

1. 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.

Over the past three years:

- 100% of our alumni have not only graduated high school but also continued on to college or other technical programs, in comparison to the graduation rate of 81% in Philadelphia
- 81% of RoboLancers alumni major/majored in a STEM field, and 84% of our team's alumni plan to work in a STEM field
- 21 alumni have returned to mentor, coach, or assist the team

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

- We are from Philadelphia; 68% of students in our school are classified as economically disadvantaged
- The demographics of our team closely match those of our city as we come from 40 different zip codes; 76.1% of our team are people of color and 55% are fluently multilingual
- 37% of children in Philadelphia live below the poverty line, compared to 16% of children in the United States. We waive team dues and travel costs for team members who cannot afford them.

3. 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?

Our team supports the *FIRST* mission to create recognition of the benefits of STEM programs for students by:

- Spreading our experience of the impact of STEM programs in the past year to over 1,200 students across Philadelphia through our many initiatives.
- Leading a LEGO robotics summer camp last summer where we reached 60 students at 4 sites
- Sharing our support of *FIRST* across 9 social media platforms, reaching over 2,800 followers and having over 52,000 views on YouTube

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

This year in *FIRST* we will/have:

- Run 14 events and volunteer at 7 other *FIRST* events in various roles. In doing so we represent to students the diverse groups that belong in STEM
- Mentor over 220 students on a regular basis, and also offer tailored virtual assistance to teams unable to have visitors
- Demonstrated our robot to Big Brothers and Big Sisters, and the Boys and Girls Club which ultimately led to a stronger relationship and increased access to robotics

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

- Started 82 teams in past 3 yrs, 71 teams this year
- We currently support 128 teams in Philadelphia; 32 FTC, 40 FLL Explore, and 56 FLL Challenge
- Mentored 23 teams for 100 hours total
- Assisted 52 teams who attend our workshops

- Supplied underserved teams with \$175K+ this year and \$236K+ in the past 3 years
- Assisted FTC 12308 and FRC 9014 in our shop and provided them with technical support
- Started 14 FLL Explore teams with Philadelphia Boys and Girls Club in schools and communities

6. 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?

Some of our additional initiatives spanning the past 3 years are:

- Running a panel on College STEM options for students in our school when college visits were unavailable due to the pandemic
- Starting a full-school implementation of FLL programs at Hamilton school where students compete on an unofficial team to advance to official FLL competitions.
- Bringing 20 students to Temple University to learn from engineering students about their work and opportunities after high school

7. 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

- Signed a contract with the School District of Philadelphia as an After School Enrichment vendor to guarantee continued support and secure payment for teachers coaching
- Partnered with Hamilton School, Phila. Parks and Rec, and the Boys and Girls Club to start summer and school year FLL programs
- Facilitated connections between our teams and sponsors such as Comcast and Exyn
- Ran a workshop at and toured the Temple Engineering facilities

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

- We brought in an expert to lead a workshop on promoting diversity, equity, and inclusion in our team
- This year, we are starting a 12-week long afterschool program designed to encourage middle school girls to pursue careers in engineering through hands-on experience
- We provided a unique perspective on equity and diversity to the FIRST community through “RoboEquity: Building Equity through Robotics for Underrepresented Youth”, a talk we gave at the 2022 FIRST World Championship

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

To ensure we continue to provide support to our community, members must learn about our mission and how we accomplish it.

- We provide mentorship training to new members who then shadow students in their mentor roles, giving them familiarity and experience
- Students are given opportunities to volunteer at many events and gain specialization in specific roles
- As returning members run events, new members support planning and management in preparation to later assume these key positions

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

We strive to have our sponsors actively participate in our team by:

- Holding design reviews where our sponsors listen to our ideas and offer guidance
- Encouraging their employees to volunteer at our events

To recruit new sponsors, our team attends various events where we demonstrate our robot and speak with attending companies in order to explain our program and work, and learn about their work with the hope that they will support our initiatives.

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

We are working toward offering higher-quality support to teams. This includes improving the quality of our mentorship and improving our coach training.

We are

- Reworking our coach trainings to cover more skills such as task prioritization, competition strategy, and resource location
- Developing comprehensive training curriculums for student mentors to improve the quality of the support we give

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

Our team's mission is to inspire and prepare the next generation of STEM leaders in Philadelphia, with the goal of providing every public school student in Philadelphia with access to high quality robotics programs.

- Each initiative we have created throughout our team history works towards this goal.
- We work to break down financial, transportation, and technical barriers within our city by team funding, direct mentorship, engaging workshops, and transportation accommodations

13. 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 team runs 5 coach training events supporting coaches from the School District of Philadelphia and other Philadelphia area schools.

- Sessions focus on establishing the role of a coach and providing perspective from students as well as sharing resources to jump start team success
- Provides coaches with hands-on experience to create confidence in the face of this new challenge
- Connects new coaches to veteran coaches, allowing for coaches to access support from multiple perspectives

14. Please use this space to ask 1 question to your *FIRST* Impact Award Judges which will be answered after each event with feedback from the judges (250 characters maximum).

What additional data would help further your understanding of our work?

In the 25-year history of the RoboLancers, we have experienced many barriers that prevent Philadelphia students from participating in STEM programs. Pillars of a successful FIRST team such as funding, experienced coaches, and events were lacking across Philadelphia, maintaining the barriers that made STEM inaccessible. Our team strives to break down those barriers and ensure STEM programs are equitable and accessible to all students.

## **FUNDING**

Historically, STEM opportunities and programs have had high participation costs, making them inaccessible to the vast majority of Philadelphia students. For many years, the School District of Philadelphia (SDP) was the sole provider of funding for robotics teams. Once that funding ended, many teams were unable to sustain themselves, and ultimately disbanded.

We were affected by this inconsistency and worked to acquire multiple streams of funding. As we became self-sufficient, we looked outward to help support our community. Since 2013, our support has gone from \$321 microgrants for a handful of teams, to running a full-fledged non-profit with a yearly budget of \$500K, and distributing grants of up to \$2K each to 128 teams across the city. Our non-profit, the Philadelphia Robotics Coalition, is our brand of outreach.

However, coordinating teams and events on a large scale in a city of over 124K students is impossible for high school students alone. In the past two years, we have hired two full-time employees to accomplish tasks we cannot. While our students volunteer, mentor & assist teams, apply for grants, and run events & coach trainings, our staff complete other essential tasks like opening bank accounts and taking daytime meetings.

## **COACHING**

Direct technical support is rarely enough to ensure the sustainability of a team. As we know, public school teachers are often overworked and underpaid. We've found that compensating coaches for their time spent coaching provides them with reassurance that their support is valued. This helps to create more sustainable teams. Currently, we are contracted as an official After School Enrichment vendor with the SDP. In the process of advocating for this contract, we guaranteed that coaches within the SDP would be paid by the SDP for time spent coaching. Last year, nearly \$100K was distributed by the SDP to these coaches and an estimated \$750K will be distributed this year. To provide even more support, we run 5 coach training events at the beginning of the school year. Our team members work directly with coaches to provide them with the knowledge and insight they need to successfully lead a *FIRST* team. Coaches build and program robots of their own with support from RoboLancers students and collaborate with coaches from other teams to create activities for their students while being introduced to the *FIRST* Core Values. Throughout the school year, we run additional trainings to provide coaches who were unable to attend the first training with the same knowledge and resources, and to create a space for coaches to ask questions and receive feedback and extra assistance.

## **WORKSHOPS**

In addition to establishing support for coaches, we run workshops to connect teams to one another. We run Design It!, Build It!, Program It!, and Drive It! to help guide FTC teams through their season. In order to create a successful program, we work to support and encourage teams in each stage of their season and allow teams to collaborate, while also connecting them to knowledgeable student volunteers.

## **MENTORING**

In addition to trainings and workshops, teams benefit greatly from individualized support. As our team grew, we knew we could provide a variety of technical assistance. In 2018, we began offering programming mentorship. However, we wanted to expand this resource to provide one-on-one support to all of our teams in different areas. This year, we've vastly improved our reach by connecting our students to teams in their neighborhoods. This utilizes our members' diverse backgrounds and skill sets to provide more widespread support. Through these efforts, we are also able to provide teams with role model representatives from their communities. In this year alone, our students have mentored 23 teams in a total of 102 sessions, impacting over 220 people across Philadelphia.

## **HAMILTON & SUMMER CAMPS**

For the 2022-23 FLL season, we embarked on our first attempt at a full-school implementation of the FLL programs at Andrew Hamilton Elementary School. This program required 218 hours of intensive support. Students participated in the program as a part of their digital literacy class. Hamilton students comprised the equivalent of 50 teams across all three levels of FLL. In November, we ran their internal qualifier, in which three FLL Explore and two FLL Challenge teams advanced to the official Philadelphia events.

In addition to this school-wide implementation, this past summer we began our first foray into running summer camps as a collaboration with the Philadelphia Department of Parks and Recreation and Inspiring Minds Philadelphia. These established programs provide us with the space, students, and support staff needed to provide free robotics programming opportunities to underserved youth. We ran the camps for 7 weeks at 4 different sites. Campers built and programmed robots for FIRST LEGO League Challenge under the guidance of RoboLancers students. The 60+ campers learned about FIRST and were informed on how to continue participating during the school year.

## **EVENTS**

We have discovered 2 major barriers to event attendance during our time supporting teams; geographic proximity and scheduling conflicts. If events were not accessible by SEPTA, our city's public transit system, we saw drastic drops in attendance levels from teams and students.



Whenever possible, we run our events served by major public transit routes. When this isn't possible, such as this year's FTC Qualifier, we charter buses to shuttle teams, bridging the gap between transit centers and the event venue. For FTC teams that want to compete at events outside of Philadelphia, we charter buses for them at no cost to them. Despite the vast majority of our events being SEPTA accessible, we also prioritize having varied locations in order to cut down on commute times. Of the 14 major events we're running this year, 7 aren't at our school. Secondly, weekend events are sometimes hard for students to attend due to work or family commitments, so we run our Program It! workshop and FTC scrimmage during the school day to allow more students to attend.

To provide events in the city to our many teams, we run 5 official events: the Philadelphia FTC Qualifier, 2 FLL Challenge RQTs, and 2 FLL Explore Festivals. In addition to official competitions, we run the Philadelphia FTC Scrimmage and RoboJawn, our series of offseason events for FLL and FTC teams intended to encourage continued progress after their official season ends.

We have volunteered at 33 events, 14 of which we have run, since the end of last season. Our team has dedicated well over 2000 hours to volunteering in support of our mission throughout this season alone.

## **FUTURE PLANS**

One of our newest initiatives is HackaJawn, an event that includes both a hackathon and an endurance FLL competition for high school students. Both competitions will last a full 24 hours and offer new and exciting ways for students to learn more about programming. Throughout the event, our team members will run skill-building seminars on an assortment of topics.

As we work to increase STEM equity in our city, we have designed a new initiative to involve more women in STEM. This initiative is entitled Women in Robotics and Engineering (WiRE). WiRE is a 12-week afterschool program intended to encourage middle school girls in Philadelphia to pursue careers in engineering. Each weekly meeting features hands-on engineering experiments led by female STEM professionals. Along with being connected to a network of role models and mentors, students will gain experience with the engineering design process by developing their own engineering projects and sharing them with their peers.

## **SUSTAINABILITY**

Providing support to so many teams requires our own continued sustainability. Through our robot demos at events such as the Society of Cable and Telecommunications Engineers Expo, the International Conference on Robotics and Automation, and the Philly Tech Week Signature

Event, we've been able to make new connections with prospective sponsors, recruit mentors, and further expand our reach.

Outside of building these relationships, we also demo our robot at our school's spring fair and speak to students at our freshman club fair. We invite students who aren't members of our team to drive our robots to continue to build a presence in our school community. To ensure all interested students have access to our program, this year we expanded our program by growing from three internal FTC teams to 6, including 49 more students and experiencing growth of 45%, solidifying our position as the largest organization at our school.

The impact of our initiatives on hundreds of SDP students is the most important part of our work. We are able to see the long-lasting effects of everything we do on the students we engage with. Students who have engaged in our programs recognize the value that FIRST brings and go on to create their own teams. Our team has facilitated education in everything from how to use a screwdriver to how to use a lathe. Students at our summer camp went from feeling like they didn't belong in STEM to developing leadership skills and building robots. Our work provides equitable STEM opportunities to historically underprivileged populations across our city. Through our dedication to our community, we utilize FIRST as a tool for change as we inspire and prepare the next generation of STEM leaders in Philadelphia.