD: event/build space & transportation to in/out-of-state events  
Mountain Shine, powder coat the robot for free every year  
Flagstaff Family food center, donate food for volunteers, travel, and build  
Flagstaff Community: \$20K+ annually via Tax Credits  
Every donor from \$10-\$10,000 receives a thank you letter



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**Describe the strength of your partnership with your sponsors within the last five years.**

Northern AZ University is our key partner in growing FIRST. They donate venues for the AZ FTC Champs (run by us) & AZ North FRC Regional (started by us)- a donation valued at \$85,000+! We petitioned NAU to start four \$24K FIRST scholarships which they did. NAU students & faculty volunteer at FIRST events. Well over 50 students have chosen NAU after competing at an on-campus FIRST event. We say thanks in many ways from sponsor/partner lunches at the AZ FTC Champ to service days at the Food Bank.

**For FIRST Robotics Competition teams older than 5 years, briefly describe your team's broader impact from its inception.**

We are the only FRC team to manage & run an entire FIRST Program (AZFTC). We have invested 16,000+ hours traveling 50,000 miles to catalyze the growth from 8 AZ teams to 80 in AZ & 30 in NM; growth of over 900%! We've created a sustainable program by mentoring tournament directors and host teams, running huge kickoffs, innumerable workshops, and fostering our expanding volunteer network. After 6 years of nurturing, New Mexico is in its 1st year as their own independent FTC region.

**Describe how your team would explain what FIRST is to someone who has never heard of it.**

Yes, we build competitive robots, but it's much more: "An opportunity to do what I love, to further my future." "Where I can be myself." "A place to be friends with anybody, no matter who they are." "A community making the world a better place." "FIRST brings out the best in everyone." "A chance to teach the next generation of innovators to love the world's beauty; to better ourselves & each other." "FIRST gave me HOPE: for a new way to learn, a better tomorrow, to have a say in who I become."

**Briefly describe other matters of interest to the FIRST Judges, if any**

Our story is an exemplary example of the power of STEM to change lives. The Simons Foundation from NY created a video about our Lunar Rover called "Fireworks, Apple Pie and Robots." Please visit [www.simonsfoundation.org/2019/10/17/watch-fireworks-apple-pie-and-robots/](http://www.simonsfoundation.org/2019/10/17/watch-fireworks-apple-pie-and-robots/) Our story was featured at the '19 FIRST Championship Showcase. Our coaches shared the stage with Dr. Woodie Flowers & one of our 1st AlumNuts. We reminded volunteers, sponsors, & FIRST program partners what they do inspires HOPE.

## ESSAY

What do you see when you gaze at the endless depths of the universe? Darkness? An infinite void? The cold truth of isolation? Look deeper. A light in the dark. A beacon to combat doubt. Boundless potential. Hope.

In a world contaminated with doubt & conflict, Team 2486 "The CocoNuts" provides a spark of change to bring light to dark places & kindle HOPE. Desperation, hopelessness, tears and lack of progress defined our 1st season; we vowed that no team would ever be as alone as we were. We found our light in the life-changing opportunities FIRST provides. Our time, energy and mission is dedicated to providing an opportunity for ALL to be part of FIRST- no matter the circumstances. We are sparking Hope by Empowering Others, Changing Culture and providing a Brighter Future.



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The secret to building & sustaining FIRST teams is to Empower coaches with technical & management skills. Our "FIRST Lego League in a Nutshell" curriculum is a professional development course that covers how to be successful in FLL- from programming & design to the Project & Core Values. "Nutshell" is grounded in activities we developed for Camp COCONUTS, which teaches kids to apply MINDSTORM skills to new situations- like the FLL game does. Since its premiere in '14 it has been used to jumpstart countless teams. This curriculum has been presented at FIRST headquarters & other school districts where teachers earn professional development credit. "FLL in a Nutshell" builds on our long-standing tradition of providing sustained mentorship & support to our local teams.

One rookie coach said: "Your Coach Training sessions were well-organized, engaging and helpful as we started our teams. I am indebted to 2486 who volunteered to mentor our teams. They're great role models. We now have 2 competitive FLL teams & 20 more eager-to-learn students! Your spirit of collaboration gave us a solid foundation for a successful season." In Dec, this coach fielded his teams at our FLL Qualifier, which is one of the longest-running and most popular in AZ.

Our success in building FLL illuminated another area of need: how to create sustainable FIRST Robotics Competition teams. Steve Sanghi, long-time champion of AZ FIRST, has funded dozens of rookie FRC teams over the years, only to see them flounder, then disappear. He tasked our team along with the NAU Center for Science Teaching & Learning to create a training program for new FRC coaches. Following the same principles that have made "FLL in a Nutshell" successful, coaches are provided with hands-on in-person training in mechanics, programming, grant-writing & team management. Coaches receive continuing education hours from NAU for their time, as well as in-person & long-distance support from us throughout the season. This year we hosted an official FRC Kickoff in Flagstaff for our cohort. Each team received personalized, hands-on technical training in their highest area of need. After rookie teams gain experience, they are expected to "pay it forward" by starting & supporting additional teams. The 1st two years focused on starting teams in rural Northern AZ. This program will add several satellite locations statewide, each with a veteran team working to build & sustain new teams.

In '09, FIRST Tech Challenge in AZ was falling into darkness. With only 8 teams & no leadership, it was almost extinguished. Despite the odds, we've nurtured that small spark into a vibrant flame for thousands of students who would not otherwise have access to FIRST. The FTC program provides powerful, life-changing experiences at a fraction of the cost of FRC. We've created a pricing structure that caters to all teams, including those from rural areas or schools with access to fewer resources. We set our entry fees lower than many regions of similar size so that teams can afford to compete in multiple qualifiers. Empowerment begins at our season Kickoff. From the standing-room-only game reveal, to informative workshops, students & coaches come away energized & ready to tackle the new game. To prepare for competition, teams can "Meet the Field" at 6 AZ locations to test programs, get technical assistance & run matches. Teams then compete in our 10 high-energy, professional qualifiers. When a qualifier is scheduled with a new tournament host, a large "Nut Crew" is sent to train the new volunteers so the event is successful. As each new host gains confidence in running their qualifier, we only send equipment & key support staff. This year, over 100 teams from 4 states & Mexico competed at our qualifiers. From the qualifiers, we advance 48 teams to our AZ Championship. This is a 2-division event, making it one of the largest in the country! One CA team called it a "mini World Championship"



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due to the grandeur, caliber of competition, and sense of joyous Coopertition. Here's what a few of our teams said about their experiences: "The tournaments they host are an experience of a lifetime." (9743) "More than all you do is how you make both students & coaches feel welcome & important. Thank you for providing a safe & fun environment for these students to grow & heal." (13309)

The power to Change Culture lies in the courage to bring FIRST to light to those who can influence policy. In the last 5 years, we've illuminated the importance of FIRST to our AZ legislators. The initial spark was "Take Your Legislator to School Day," & an invitation to the AZ capitol to showcase our robots & FIRST. In '17 the spark grew to an ember when we were the 1st AZ delegates at the National Advocacy Conference in Washington, DC. In the spring of '18 the ember grew into a flame when we shared what we learned in DC with 8 teams at the AZ Advocacy Conference at the AZ House of Representatives. This interaction allowed us to spread what we learned throughout AZ & influence more widespread cultural change. In '19 we were invited to advocate to the House Technology Committee for teacher, coach and mentor stipends which has allowed our flame to grow. So far in '20 we have presented to the Senate Education Committee as part of the weekly "Spotlights on School Success". This gave us the opportunity to educate our state senators about the FIRST programs & hopefully start sparks in each of their districts.

We were commissioned by the City & the Sci-Fest board to participate in Lunar Legacy. This was a year-long celebration of the 50th anniversary of the Moon Landing & showcased the critical involvement Flagstaff had in early space exploration. We built a quarter-scale model of the Lunar Rover which was used as a key advertising point for this celebration. The Rover promotes STEM education & FIRST programs wherever it goes, from the National Defense Manufacturing Conference to the AZ School for the Deaf & Blind holiday party. Individuals are allowed to drive the rover at the different events which enables us to talk about the impact FIRST has had in our community & state. The CocoNuts debuted our rover at the same cinder fields where NASA tested their Apollo hardware! The rover actually sports the signature of Moonwalker Charlie Duke as the rover was the welcoming committee for his Flagstaff Sci-Fest keynote speech! The Lunar Legacy Invitational attracted teams from all over the country as well as Hong Kong, Lebanon and Romania. There were challenges for FLL & FTC programs, as well as a NASA-sponsored game which replicated a moon landing. These contests required the students to use drones & Lego robots. The program was so successful we are in the process of planning our 2nd Annual Lunar Legacy Invitational. The '19 Invitational allowed us to send Team Lego Side on an all-expense-paid trip to the Johnson Space Center. This team is from a socioeconomically challenged population comprised of a high-minority student body. This trip gave the students a once-in-a-lifetime chance to experience STEM in action.

Another of our priorities is to support FIRST teams at all levels in rural areas where STEM is under-represented. This includes traveling to remote teams like Naatsisaan on the Navajo Nation, where the closest store is 2 hours away and driving directions include things like "continue on the dirt road until it ends." Teams like 6546 struggle with their seclusion & access to robot materials. We work with these teams to help them take advantage of local sponsorships & grants. We do whatever it takes to help teams succeed & spread STEM & FIRST in our state's rural areas.



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The hours we spend spreading the message of FIRST is the cause of much transformational change in Arizona, but more importantly we ourselves are transformed. By mastering difficult skills and being put in the position of role models, we find new courage that lights the way to our own Bright Futures. By the time our AlumNuts graduate, they are ready to be leaders, innovators, positive influencers. In the process of going from CocoNut to AlumNut we are empowered to impact our own Futures for the better. Ghandi said, "Be the change you want to see in the world."

What does it mean to be a CocoNut? Stereotype says we're wimpy loners, have no social skills, and live behind a screen. But for 13 years The CocoNuts has provided a safe home for our eclectic group of youth representing a cross-section of our diverse community. We are musicians, cheerleaders, varsity athletes, thespians and leaders within our community. We are passionate, driven, enthusiastic, generous and selfless young minds united in our mission to ignite Hope & spread STEM education & the FIRST programs. We are more than the sum of our parts. We are a light in the dark, a spark to start a chain reaction that spreads like wildfire.

Why do all of this? Why go through countless hours, travel thousands of miles and invest so many resources to help each FIRST team to become a light in the dark? Because we aspire to inspire. We want to build a bigger, better, brighter future. We are a Force for Change.

"What is it they've sent us?"

"Hope" - Princess Leia

