

Chairman's Award - Team 461

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2021 - Team 461

Team Number

461

Team Nickname

Westside Boiler Invasion

Team Location

West Lafayette, Indiana - USA

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.

Participation in FIRST has had a measurable impact on our team members in their academics, love for STEM, and involvement in FIRST. Over our team's 21 year history, 100% of our team members have graduated from high school, over 99% have attended college, 80% go into STEM careers, and 50% of them have chosen to give back to the FIRST community by starting their own teams, mentoring existing teams, or working as volunteers at FIRST events all over the country.

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

Our community faces a shortage of robotics-based opportunities for young students. To mitigate this issue, we currently manage the only FLL Explore teams in the area and have ensured our FLL Explore teams are open to anyone in the community. Additionally, we aided other teams in our area in starting two other FLL Explore teams within our county. Currently, all FLL Explore teams running within our county are managed by us in partnership with our alumni.

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?

The team attends public events and provides various demonstrations 2 to 3 times each month. We provide learning opportunities in STEM, through the use of activities such as "Space Jam", "Inspire to Innovate", and West Lafayette Family Fun Day. All curricula created by our team have been released on our outreach website for public use to spread the influence of our programming throughout the world. In the past off-season alone, April to December 2020, over 750 users have visited the site.

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

Our team members have taken the lead in field and audio-visual setup during FIRST events such as the FTC Indiana Robotics Invitational, almost all on-season FTC competitions, and the off-season FRC Boiler Bot Battle. The team also works in partnership with Purdue FIRST Programs in organizing the Purdue FIRST Forums, an event where FIRST students can attend presentations. In particular we teach valuable skills in drive train design, FTC design process, awards submissions, and graphic design.

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

By supporting and managing teams at every level, we maintain a "FIRST Pipeline" for students to follow throughout their education. We helped start and now mentor two FLL Explore teams. We run and mentor four FLL Challenge teams and do the same for two FTC teams. As students move into FRC and beyond, they give back and start teams of their own. One example is one of our alumni who started two more FLL Explore teams in our area that we now assist in providing materials and resources.

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?

Our team prides itself in inspiring younger children, to fulfill their potential to be leaders in STEM. We spread our influence through teaching kids STEM at events like CoderDojo STRIKE, GLC Manufacturing Camp, and Space Jamboree where we have cumulatively taught almost 1,000 kids within the past 3 years alone from all over the country. Following participation in these programs, students are often so excited about STEM that they join FIRST Teams.

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 also partner with key pillars of our community like our public library and school corporations. We have taught at the West Lafayette Family Fun Day program in our library. Our school corporations allow us to do demonstrations at events during the school day. Additionally we work with key pillars of the FIRST community such as FIRST Indiana Robotics (FIN). We act as volunteers whenever needed by FIN and work with them to store FTC field pieces for state events.

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

Our team believes FIRST is for everyone, regardless of gender, race, or ability. We have created and aided many initiatives to further our belief including the Summer Engineering Workshops and PREFACE programs in partnership with Purdue's Minority Engineering Program as well as our own Unified Robotics, Girl Coders, Girls in Engineering and Mechanics and Girl Scout Badge programs. In 2020, we started a YouTube channel to continue our workshops and lessons during the global pandemic.

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

Our team structure guarantees that our initiatives will continue to run far into the future. Our FIRST pipeline keeps new students coming into our team, replacing the seniors that graduate. Our partnership with PFP ensures the team will never see a mentorship shortage as they consistently provide us with new, experienced mentors every year. With the older members and mentors teaching the younger students, skills are passed down, and our initiatives are kept running smoothly.

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

Team 461 would not exist without the help of our sponsors. In exchange for their support and in order to strengthen our partnership, we aid in their events such as, GLC manufacturing camp where we work as staff, and created sponsor tiers to benefit our sponsors. Our team keeps our sponsors updated through frequent social media posts. Additionally, to express our gratitude for them, we often invite them to competitions and have started making weekly posts of appreciation on our social media.

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

In a season where our activities cannot include traditional outreach, mentoring, and competitions, our team has struggled with retention and keeping students' interest. To help combat this issue and strengthen team bonds, we are now offering a wider variety of ways to participate. We are expanding our FLL and FTC mentoring; offering virtual meetings; online movie nights; and, for students who miss in-person socializing, we have offered outdoor therapy sessions.

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

Our mission is to inspire students to excel in STEM fields by providing hands-on, mentor-based experiences that allow them to forge the path of tomorrow. This aligns with FIRST's mission. Our outreach aids us in going beyond the scope of our mission. Our programs, such as Unified Robotics, Girl Scouts Badge Workshop, and Girls in Engineering & Mechanics, provide hands-on experience to help students grow their skills in STEM, allowing us to inspire over 1000 youth every year.

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 contribution towards STEM education promotes the development of FIRST qualities within our alumni. In stark contrast to our twenty year history, in the past three years alone, 83% of our recently graduated alumni went on to volunteer in various ways during FIRST competitions and around 40% went on to mentor teams of their own, this is a

miserable increase from the average 50% and 30% respectively, proving that our team has continued to grow and encourage our members in STEM and FIRST.

Essay

The challenges people face in their day-to-day lives are like hurdles in the race we call life. To persevere through our struggles, we must find game changing solutions. Throughout our team's history, we have changed the game for countless groups in our area. We do so by promoting the development of leadership skills, engaging team members, assisting teams within our community, running demonstrations to further the reach of STEM and FIRST, staffing summer camps to guarantee that they are able to run, and creating original minority based programs to dismantle the hurdles ahead of them. Using creative and bold solutions, we are able to help students overcome the hurdles they face in STEM and ensure that every student crosses the finish line.

Over the hurdle

Team 461 helps its members leap over their hurdles through our communication, rewards systems, and team structure. Communication between team members is furthered through our use of BackOffice, a website custom designed by our team. BackOffice includes time tracking to know when and how long specific team members are at the shop, project boards to keep team members updated on the status of projects, a calendar for all scheduled team activities, and a badge system to assess qualifications and experience level.

Additionally, we have Brad Points, a newly established rewards system named after our head mentor, which are earned through attending team meetings, fundraising, and outreach events. The points are used to earn titles like Varsity and Junior Varsity team members, as well as fun rewards such as team bonding events, snack choices, and rooming placements. Since the creation of the Brad Points system, team members have become more engaged.

There are many positions on our team that allow students to hone their leadership skills. The positions include executive board members who deal with inter and intra-team conflicts, communicate with business, and coordinate events, subteam leads who are in charge of their respective subteams, and project leads who take charge of unique projects. Our executive board is elected democratically by our team members. Based on their knowledge, team experience, and dedication, the executive board promotes team members to subteam lead. These leads take charge of any one of the Technical, Outreach, Media, and Programming subteams. Often, students demonstrate leadership skills outside our defined subteams. When particularly motivated by one of these other areas, students will step into the role of a project lead and guide a group of students for a specific project. This system encourages our team members to leap over their hurdles by developing their leadership skills, creating their own unique project ideas, and fostering their creative growth.

The leadership opportunities that our team provides aid in the development of important skills that change the game for our students. As our team president and subteam leader of programming states, "Before I joined Team 461, I was more shy, but shortly after joining the team I gained more confidence in my communications skills, became more free to voice my ideas to my teammates, and after joining the high school team I easily had the capacity and experience to teach the other students on my subteam and run workshops in our community."

Lower the hurdle

We help other FIRST teams lower their hurdles by mitigating the challenges they face. Our team has aided, mentored, and started many new teams in our area. We also assist FIRST teams throughout the state by helping run events, providing resources for all teams on our website, aid with the set up and tear down of nearly all of the Indiana FTC and FRC events, most notably the complete set up and tear down of FTC IRI. We also had a major part in the startup of all four FLL Explore teams in our county. This year, in light of COVID-19 and the lack of space and recording equipment for FLL teams, we opened up our workshop to any and all teams in the area that needed space to record for their competitions and helped them with their submissions.

Additionally, we have created a FIRST Pipeline that ensures students in our district have a FIRST program to join throughout their years in school. To start students on their STEM journey, they begin our pipeline as part of our county's first two FLL Explore teams. Older elementary school students in our community can join any of our four FLL Challenge programs. Once students get to junior high, they transition to one of our two FTC programs. Through every step of the pipeline, the students participate in a sustainable team that was started, run, and mentored by our team. Out of our last three years graduates, 83% of our students will go on to give back to FIRST volunteering, mentoring, or starting their own teams. This is a marked improvement from our 21 year average of 50% of students heading to volunteering! Through our FIRST Pipeline we lower the hurdles in the way of our students allowing them to experience the wonders of STEM and FIRST.

Through the hurdle

Many existing programs in our area have hurdles. We elevate these programs by helping them dash through their hurdles by running demos and helping with event curricula, programming, planning, and execution. Within our own community, we help with the West Lafayette Library Family Fun Day, where we run a demonstration in our public library by bringing our robots and allowing children to drive them; through this, we are able to help expose kids throughout our community to STEM and FIRST. Partnering with other FIRST teams, we create and teach programming curricula to elementary students at CoderDojo STRIKE. Beyond the borders of our state, we are promoting STEM and helping scouts earn badges at Space Jam, a national Boy Scouts of America event. So far we have awarded over 3,000 STEM badges to scouts across the USA. We support our team sponsor, Greater Lafayette Commerce, with their STEM summer camps by leading engaging activities to teach approximately 100 younger kids about STEM topics every year. Through these sustainable programs, we are changing the game generations of students who attend these programs can learn about STEM without hurdles in their way.

Dismantle the hurdle

Throughout STEM fields there are many hurdles placed in the way of minorities. According to the most recent census data, 50.8% of the United States' population identifies as female. Despite this, the Bureau of Labor Statistics states that females represent only 25% of STEM professionals. Our team is breaking down hurdles young women face when expressing an interest in STEM at a young age by providing a variety of engaging programs. For the past three years, we have designed and taught a curriculum that has helped Girl Scout Troops earn their STEM badges. We have awarded more than 300 badges during these workshops. In conjunction with this, we started a series of in-house workshops to teach girls in our community the basics of coding. Through this program, we have taught around 100 girls within our community. This year, we expanded upon it by founding Girls in Engineering and Mechanics - or as we like to call it GEM. This hands-on, project-based program teaches hands-on STEM concepts such as simple machines, physics, and more. To ensure that we could continue to eliminate accessibility hurdles, all these programs are now available on our new YouTube Channel! These videos make all of our past and current curricula available to everyone despite the challenges and distance requirements caused this year. Overall, we've had a total of almost 200 views on our channel and an additional 200 through our outreach website.

We work towards the dismantling of hurdles that impede racial minorities through our continuous support of the Minority Engineering Program at Purdue University. We assist them in their yearly summer camps by teaching Scratch Coding, Game Design, and LEGO Sumo.. Additionally, we work to change the game for those with disabilities. We collaborate with Inspire to Innovate on Deaf Kids Code to introduce children who are deaf or hard of hearing to STEM. To further our impact on individuals with disabilities, we founded the first Unified Robotics program in the midwest United States three years ago. The Unified Robotics program began as an FLL style event for children with disabilities, however; this year, due to COVID restrictions, we moved our Unified Robotics Program completely online with easily-accessible digital videos and materials so students can replicate easy experiments that introduce STEM topics like density, polarity, and pressure. This extends to work within our own team, learning about how to interact respectfully with people who have a disability. These experiences are beneficial for our own members outside outreach events in daily life. Through our programs & partnerships, we change the game for STEM minorities by dismantling the hurdles which so often block their path.

Through our ceaseless efforts in boosting our team members over their hurdles, aiding FIRST teams by helping to lower their hurdles, driving our community groups through their hurdles, and dismantling hurdles for minority groups, we play our part in changing the game of STEM.