

FIRST Impact Award - Team 135

2023 - Team 135
Team Number
135
Team Nickname
Penn Robotics Black Knights
Team Location
Mishawaka, IN - USA
Describe the impact of the <i>FIRST</i> 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 <i>FIRST</i> programs as mentors/sponsors.
Members of our team learn critical engineering and communication skills, which encourages the development of a positive outlook towards STEM beyond high school. 91% of our teammates plan to attend college, and 77% are striving toward a STEM major. We also have over 17 Team 135 alumni currently mentoring FIRST teams or otherwise active within the FIRST community, including a national Dean's list winner. 77% of our teammates have expressed interest in volunteering for FIRST post-graduation.
Describe your community along with how your team addresses its unique opportunities and circumstances.
Our team is in a large school district, which connects us to a vast student population. We utilize this network by running large-scale robotics camps and workshops to teach various engineering concepts to youths. This allowed us to provide 618 individual STEM experiences just in 2022. This year, we also started Short Circuits, a robotics program where we directly mentored 232 3rd graders across 11 elementary schools, teaching them programming skills and FIRST core values at no cost to families.
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?
One of our most successful initiatives has been showcasing our program to industry professionals on a global stage. Last year, we presented at the International Manufacturing Technology Show (IMTS) for the 4th time since 2014. As the only exhibitors of FIRST, we emphasized its importance to an international audience. 18 members of our team connected with 3,255 companies, attendees, and students, showing them how FIRST gives its participants an industrial skill set to help them in future careers.
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
Members of our team encourage other teams to be active in all levels of FIRST. We support and host local events, including FLL tournaments, FTC kickoffs, and an FRC scrimmage and district event. We

also assisted 1 FLL, 3 FTC, and 5 FRC teams this year by giving feedback on Innovation Projects, evaluating robot designs, and machining parts. In addition, we have fostered coopertition by donating \$14,200 worth of robot components and materials to local FIRST teams over the past three years.

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

Through our work with teachers and parents in our Short Circuits program, we have bolstered interest for FLL in our elementary schools; we are prepared to start and mentor 3 or more FLL teams next season. In addition to supporting FLL, we are fostering growth in FRC programs. Most notably, we started and actively mentor our sister FRC Team 328 to prepare them for their first season. Since many of them are new to FIRST, we have spent over 400 hours mentoring them to help develop their skills.

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 keystone youth programs are the 10 STEM-themed camps and workshops we run for 1st-8th graders in our community. From teaching engineering design with LEGOs to advanced programming and manufacturing, we offer diverse learning opportunities. This past year, we saw a 29.6% increase and a 528% increase in our camp and workshop turnouts, respectively. With 91 students returning to experience our camps again within the past 3 years, we are fostering interest in STEM in those we teach.

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

One of our most prominent partnerships is with Beacon Health Systems, which directly advises our Mission to Engineer (ME) program. With their guidance, we have been able to expand our program to develop 7 adapted devices for 2 youths in our community this year alone. We are also working with our school's education foundation, the University of Notre Dame, and the National Science Foundation to develop, and fund the Short Circuits program and offer it at no charge to students in our district.

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

We make STEM accessible for our diverse community by ensuring that the programs we run are adaptive to students' individual circumstances. To ensure financial need is not a barrier for students interested in STEM, we provide scholarships for kids in our youth camps. Our team fundraises \$110,000 annually so our members don't have to pay to participate. We also promote an environment of low power distance: coaches, mentors, and students address each other as equals regardless of their differences.

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

Last year, to recruit more teammates, we held the Penn Counseling Initiative, where we encouraged our school counselors to promote the unique aspects of our team to potentially interested students. As a result, we had an influx of new members, which allowed us to start FRC Team 328. Through training in topics like CAD, manufacturing, and community engagement, we have spent over 400 hours teaching 328 the unique facets of FRC to strengthen Penn Robotics and ensure our program's future.

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

Our team builds connections with our sponsors through consistent communication. Through Twitter posts and Smore updates, we broadcast our team's activities and express our thanks. We invite sponsors to our lab to show them how their support impacts our team. Many of our outreach events also serve as opportunities to find sponsors. This is prevalent at conferences we attend, such as IMTS, where we build strong partnerships with companies. Since 2020, we have made 76 unique sponsor connections.

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

Since disorganization caused inefficiencies last year, we are improving our internal organization so that our team can excel. By creating expansive databases of our history, we can analyze our past successes and areas of improvement, facilitating knowledge retention and growth on our team. We have also redesigned our meeting structure to promote transparency; opening every meeting with student, mentor, and subteam announcements has encouraged efficient and thorough communication.

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

Our goal is to grow a FIRST pipeline to establish a strong STEM presence within our community. We are working directly with 8 local FIRST teams to give them the tools to be STEM leaders. Additionally, we are projected to start 3 FLL teams with our school board due to the success of our Short Circuits program. Our existing and new programs work in tandem to ensure that everyone has the opportunity to be the next generation of science and technology innovators.

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.

In February of 2022, our team was invited to represent FIRST as a medium for STEM in classrooms at IDEAcon, one of the largest ed-tech conferences in the Midwest. Thanks to our performance, the organizers invited us to present again this year and have also expanded the conference to include 27 student presenters. We are shaping the educational landscape in the Midwest by introducing FIRST to 121 educators and exhibitors at the conference.

Essay

We Are Team 135 Our team envisions a future where all students have access to STEM. We are making that future a reality by growing the FIRST community. We are leveraging our technical expertise,

interpersonal skills, and diverse individual pathways to grow STEM recognition nationwide. We are Penn Robotics, Team 135, and we are transforming our community and inspiring the world to change students' lives through FIRST.

We Are Sparking Innovation In The Youth We Teach Our team focuses on engaging students by guiding them on their STEM journey. This dedication is evidently shown in our annual youth camps and workshops, where we teach students fundamental STEM concepts through fun and engaging projects such as Newton's laws with bottle rockets and CAD skills through designing train cars. In an effort to meet the increased demand for our youth activities, we scaled up and reorganized our operations to accommodate many more students. As a result, we saw a 29.6% increase in Penn Robotics Summer Camps attendance and a 528% increase in Fall and Winter Workshops attendance. Over the course of 13 days and 31 projects, our team provided 618 1st-8th graders in our community with STEM learning and growth opportunities. Our Build-a-Bot camps introduce children to FIRST-style competitions, priming them for a fulfilling future in robotics. We are reaching younger generations through our camps and workshops, promoting technical development and showing them FIRST as a path to success. Over the summer, we worked in tandem with a local girl scout troop to develop a new program to get young students into STEM. With the troop's testing and insight, we were able to develop a new robotics program called Short Circuits. We debuted this program in our district's eleven elementary schools in collaboration with the University of Notre Dame, the National Science Foundation, and the Penn-Harris-Madison Education Foundation (PHMEF). We brought about a unique STEM experience for 232 3rd graders, teaching them valuable programming and problem-solving skills through an obstacle course challenge. By offering free afterschool programs like these, we are able to reach students across all socioeconomic levels and foster STEM interest across our area. At the end of the four-week program, we invited over 1,000 students, parents, and teachers to come through our lab and see the possibilities of FIRST in their future. Through meeting with our school board, we garnered interest in and secured funding for FIRST Lego League programs in our district. We are prepared to mentor three or more FLL teams in the next season. In just the first year of Short Circuits, we have instilled a newfound interest in robotics in the youngest members of our community. By building a strong network of students and educators, we are driving forward a momentous change in our community's robotics programs and in the lives of STEM-interested students for years to come.

We Are Supporting FIRST In Our Community Building a strong support network is key to growing FIRST. By hosting kickoff events, we assist and positively impact local teams. Over the past two years, we have provided informational sessions for 14 FTC teams and have given away a \$1,200 GoBilda chassis. We also utilize our resources to eliminate barriers for teams. Over the past three years, we have donated thousands of dollars of aluminum and other robot components to FIRST teams. Specifically, FRC Teams 7477 and 9071 and FTC Teams 14596 and 20027 were able to make use of our machining services; in total, we machined 42 parts at zero cost to the teams. We are fostering an environment of cooperation through helping our local FIRST teams succeed. By hosting and supporting competitions for all three levels of FIRST, we show our commitment to the program and act as a role model for other teams. Following the return to in-person competitions, we supported two FLL tournaments and ran an FTC League Meet. This season, we are hosting and co-running an FRC scrimmage event with FRC Team 5484 and are hosting a District Event for 34 FRC teams. We are cultivating a strong FIRST base in Northern Indiana by making sure that high travel costs are not financial barriers for competing teams. Through our actions, we are encouraging Indiana teams to support each other, ensuring the sustained growth of FIRST Indiana. Our team has also been spreading FIRST throughout our school. Last year, our team created the Penn Counseling Initiative, where we presented our program to our school counselors,

transforming their view of robotics. As a result, our program has seen a large increase in student numbers this season, which is why we were able to start our new sister team, FRC Team 328. We are dedicated to helping 328 grow through their first season. By sharing our workspace, we utilize opportunities to work directly with people who are newer to FIRST and help them grow their skills and confidence. Since August of 2022, members of 135 have dedicated over 400 hours to mentoring these students. Through working on joint projects such as wiring boxes, t-shirt designs, and manipulator prototypes, we have created a framework for future cooperation with The Golden Rooks.

We Are Broadcasting STEM And FIRST To The World We are raising awareness about the power of STEM in our community by showcasing robotics to diverse audiences. By connecting with teachers, we strengthen STEM pathways in classrooms across the state. This past summer, we introduced Indiana teachers to FIRST at Technovation, an education conference hosted at our high school. We also introduced FIRST to our district's student body. This year, we exhibited our program at Penn's Open House and walk-around events and Northpoint Elementary's Learning Spheres event. Through these efforts, we reached a combined 483 students and parents. Outside of our district, we have held a booth at the Ironhorse Cub Scout event for the past two years; this fall, we talked with 202 scouts and parents. Through promoting FIRST, we are establishing integral connections and increasing the visibility of robotics throughout northern Indiana. We are advocating for the development and funding of robotics programs in our community and across the state. In May of 2022, our team debuted Short Circuits to 350 partners and sponsors of our district's education foundation, PHMEF. We were able to raise \$30,000 in funding for the next four years of the Short Circuits program. Through directly interfacing with large corporate donors, we emphasized the importance of strong STEM programs in education to several of the biggest influencers in our district. We continued this momentous advance by traveling to the Indiana Statehouse for the passing of House Bill 1382 by the Education Committee. There, we advocated for funding for robotics programs across the state by speaking with district representatives and other officials to display the positive effects of FIRST robotics. Our team is spreading the word to increase awareness in the minds of public policymakers because we firmly believe in all children having access to STEM and FIRST. Accessibility is a cornerstone of Team 135, which is why we are continuously engineering a more inclusive community through our connections with Beacon Health Systems. This year, we reached two children, Brayden and Richard, and created seven unique Assistive Technology (AT) projects through our Mission to Engineer (ME) program. Some of these AT projects include a communication device to help Richard signal to his parents when he wakes up at night and a door opener for Brayden to help him travel around his home independently. As customized AT devices like these are particularly expensive, we develop them at zero cost to families. In order to expand the reach of the ME program, we attend and present at the Assistive Technology Industry Association (ATIA) conference in Orlando, Florida. Over the past 4 years, we have connected with industry professionals, AT makers, and individuals in need of AT. Through ATIA, we are growing our program and connecting those in need to those who can help. In February of 2022, we were invited to present at IDEAcOn, one of the largest ed tech conferences in the Midwest. At IDEAcOn, we promoted AT and FIRST to educators as ways to encourage STEM involvement in the classroom. Our presence subsequently inspired the involvement of more student presenters at the conference. This year, we traveled back to Chicago to present our ME program, Short Circuits, and information on how to start FIRST teams. By connecting with over 100 educators and other professionals, we are inspiring the next generation of robotics in the classroom. Through our presence at the International Manufacturing Technology Show (IMTS), we demonstrate the impact of FIRST on its participants to a global audience. As the only FIRST presenters, we show industry leaders how participation in FIRST hones skills—like problem-solving, communication, and technical expertise—which are invaluable in the workplace. Last year, we reached 3,255 companies, attendees, and students.

As a result of our presentation and networking at IMTS, we have made meaningful connections with companies like Blaser, Thermwood, Misumi, and Andresen to help us further the integration of FIRST and industry.

We Are Changing Lives We are building the next generation of engineers, business leaders, and innovators, ready to tackle the challenges of tomorrow. We are bringing FIRST to a national stage to increase its visibility and reach a broad spectrum of people. This season alone, we spent 4,078 volunteer hours creating an environment where everyone can experience the life-changing power of robotics. We are Penn Robotics, Team 135, and we are enacting our vision of FIRST for all. ;

