



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

FIRST Robotics Competition Team 2486 "The CocoNuts"

Present our 2017 Chairman's Award Submission:

Celebrating 10 Years and Asking, "What if..."

1. **Describe the impact of the FIRST program on your community with special emphasis on the current season and the preceding two to five years.**

Through our efforts, Flagstaff has earned the title of "America's 1st STEM City." 2/3 of the nominations for the 2017 STEM City awards are Nuts. Hundreds of Flagstaff students participate in a FIRST program we started. 85% of K-8 schools have FIRST teams. 22 teachers were trained this year & over 100 in the last 5 years. Over 800 people attend our High Altitude Robotics Extravaganza at our school, hosting FLL and FTC simultaneously. We have appeared in the media over 150 times in our history.

2. **Describe the team's innovative or creative method to spread the FIRST message.**

Through our endeavors we have impacted 200,000+ people through FIRST. The CocoNuts spread the FIRST message by running the FTC program for AZ & NM, performing community service year-round, working personally with our legislature, presenting to professionals & supporting FIRST events. We've traveled over 36,800 miles & dedicated 25,670+ hours spreading FIRST. We talk to members of the community at dozens of annual outreach events; many of these every year for the last 9 years.

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

When others interact with the Nuts, it is a positive experience. We aspire to be enthusiastic, dependable & distinctive. We assist others with learning the ropes for running competitions. After 10 years, we are humbled to be considered Arizona's role model team. "We have felt 2486's dedication & enthusiasm; they share their polished robots, infectious spirit, & creative submissions for the Chairman's Award... they command admiration & the utmost respect from our team & countless others." FRC 4146

4. **Team's initiatives to help start or form other FIRST Robotics Competition teams.**

This year, we put on 20 demos at public events & schools. We bring robots, present our team, and offer ways to get involved. As a result of speaking to people at the County Fair & Festival of Science, new FRC teams were started in rural AZ: 6482 (Joseph City) & 6585 (Many Farms). We foresee these teams, in conjunction with our support, inspiring others on the Navajo Reservation to start new teams. With the other numerous teams we mentor annually, we are cultivating diversity & growth of FIRST.



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

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

Our FLL summer camp & teacher trainings have led many to join or start teams. They provide direction for students & teachers. This year's training resulted in 1 new FTC and 5 new FLL teams. By creating numerous tournaments in rural AZ & NM, we are fostering the growth of all FIRST programs. These range from Alamogordo to Prescott. The FTC program in AZ/NM grew to 76 teams overall, with 35 rookie teams! This 25% growth is a result of reaching out to partner organizations & helping new coaches.

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

2486 is the only FRC team to run an entire FTC region. To assist teams we:

- Held 3 simultaneous "Meet the Field" days in Flag, Phx, & Tucson for FTC. Every team left with working bots.
- Sponsored & ran 8 FTC qualifiers in AZ/NM
- Hosted 2-division AZ/NM championship, partnering w/ NAU
- Wrote the Chairman's Guide, downloaded by hundreds
- Only Beta Test team in AZ

Flagstaff exemplifies the Progression of Programs w/ 7 JFLL, 15 FLL, 5 FTC & our FRC team. 60% of 'Nuts were on an FLL or FTC Team.

7. **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).**

We facilitate weekly calls with other FRC teams across the country discussing design, programming & Chairman's. Teams 4985, 5200, & 6482 come to our build space to learn from us. In '13, we created the Chairman's Exchange, which is now hosted at Regionals around the globe to enable teams to share their presentations & receive feedback. Most Nuts personally mentor local FIRST teams & work with them at our competitions. At the STEM Celebration, we will put on our 1st Jr. FLL Expo.



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

8. Describe your Corporate/University Sponsors

FUSD-provides competition space and transportation for free
CHS-provides build space, competition space
NASA-2017 FRC Grant (our 3rd)
GKC Geoscience-sponsorship, purchased video equipment, volunteers
Softrol-yearly donor
WWT & Cisco-yearly sponsor
WL Gore-Materials, mentors, machining, volunteers
No. AZ University (NAU)-FRC Regional & FTC Championship venue; FIRST Scholarship
Flagstaff community-individual donors contribute \$10,000 annually
ASU-Hosts annual FTC kickoff event
Belden-\$5000 for FTC

9. Describe the strength of your partnership with your sponsors with special emphasis on the current season and the preceding two to five years.

Partnerships have ensured our sustainability. Each year we start the season with the funding needed to run our FTC program & FRC season. Our strong NAU partnership led to their donation of venues for the AZ North FRC event & the FTC 2-division state championship. The value of these donations approach \$100k. A partnership with AZ Rep Bob Thorpe gave us a foot in the door at the AZ Legislature to influence STEM education. Every donor is sent a thank you letter & picture at the end of the season.

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

Since the inception of 2486, our team has been built on a mission of impacting others through FIRST. Our impact has exceeded our wildest dreams such as:

- Being a role model & collaborating with FIRST teams across the nation
- Hosting & supporting FIRST events in AZ & NM
- Serving as the Affiliate Partner for FTC
- Working with the Navajo Nation to build programs on the Reservation
- Partnering with universities to provide \$24k in annual FIRST scholarships
- Creating new regional FLL, FTC & FRC events

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

FIRST is more than robots. We build robots to build character. It's about igniting change & inspiring others. Our favorite way is through volunteering. We bring robots to life for rookies, run miles to support events & teams, & ensure teams don't just compete, but celebrate. Shaping people & generating passion is what FIRST is all about. This excitement burns inside & is the force to transform communities. Our impact is far greater than we can imagine. FIRST is where kids can be remarkable.



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

12. Briefly describe other matters of interest to the FIRST judges, if any.

Who would think FIRST would open so many doors for the Nuts? We've had the opportunity to travel the nation, work with NASA to develop a caving robot to explore Mars, adopt a platoon in Kuwait and an Avenue in Flag. We get to communicate with teams across the world. Our team is a diverse family with unique skills in art, photography, writing, machining, designing, engineering & coding. Everyone has a place on our team; our arms are open to all. Where else can you find a home as Nutty as ours?

13. Briefly describe the impact of the FIRST program on team participants with special emphasis on the current season and the preceding two to five years.

FIRST transforms lives; every CocoNut is affected by its power. 100% proceed to college, many are 1st generation. 26 AlumNuts have been offered over \$4.5 million in scholarships & half would not have attended without FIRST. 95% have chosen to pursue STEM careers. They are inspired to continue mentoring after graduating & impacting others through FIRST. 92% of 'Nuts are enrolled in accelerated STEM programs, AP & engineering courses at our school. "I was inspired by our impact on others..."
Maddie

Essay

What if the CocoNuts never existed? What if 10 years of perseverance, passion, & drive to spread the message of FIRST had never been? FTC in AZ & NM would have faltered. FLL in Northern AZ (NAZ) would not exist. Our city may not be the STEM mecca it is today. Numerous students would not have been able to go to college & pursue STEM opportunities or be role models for STEM. But we do exist! In our FIRST 10 years we dreamed big & persevered against all odds to achieve our mission of bringing STEM & FIRST to even our remotest regions.

Imagine FTC without us: only a few AZ & NM teams & no events in NM. In 2009, we became the sponsor for AZ FTC & our coaches became Affiliate Partners, taking responsibility for growing a region with only 8 teams. In 2013, AZ grew past the max number of teams for a single championship; we took NM under our wing & introduced qualifiers. This year we exceeded the growth goal set by FIRST: 35 rookies, 41 veterans, & 8 FTC qualifiers. Growth doesn't happen by accident! In the summer we recruit new teams & plan events. The annual kickoff at ASU draws 800+ people to see the game & attend our workshops on everything from programming to Dean's List. We are the main point of contact throughout the season, supporting teams remotely & in person, & turning boxes of parts into working robots at events like Meet the Field.

The Nuts do exist & have been sharing our expertise across AZ & NM. Our coach calls us her "traveling road crew" for good reason. We hosted our 1st event in 2008 when we brought FLL to NAZ. This event quickly expanded to dozens of tournaments we personally run. We soon grew beyond capacity & started a new event in Winslow, AZ. After 4 years of Nut support, they're now independent. We debuted a new



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

tournament in Prescott, AZ with a crew of Nuts. Why do we do it? When Flagstaff was the only FLL event, many teams had a 3+ hour drive to compete & did not attend due to travel expenses. This season we sponsored 11 qualifiers, 2 state championships & twice we were in 3 different cities at once; cramming 6 tournaments into 3 weeks so teams could compete close to home. 'Nut Mahon says, "Running 6 events in 3 weeks is very stressful, & may seem like a challenge, but I love it. Volunteering for FIRST is one of my passions."

To expand team capacity in NM we drove 10 hours 1-way to Alamogordo after finals to debut their event. New tournaments in remote AZ/NM spark the growth of new teams & spread FIRST at an astonishing rate. Why do we do it? Tessa said it best, "We run each event in what seems like a blink of an eye, but we leave feeling a huge sense of achievement. We do it because we care." Zach, our head student CSA said "Despite issues we encounter at events, we persevere to give them the best experience they've ever had."

Starting new events & serving as role models for others isn't something we take lightly. At every event we take on key roles. Our goal is to make every event a rocking celebration. A new tournament director shared, "We started with no idea what we were jumping into, & with help from the CocoNuts we were able to pull off what we thought would be impossible. The Nuts were not only highly performing & hard workers, they were very respectful & courteous, receiving praise from everyone they interacted with."

Every local FIRST team is assigned a mentor Nut; without our mentorship, many of these teams would have dissolved. "Indeed, without the CocoNuts, FLL would be virtually non-existent in NAZ." (AZ FLL partner) We're mentoring 2 key NM volunteers to help them develop the resources, teams & volunteer-base to become an independent region in the future. Despite a geographic area over 235,500 sq.mi., our hard work & dedication provide opportunities where none existed before. Our impact will endure well into the future.

A shining example of this impact is seen in our NUTTY & OUTRAGEOUS Camp COCONUTS, a 2-week robotics program for 4th-8th graders. Each day has a new design challenge. The week culminates in a Nut-created game, tournament & awards just like a real FLL event. The Nuts are instructors, counselors & "cool big buddies". Camp brings in enough money to pay a Regional fee & some travel expenses for the season. In 7 years, over 300 students have participated; many join teams.

Great teachers are the key to student inspiration, so we transformed our "kid-tested" activities into our "FLL in a Nutshell" curriculum & 2-day training. Designed to empower teachers & taught by Nuts, it puts teachers in the shoes of students & shows them how to use FLL in the classroom. Mr. Tessmer, a Coconino HS engineering teacher, came to train in 2016 & revamped his programming unit to include NXT. Students now solve chemistry-related challenges while learning sensors & logic. Our program has impacted teachers from all over AZ & is the foundation for a pilot program for all 4th grade classes in Manchester, NH. We partnered with FUSD & Coconino County to provide stipends & education hours. Like an acorn thrown in a pond, this impact ripples out to hundreds of students. Many we may never meet, but they will surely be impacted by FIRST & the Nuts.



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

The acorn doesn't fall far from the tree & our school benefits from the Nuts. CHS is our home & our partner in change. For 9 years CHS has hosted our FLL & FTC events free of charge. 6 years ago CHS gave us "The Nut House," a private build space, and in turn, we impacted the CHS STEM curriculum. Mr. Nicholson, a 30-year veteran teacher, saw a decline in enrollment for outdated shop classes. We helped him create the CHS Makerspace & Digital Design course. With robots in mind, the Makerspace features state-of-the-art CNC equipment that rivals what would be seen in industry. 100+ students/year, including half of 2486, learn CAD, manufacturing & CNC skills in a creative, student-driven course. We now design our robot in 3D & manufacture custom parts during the school day to create a unique machine that is beautiful & effective. Our influence on the Digital Design course has reignited Mr. Nicholson's passion to teach.

Had 2486 never existed, FIRST wouldn't be in the farthest reaches of our states. This season we supported 14 FLL teams, 11 FTC teams & 3 FRC teams on or near Reservations in AZ/NM. Daunting obstacles like cultural barriers, extreme poverty, & geographic isolation make getting through a season challenging. These are the teams that need the life-changing opportunities that FIRST offers. "Not only do the Nuts serve as a model for innovative STEM teaching & learning, they also serve as a model for inclusion & diversity as they are committed to sharing their passion & enthusiasm with everyone they meet." (CHS principal) Other teams are now emulating these values. The FTC rookie team "Navajo Code Writers" is one. At their 1st event, they earned the Inspire Award, and a trip to the AZ/NM Championship! Their coach explains "the idea of a Makerspace may be a Western idea, the idea of making is not. The Diné people are some of the world's finest makers. Making is a great candidate to promote STEM education for the Navajo on their own terms." This team promotes STEM throughout their school by procuring Legos to teach engineering while partnering with the Navajo Tribal Utility Authority.

The work of 2486 has a profound impact in Flagstaff. We quickly earned a place in the hearts of the community as role models & set standards for other STEM programs. In 2012, our City Council declared Flagstaff "America's 1st STEM City" because of the rich variety of STEM businesses & education opportunities. Robotics was cited in the charter as a reason for declaration. 2486 is the headliner for annual celebrations and the Community-Wide STEM night, which 5000+ people attend. 85% of FUSD schools have a FIRST team, which has drawn students back to public schools. "Their relentlessly positive image & public performances have helped to bring back confidence in our school system." (FUSD)

Partnerships are key to success. Our community partners provide financial support, parts, mentors & volunteers to help our mission. A Nut-initiated partnership with NAU allows sponsorship for the AZ North FRC Regional & AZ/NM FTC Championship. We wrote a NSF grant with NAU & FIRST to start Reservation teams. Rep. Thorpe invited the Nuts to the capital to present FIRST to legislators & had the honor of presenting the opening session colors. He has been our guest for 3 yrs as part of Take Your Legislator to School. We've made dozens of presentations to professional organizations, who go on to champion our cause. Referring to one presentation, the head of the Flagstaff 40 said, "They received a standing ovation & tear-stained smiles. Those successful businessmen & women & elected officials knew they were witnessing the future & they were proud to be there." We've laid the foundation to create lasting change in education policy in AZ.



Coconino High School Robotics

FRC Team 2486 · The CocoNuts · Flagstaff, AZ

One may ask, "How do you do it & still build a competitive robot?" Student leadership & mentors is our answer. We're not just a team: we're a family. A volunteer said, "The energy, camaraderie & joy your entire team had truly could be felt. You're a family that works incredibly well together, enjoys each other & rejoices in each other's strengths!" Helping others is at our soul & why we've traveled 6300 miles this year alone. Our passion for FIRST drives everything we do. "This organization has transformed our members. FIRST is so much more than robots to all of us." (Tessa)

AlumNut Kinney said, "Changing the world takes time, but changing a life is as simple as making a long drive, keeping a promise, or telling a story that inspires." What would the world be like if the CocoNuts had never existed? The void that would exist in our absence is terrifying to imagine, but the CocoNuts ARE here to inspire, teach, & learn. Our mission is clear, our determination unwavering. 10 years of change can't be undone. What will the next 10 years bring?