

Chairman's Award - Team 461

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2019 - Team 461

Team Number

461

Team Name, Corporate/University Sponsors

Caterpillar/Purdue FIRST Programs/Purdue Polytechnic Institute/Roadworks Manufacturing/Colors, Inc. & West Lafayette Jr/Sr High Sch

Briefly describe the impact of the *FIRST* program on team participants with special emphasis on the 2018/2019 year and the preceding two to five years

Team 461 transforms STEM from theory to reality as our students implement complex climbing mechanisms, teach classrooms full of younger students, and develop intricate scouting systems. In the process, we create leaders who not only succeed in higher education and careers—100 % of our graduates in the past five years have gone on to attend a 4-year college—but care about making their communities a better place.

Describe the impact of the *FIRST* program on your community with special emphasis on the 2018/2019 year and the preceding two to five years

Through community STEM education, we inspire the next generation to pursue STEM interests, solve problems, and work with others. We utilize our summers to run more than five weeks of camps every year. During the off-season, we also conduct many workshops, impacting those typically left behind by STEM education including girls and children from low-income backgrounds. Through these experiences, we not only teach children about STEM but empower them to change the world.

Team's innovative or creative method to spread the *FIRST* message

In the past year, we've spread the message of FIRST through Unified Robotics, an organization that provides a FIRST-style game to students with intellectual and developmental disabilities. We hosted a competition that was the first of its kind in the Midwest by combining elements of FLL and FRC. Because of our innovation and ambition to give these students an opportunity to succeed in STEM, we were invited by the national Unified organization to be members of the national game design committee.

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

We've encouraged our members to go beyond the technical side of FIRST by weaving outreach into the fabric of our team. Each team member must contribute 10 hours of outreach, and we have exceeded that expectation with a team average of over 26. This shows that our members see FIRST as a way to help others, rather than just a game. We also help younger members thrive in FIRST through our buddy system, where returning members gain leadership skills and new members are welcomed into the team.

Describe the team's initiatives to help start or form other FRC teams

We assist many new teams on their FIRST journeys. In 2018, we gave rookie team 7198 Fearsome Gears a robot to use at an off-season competition. During the build season, we invited them to our kickoff event and provided them with programming, team structure, and awards. In 2017, we aided rookie team 6498 Castle Robotics by providing a box full of motors and gearboxes, plus a cart for competitions. Our support has allowed rookie teams in Indiana to thrive and advance in their FIRST journey.

Describe the team's initiatives to help start or form other FIRST teams (including Jr.FLL, FLL, & FTC)

In the past year, we have formed 4 new FLL teams with students from our school district's elementary school, commencing 24 elementary school students' journeys into STEM and FIRST. Team 461 members assist the teams in programming, building, and project development. In addition to providing registration funds, we also supplied the robots, building materials and fields. We've also started two FTC teams, providing them with the mentors, financial support, and supplies essential to their success.

Describe the team's initiatives on assisting other FIRST teams (including Jr.FLL, FLL, FTC, & FRC) with progressing through the FIRST program

From FLL Jr to FRC, our team provides a seamless pipeline for students to experience FIRST. We provide mentors and supplies to two FLL Jr teams in our area. Students who graduate these teams enter our FLL program, which we support with materials, mentors, and workspace. When these students enter junior high, we encourage them to join our FTC teams who we support with supplies and mentors. After the completion of FRC, the students who have completed our program will have spent 13 years in FIRST.

Describe how your team works with other FIRST teams to serve as mentors to younger or less experienced FIRST teams (includes Jr.FLL, FLL, FTC, & FRC teams)

Our team believes in the power of mentorship to inspire. For the past four years, 461 students have served as mentors for both our FLL and FTC teams. This year, 20% of our members mentored FIRST teams sustained by our program, totaling about 446 hours of involvement. Through these initiatives, we not only support the teams in their competition activities but inspire younger students to continue their participation in FIRST.

Describe your Corporate/University Sponsors

Our primary sponsors are Caterpillar (CAT), Purdue FIRST Programs, Purdue Polytechnic Institute, and West Lafayette High School. We are also funded by many local community businesses. Recently, we began receiving support from Greater Lafayette Commerce. Additionally, after students volunteered at their Robotics in Manufacturing camp located at different factories around town, they provided student volunteers money towards their team dues.

Describe the strength of your partnership with your sponsors with special emphasis on the 2018/2019 year and the preceding two to five years

By attending CAT's annual picnic and having a CAT mentor work with our team, we maintain strong relations with our largest corporate sponsor. We provide one of our newest sponsors, Greater Lafayette Commerce, with mentors for various STEM education camps and workshops. In addition, our alumni network not only contribute over \$14,000 a year but also frequent our meetings and events. They inspire us to live up to our team history and provide valuable insight.

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

FIRST is an organization that fosters interests in science and technology, beyond that, it encourages students to discover their unique passions. From age 6, participants are exposed to problem-solving and teambuilding skills. From building pneumatic systems to developing business plans, students cultivate skill sets that help them in their future educational pursuits. Through collaborations with a variety of professionals, FIRST is a program that allows students to thrive in the future.

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

As a STEM-based program, we have an obligation to not only provide education to the students in our community but also to enhance our community through environmental improvement. We have continually accomplished this by donating rain barrels to the Wabash River Enhancement Corporation annually, maintaining an Adopt-A-Spot, and participating in Detrash the Wabash. Furthermore, we also promote science-based environmental policies through our attendance of the 2017 Indianapolis Science March.

Team Captain/Student Representative that has double-checked this submission.

Henry Roberts

Essay

Former astronaut and Senator John Glenn once remarked that what mattered more than his past—his legacy—was what he did for his community in the present and future—what he termed his "live-acy." Similarly, Team 461 Westside Boiler Invasion, strives to build upon our team's past contributions to our community and constantly improve our outreach. We believe that by giving back to our community, we can educate future generations, include those often left behind by STEM initiatives, and address the needs of our changing world. Throughout our 20 years of existence, we've accomplished these goals by broadening our outreach to six unique focuses. In this essay, we will outline these areas in chronological order, illustrating how we've grown our outreach while remaining grounded in the expectations we set for our team 20 years ago.

Showcasing Robots

From our founding, outreach has been ingrained into the foundation of Team 461. For the past two decades, our team has inspired youth in our community by conducting demos at our local public library and elementary schools. To extend our influence, we've begun operating demos elsewhere in our community at events such as the Barnes and Noble Mini Maker Faire, Camp Tecumseh Kidney Camp, Wolf Park STEM Fair, and Eggstravaganza. By providing unique opportunities for children to interact with robots, we've cultivated a life-changing passion for STEM and an exposure to FIRST for students who could benefit from the program. Additionally, we've expanded our impact to the entirety of Indiana by spreading STEM at a variety of statewide demos such as Celebrate Science and Curiosity Fair. Recently, we began attending Starbase Indy, where we inspire attendees from Star Trek fans to astronauts by showcasing our robot and talking about the extensive influence of FIRST. Through our 20 years of demos, we've inspired more than 20,000 people to pursue STEM, aspiring to constantly innovate new ways to impact our community and propel our live-acy to new heights.

Mentoring Youth

Another significant aspect of our outreach is the mentorship of younger FIRST teams. For almost two decades, we've inspired children in our school system by starting, supporting, and sustaining FLL and FTC teams. In 2002, we founded our first five FLL teams. Since then, we've continued to provide mentors and resources to a total of 30 FLL teams, helping over 1,000 children commence their FIRST careers. In addition to FLL, we sponsor two FTC teams, providing both with student coaches and financial support. We further expanded our work this year by helping to form the first two FLL Jr. teams in our county. Mentorship is a fundamental part of our team with 20 percent of our students mentoring a younger FIRST team. By supplying these teams with role models and guidance, our students inspire future generations to success in FIRST. Additionally, our student mentors gain beneficial life skills such as leadership abilities, teaching experience, and a mentality focused on bettering their community. By sustaining and expanding FIRST programs, we will continue to inspire younger generations and build a foundation for STEM excellence.

Hosting Workshops

As our team has grown, we've broadened our outreach program to prioritize hands-on workshops and other STEM education programs. Since 2009, we've attended Space Jamboree, the Midwest's largest STEM event for Boy and Girl Scouts. Using a curriculum we create and distribute, we've awarded nearly 3,000 badges in both programming and robotics, allowing thousands of young students to experience STEM first-hand. In the past year, we expanded this program by hosting events for Cub Scouts throughout the year.

Additionally, our students spend their summer vacations educating younger generations through robotics camps. In a 17-year partnership with our school district, we run two weeks of annual preparatory FLL camps. This past summer, we, along with other local FRC teams, ran the YMCA's Robotics in Manufacturing program. Inside different factories across our community, we led the robotics station, helping children discover their curiosity and passion for STEM. Since our team provided the majority of the volunteers, Greater Lafayette Commerce (GLC), the primary organizer of the camps, asked our team to create a recap video. We have since continued our relationship with GLC by volunteering at CoderDojo camps, where we teach programming skills essential to success in STEM. By providing unique opportunities for children to directly experience STEM, we constantly adapt our outreach to meet the needs of our community.

Thinking Outside the Bumpers

Essay - page 2

Team 461 extends our outreach to encompass "more than robots." During the past summer, we built a prosthetic for a local disabled dog, Figg. Providing the opportunity for Figg to live a normal life allowed our students to implement their engineering and design skills while helping a community member. Additionally, we hold an annual item drive for non-perishable goods to donate to Ronald McDonald House. Every year that we have attended the CAGE offseason event, we've won the Giver Award in recognition of our donations, totaling over 10,000 items donated in the past 7 years. We attended the 2017 Indianapolis Science March to promote science-based policy. We also conduct multiple environmental improvement programs. In 2011, we began our first environmental outreach project: maintaining an Adopt-A-Spot, a 900 square-foot median outside a local ice cream parlor. By painting and donating rain barrels, helping preserve two waterways, and creating videos that promote environmental conservation, we promote sustainability. These community improvement events have strengthened our team and community alike.

Building Bridges

We strive to increase underrepresented minorities' involvement in STEM by partnering with local organizations. Four years ago, we began our collaboration with Purdue's Minorities in Engineering Program, a summer camp that aims to increase minority involvement in STEM. Using a curriculum that our team developed, we teach STEM skills through programming with Scratch, designing NXT LEGO robots, and programming these robots to fight in a sumo competition. For the past two years, we've also worked with Purdue's College Mentors for Kids, an organization that provides education and tutoring for children in socioeconomically disadvantaged households. By educating these students, we spark an interest in STEM from an early age through presentations about mechanics, discussions highlighting applications of technology, and demos of our past robots. Additionally, we recently began a partnership with Deaf Kids Code and through this relationship co-hosted the 2018 Inspire to Innovate STEM Fair, which aims to help children who are deaf and hard of hearing feel comfortable and confident in the STEM community. For this event, we also host training for our members so they can respectfully and effectively communicate with the deaf and hard of hearing community at the event and in the future. As our partnership continues and evolves, we aim to foster mutual understanding and learning. Through our partnerships with local organizations, we've expanded the scope of our outreach, spreading the joy of science and technology to further grow our live-acy.

Pioneering Inclusion

In recent years, we have expanded our outreach to promote interest in STEM-related disciplines among marginalized groups. In order to expand women's involvement into the male-dominated STEM world, in 2017 we pioneered a Girl Scout Merit Badge program which has awarded 50 Girl Scouts with a total of 150 badges in designing, programming, and showcasing robots. To establish this program, we wrote our own integrated curriculum for the three different badges. Furthermore, we made it available to all on our website and marketed it extensively in the FIRST community, becoming the first and only organization to generate and publish such a document online. In the past year, we've bolstered our initiatives to increase female involvement in STEM by planning and hosting workshops for Girl Coders, an organization that designs badges to motivate girls' involvement in programming. This past December, we hosted several extensive workshops where we taught girls about both cybersecurity and HTML.

In addition to sparking girls' curiosity in STEM, we also foster the inclusion of those with intellectual and developmental disabilities. To broaden our long-standing partnership with our school's Best Buddies club, we installed the first Unified Robotics program in the Midwest. Unified Robotics provides a FIRST style game to students with special needs, teaching students how to build and program LEGO robots with confidence. While most Unified Robotics teams use a sumo-style game, in the spirit of coopertition, we designed a game that allows for universal success. This game mirrors FRC as a whole by using both autonomous and teleoperated periods. Because of our efforts, we impelled the national Unified organization to redesign the entire program's game. Several of our students were invited to join the game design committee, shaping the future of the program. Our refusal to depend on our legacy and our drive to further establish our live-acy has made a significant impact on those in our community who STEM education too often leaves behind.

Conclusion

Throughout the entirety of our existence, Westside Boiler Invasion has been an active partner in the development of our community, providing and learning from those around us. Even as we maintain our staple outreach events, we continue to create new and adaptive programs targeted toward our ever-expanding audience, especially those who are marginalized. Building upon our past efforts in these six areas, Team 461 Westside Boiler Invasion works and will continue to work towards the future of our community and the world around us to create a lasting and growing live-acy.