

FIRST Impact Award - Team 4145

2023 - Team 4145
Team Number
4145
Team Nickname
WorBots 4145
Team Location
Columbus, OH - 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.
In the last three years, 100% of our alumni graduated high school (92% is the district average), 100% went to college (83% is the district average), 92% pursued STEM in college (compared to the estimated 32% of Worthington alums), 2 volunteered at 2022 off-season events, and 4 returned to mentor this season. Our team members have an average 3.89 unweighted GPA (3.07 is the district average), and 69% of students are in PLTW courses. 89% of members cite FIRST as a reason they want to pursue STEM.
Describe your community along with how your team addresses its unique opportunities and circumstances.
Worthington Schools includes 11 elementary, 5 middle, and 2 high schools. Before our team, high school courses made up most of the STEM education opportunities. To catalyze STEM growth, we started 4 FIRST teams in the last 5 years, promoted STEM at community events, educated students about robotics, and advocated for STEM in our district. Recently, after finding out our high schools were remodeling, we advocated for STEM/PLTW spaces at both schools — expanding STEM access for years to come.
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?
Through hosting the CORI Invitational with the PAST Foundation (2018, 2019, and 2022), hundreds of community members, district officials, and FLL/FTC students see the impact of FIRST as 30 teams from the Midwest compete. By mentoring young students in feeder programs and creating training programs, we ensure that everyone can build a robot. 39% of our team comes from a feeder team (compared to 25% in 2021), and 78% of our team attended an outreach event before joining (compared to 55% in 2021).
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.

Published resources (safety seminars, posters, checklists, and kits; sponsor information sheets; and recruiting guides) and shared awards submissions at competitions have assisted 300 teams. We helped FRC 6916 get parts, cut parts, figure out design and strategy, and prepare for the season and now mentor the team. We assist teams at competitions with programming bugs, cheer teams on after presentations, and answer questions on social media. Mentoring FLL and FTC inspires future generations.

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

We started, financially assisted, and mentored 3 FLL and 1 FTC team. At one school, we started a robotics club in early 2022 to engage students; they are now on FLL 57154. We assisted FRC 6916 in getting parts pre-season and now mentor them. We answer team's questions on social media and through publishing resources. Recently, we helped FRC 8856 from Turkey learn more about outreach, talked to a STEM initiative in India about FIRST, and helped a student in Germany prepare to start a team.

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?

We demonstrate at after-school programs, curriculum nights, STEM camps, PLTW classes, orientation events, activities fairs, and community gatherings. We provide interactive activities at local library workshops, STEM fairs, science days, schools without formal programs, and in our shop for students from any Worthington school. These events introduced 78% of our current team members to FIRST, resulted in the creation of an FLL team, and encouraged students to join our FTC team when it started.

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

PATH Robotics provided a facility tour, and we have now acquired an electrical engineering mentor from there. Lake Shore Cryotronics and ATS Automation offered us engineering advice and internship opportunities. We have mentors who work for Honda and L3 Harris, two of our sponsors. PLTW teachers provide mentorship and assistance in reaching their students. FC Bank offered us space at Worthington Market Day. Impower.ai and Merrill Lynch reviewed our business plan and presentation.

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 more accessible in our K-12 pathway through contacting SWENext leaders, having an all-girls off-season drive team/pit crew, working with Girl Scouts, offering need-based scholarships to waive team fees, and lowering our overall team fee by 60%. Our pathway ensures that early access to STEM is unrestricted. 80% of our leads and 64% of members are from an underrepresented minority in STEM. With 92% of alumni pursuing STEM, increasing early STEM access diversifies local STEM careers.

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

78% of WorBots saw the team before through FLL/FTC and outreach, so they're eager to share FIRST with community members and mentor FLL/FTC. Each subteam documents what they have done and run a training program to ensure that knowledge is passed down from returning to new members. We built a rainy day fund and strong sponsor relationships, ensuring financial sustainability. We document and analyze the results of all outreach, allowing us to identify areas for improvement and preserve strengths.

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

Each summer, we drive through industrial parks to note STEM companies. We send letters, make cold calls, and present — emphasizing that FIRST is building innovators. Invitations to kickoff, tours, and season updates show the impact of sponsor support. Internships with sponsors engage them with our mission and demonstrate the program's impact. In 2 seasons, our team shifted from operating on a limited budget to entering each season with sufficient funding thanks to corporate sponsors.

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

We are working to improve social media presence to reach beyond our locality. This season, we appointed a member to run our existing pages and created a schedule to ensure consistency. We had new members look through our website and share questions they still had, allowing us to identify needed improvements. We have increased our average reach per post by 600 in the past year. We outlined benchmarks of success with current pages, which will allow us to start other social media pages when met.

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

Our goal is to ensure accessible STEM education in Worthington. We grew from a team of less than 20 students to a pathway with over 80 students across 5 teams. In the past 3 seasons, we increased our reach by thousands through appearances in local news and participation in 50 outreach/advocacy events. We built and mentored a feeder pathway starting in elementary school, recruiting students of all ages through local events, and leading to internship opportunities with corporate partners.

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.

We participate in Turn for Troops, where we turn pens on lathes and write letters for veterans on Honor Flights. In 2020, at the height of the pandemic, we 3D printed face shields to address a lack of PPE for essential workers in Delaware County. We participate in Habitat for Humanity. We also run food drives for the Worthington Resource Pantry. This season, we started a LEGO toy drive with our FLL teams for children at the Nationwide Children's Hospital — collecting 32 kits.

Essay

Established in 2012, the WorBots are dedicated to cultivating a culture of STEM in Worthington, Ohio by engaging, inspiring, and impacting our community. We join both Worthington high schools, Worthington Kilbourne (WKHS) and Thomas Worthington (TWHS), as partners in STEM education and inspiration despite them traditionally being considered rivals. For 11 years, we have brought STEM to our community by providing opportunities to learn in and out of the classroom, get involved with robotics, and access FIRST regardless of their background.

WE ENGAGE To engage community members, we attend local events to promote STEM and spread our message through media. We appeared in a subsection of the Columbus Dispatch in 2022 with information regarding the FIRST program. Both high schools featured us in the student news during our competition season and as we were gearing up for the 2023 season, which allowed us to reach over 2,500 students. In Worthington Schools' newsletters, information about our team and FIRST reached every household in our community (approximately 1,000). This year, we presented our program alongside FC Bank at the largest annual event in Worthington, the Worthington Market Day, where we talked to community leaders and families about FIRST and how they can get involved. This event reached 800 community members and engaged a new mentor.

At the WKHS and TWHS activities fairs, curriculum nights, and orientation events, we demonstrate our robot and provide information to 800 incoming students annually, resulting in over 80 students expressing interest in becoming a WorBot this year. This summer, we demonstrated at the Olentangy Caverns geology camp to 68 kids ages 6-11. For middle school students, we ran a mini robotics competition where participants built sumo and maze robots. 33% of participants in this competition went on to join the WorBots, and this event led to increased student interest at Kilbourne Middle School—sparking the start of FTC 16284. In early 2022, we started an informal robotics club at Wilson Hill Elementary to inspire students to explore STEM; those students are now competing on FLL 57154!

To ensure STEM is accessible for all students, we offer scholarships to waive team fees for those who cannot afford them, and last season, we allocated new sponsorship funds to permanently reduce team fees by 60%—further promoting accessibility. We also contact both schools' SWE chapters to ensure that women interested in STEM know about the options available through FIRST. In 2019, we volunteered at an all-girls PLTW summer camp session (the pandemic disrupted this, but we are resuming this summer). For our off-season events, we had an all-girls drive team who served as inspirations for young girls in our feeder programs. We also worked with a group of 3rd grade Girl Scouts in 2023, connecting them with FIRST and teaching them about the engineering-design process by letting them drive our robot, complete a mock initial design meeting, and do hands-on STEM activities. In the past 3 seasons, we have gone from 18 to 43% female, including 70% of student leadership. Through these efforts, we are increasing diversity in STEM.

WE INSPIRE After the season, we invite students and families from all grade levels in Worthington to tour our workshop and learn more about STEM and the FIRST program. We have seen the direct impact of these shop tours, as many students attending our 2018 middle school shop tour chose to progress to the FTC team started in their middle school the following year. In our Spring 2022 shop tour series, we

ran stations where elementary and middle school students could drive the robot, learn about the engineering and design process, and hear more about how to get involved. This series of 3 shop tours engaged 100 families from all eleven Worthington elementary schools. 74% of the attendees requested more information about FIRST. In Winter 2022, we invited our FLL students into our shop to learn about FRC and see our robot in hopes of inspiring those students to remain involved with FIRST.

We introduced 30 students between the ages of five and ten to our program through a robot demonstration at an elementary after-school program in 2022. At science days and fairs, we bring our robot and information about our team to inspire hundreds of students and families to get involved. At a local library, during Summer 2022, we helped run a 2-hour workshop introducing 47 elementary-aged children to STEM by modifying various types of robots to compete in a mini battle bots-inspired competition. To inspire students to build upon their knowledge, we demonstrated our robot and presented it in PLTW classes.

In 2021, to inspire Worthington students to join 4145 regardless of prior STEM experience, we expanded our pre-season rookie training program, so students could work in groups of 5-10 to build robots alongside returning team members and mentors. This ensures that students find their passion within the WorBots, develop knowledge and confidence, and build necessary STEM skills. This season, we expanded this program to include crash courses in engineering concepts. 85% of students stayed with the team after training. Our team also builds 2 robots during the season—a competition and an off-season competition bot—ensuring all students have opportunities to work on a robot.

For every “traditional sport,” there are cohesive pathways to encourage students of all ages to get involved; we are ensuring the same is available for robotics. We started four teams—FLL 44451, 44452, and 57154 as well as FTC 16284. Beyond starting teams, we sustain them by providing financial assistance and student mentors to our feeder programs. 39% of our current team members are from feeder teams compared to 25% of team members last year. Along with our FIRST pathway, relationships we developed during the 2021 season with ATS Automation and Lake Shore Cryotronics resulted in the team working with professionals who provided sponsorship, advice, and internship opportunities. Despite starting 11 years ago with little STEM presence in our community, Worthington students from kindergarten through college now have STEM opportunities.

WE IMPACT To impact Worthington STEM, we believe it is imperative to maintain our strong partnership with our school district. In 2021, we started a Robot Reveal event to strengthen our relationship. We invite board members, administrators, and principals into our shop to discuss the expansion of the Worthington STEM pathway, opportunities to grow STEM education, and the preservation of STEM classes and events (such as Worthington Science Day, which is operating again this year). They then see our robot and have the opportunity to drive it. Additionally, we seasonally invite them to the CORI Invitational, which we host at WKHS, where they can see FIRST in action and the importance of STEM events—solidifying discussions started at the Robot Reveal. The result of this event has been support from our directors of primary and secondary education in identifying coaches. Between 2021 and 2022, our schools began discussing remodeling TWHS and WKHS—a rare opportunity to expand generational STEM access. We advocated at board meetings to highlight the importance of preserving STEM classrooms and spaces, which the board recognized through both preserving WKHS shop space and expanding TWHS STEM spaces.

Within the FIRST community, we impact teams by consistently providing resources and mentorship. For

FRC 6916, Iron Thunder, we provided parts, sponsorship advice, administrative advice, and mentorship. We also invited them to meet with a supplies sponsor to help them develop corporate relationships, helping them remain involved as they were struggling with student engagement and retention. Throughout the season, we assist teams in many regards—from helping FRC 4121 with their code to sharing how we train new business members with FRC 4611. We impact FIRST globally through efforts in person and via social media. When a team member traveled to India, he brought team resources and discussed their potential with FIRST in India. Through social media, we talked to FRC 8856, Lapis Lazuli, about off-season events, engaging sponsors, and improving community involvement. We then shared resources we distribute at competitions. We also talked to a student in Germany who is starting a FIRST team with a university—reviewing their budget, business plan, and outreach ideas.

In the past 3 years, we have exponentially grown our community's access to STEM through outreach and feeder programs. In the past season, we have completed 40 outreach events reaching 26,000 community members. 78% of our team members attended an outreach event before joining—an increase from the 55% of members last season and 39% the year prior. Because of this increase, we mapped out the effectiveness of our outreach efforts, categorizing events by the long-term goal they work toward. From there, we compare reach to the total possible audience and list outcomes—including mentors/members gained, reach, sponsors acquired, and feeder teams started—and make any necessary adjustments.

Worthington students of all ages now have opportunities to get involved with STEM and we continue to spread STEM across our community. Our vision for a K-12 pathway of STEM has grown from ending with high school opportunities through internships with sponsors. Our students and their academic pathways are affected by FIRST—whether through internships or a newfound passion for STEM. 89% of our returning team members reported changing their career goals within or towards STEM thanks to the FIRST program, and 100% of our seniors state that they intend to remain involved with FIRST after high school. As the WorBots, we have connected two “rival schools” to make an impact felt by thousands of community members—effectively cultivating a culture of STEM in Worthington, Ohio.;

