Chairman's Award - Team 2220

Print Close

2021 - Team 2220

Team Number

2220

Team Nickname

Blue Twilight

Team Location

Eagan, Minnesota - 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.

We build global leaders who enhance their community; all students lead an outreach event, camp, or project locally or globally. We instill our core values: respect, curiosity, integrity, teamwork, inclusiveness, and happiness. Students develop technical and soft skills, and a passion for STEM. We prepare students for higher education; all continue their education, compared to our school's average of 53%, with >80% in STEM. We have 5 alumni mentoring our team and more who volunteer for FIRST.

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

Our suburban high school is renowned in speech and debate, and recognized for academics, theater, volleyball, and soccer. We are not a STEM school and have no special facilities for robotics other than our workshop that is located in the warehouse. While most team members are from EHS, we accept students from any local public or private school or home school. We consider our team to be a "robotics family", where students of any background can find a place to feel comfortable and have fun.

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?

We spread FIRST through 4 initiatives: EFR, WIRES, RWB and SIA. We have a progression of FIRST programs from FLL Jr, FLL, FTC to FRC. We provide encouragement and confidence for more girls to join FIRST. We ran FIRST robotics camps in Poland, Ukraine and India. SIA created 8 camp curricula to introduce robotics to younger students. We measure results by tracking the number of events, outreach hours, and people reached. We track hits on our website and facebook page, and followers on Twitter.

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

By focusing on COVID safe projects, we didn't let the pandemic stop us from conducting >2220 hours of STEM outreach. In the last 3 years we have hosted 60+ seminars both locally and at Championships ranging from robot build to outreach to creating a culture of safety. We mentor teams in safety, donate safety supplies, and created an FTC Safety Manual with UL. We advocated for women in STEM at the UN, annually hosted a Week Zero event, and ran summer camps in Poland, Ukraine & India.

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

In the past 3 years, we started 8 and mentored 33 FIRST teams. We started the first FTC team in the district and a FLL team in every district elementary school, with 7 umbrella programs in MN, Poland, & Ukraine. We inspired and collaborated with 5883 in Poland to expand to 101 FIRST teams; they run 5 FIRST events. We travel globally to advocate for FIRST by communicating with government officials, global sponsors, local FRC teams, and the UN. We started the first ever FRC Team in Ukraine (7851).

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 created virtual classes: Learn to Solder and Robot Build and Programming for 38 underrepresented students. 72% of students were encouraged to further pursue STEM. We assembled 50 STEM kits for students in the Twin Cities and 45 for the women's shelter. We run ~22 free STEM camps/year. We work with 1250+ Girl Scouts to earn badges at the MN Science Museum. We run robot demos at the MN State Fair, Eagan 4th of July parade and Summer Market Fest, for 5000+, 400, and 300 people respectively.

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 partner with FTC teams to run food drives. We work with 5 pre-season and off-season event hosts to run seminars on robot design, outreach and safety. We partner with a local non-profit to provide hands-on STEM opportunities to girls with disabilities. We collaborated with 2177 and 3883 to run female STEM professional panels. We partner with 5883 in Poland and 7851 in Ukraine to run robotics camps and grow FIRST. We support the UN by sharing STEM opportunities for low resource countries.

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

Inclusiveness is a core value. With a FIRST Equity and Access Grant we ran free robot build and programming classes for girls and students of color. We increase women in STEM with female professional panels and connecting with technology companies. We offer free hands-on STEM camps. We mentored a Somali team in their rookie year. We completed diversity training from FIRST. We discussed how we can model more inclusive behavior. We offer scholarships to economically disadvantaged team members.

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

Our team mission and core values guide the team towards our goals. Four key initiatives keep us focused on achieving our mission and impacting our community. We promote student leadership. Veteran team members train new team members. Students lead events and projects they are passionate about. We document our events and survey participants so that we can evaluate the impact and make improvements. To support our efforts, we track and manage our budgets and pursue targeted grants and fundraising.

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

Our long-term sponsors, 3M and Thomson Reuters (TR) provide financial aid and valuable mentors. Grants from Eagan Foundation and Eagan Rotary help fund our free STEM camps. We strengthen these partnerships by demonstrating our robot at key events: TR Unconference and 3M Robots Invade the Plaza, and by providing pictures and video to post on their websites. We created a fun introductory video about our team to share with potential new sponsors to demonstrate the impact we have on our community.

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

We would like our team to be more diverse. All team members complete diversity training from FIRST. This training helped us develop creative ways to increase the number of diverse team members. We advertise our team to be open to all students regardless of experience level, age, race, gender, or sexuality. We will broaden recruiting efforts by reaching out to student unions to increase diversity. Our team works beyond the limits of Eagan to encourage diversity and inclusion in FIRST.

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

To inspire future engineers and entrepreneurs, we spread FIRST and STEM globally. We annually host 4 FIRST events at our school: an FLL practice tournament, FLL and FTC qualifying tournaments and a Week Zero competition. We reach out to the underserved through free STEM camps and mentor inner-city teams. We support girls by building up their skills and confidence to succeed in STEM fields. We spread a culture of safety to other FIRST teams through seminars, mentoring, and assisting teams.

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 help those affected by COVID and other events. We immediately donated our N95 masks and created cloth masks and face shields. We assembled STEM kits outside to donate to kids affected by the George Floyd protests and in the women's shelter. We donated money and food by organizing 3 food drives. We created 8 gratitude baskets with treats and supplies for first responders dealing with COVID. We developed a Robot VPN to enable remote robot driving, allowing many more students to safely compete.

Essay

ADAPTING TO THE PANDEMIC

In March 2020, the COVID-19 virus became a health threat in the US, promoting a travel ban and closing businesses. The pandemic has changed how our team attends school, participates in extracurricular activities, runs robotics meetings, competes in competitions and holds outreach events. We held outdoor meetings where we wore masks and enforced social distancing. We included an online option for meetings to ensure everyone could participate. Despite the pandemic, Team 2220 Blue Twilight upholds our team mission: to conduct STEM outreach, build student leaders and expand FIRST locally and globally. We demonstrate our core values of teamwork, curiosity, integrity, respect, inclusiveness, and fun. We have created new ways to impact our community by adapting during the pandemic.

While the COVID-19 pandemic ran rampant across the country, our team worked to benefit those who are struggling. We have restricted in-person activities to protect the well-being of everyone. We donated 90 N95 masks and 132 hand-sewn cloth masks. We collaborated with Team 2052 to make 3D printed face shields and made ear savers to donate to local hospitals. We partnered with an architecture group in Minneapolis to build STEM kits for kids affected by the George Floyd protests in the Twin Cities. We designed, assembled, and donated STEM-at-Home kits for three age groups at a homeless shelter. We recorded and uploaded tutorials to our team website on how to use the kits. We got feedback from the children on what they enjoyed and on what could be improved. 88% of the students rated the activities good to excellent. We presented virtual training seminars for other teams. Topics included COVID Meeting Safety, CAD and 3D Printing, and Robot VPN: our system that allows teams to remotely drive their robot. We virtually presented safety to FTC teams and participated in a virtual sponsor event to increase awareness of FIRST. We organized multiple food drives and expanded our impact by partnering with Eagan FTC teams. In total, we donated 1747lbs of food and raised $245. We adapted our projects to support our community during the pandemic.

Team 2220 developed Robot VPN, an innovative system utilizing Raspberry Pis to program and drive robots over the internet with about 200 milliseconds (imperceptible) lag, where the driver can be anywhere in the world with internet or cell service. Robot VPN is designed for students who are unable to return to school during the pandemic, and it allows students and team sponsors to safely work on and practice driving their robot while minimizing in-person contact and Covid exposure. Robot VPN also provides the opportunity to conduct multi-robot remote matches. We gave a virtual presentation about the system at a local training event and worked with AndyMark to publicize and provide a prepackaged system. A supply list and a complete step-by-step guide for the system is available on the Team 2220 website and linked in an AndyMark newsletter. We saw visits to our website increase from 30 to 450 in a day, not only from the U.S. but from all over the world.

We held two virtual STEM classes funded by a FIRST Equity and Access grant: How to Solder and Robot Building and Programming. We assembled supplies and created a soldering kit that was delivered to students' homes. All materials for the classes were provided at no cost to the students. Students selected for the classes were girls, students of color and economically disadvantaged students, with priority given to students who were previously on an FLL team. We ran a special Robot Building and Programming class for Native American students on FRC Team 7235 from the Red Lake Indian Reservation. We were able to see some of the challenges that they face within their own team. Team 2220 students led the online classes using web cameras and provided step by step instructions getting frequent feedback. "This class vastly helped me improve my skills in robotics. These skills will definitely stick with me when I hope to become an aeronautical engineer in the future." ~ Amaan.

OUR STEM OUTREACH INITIATIVES

Through strategic planning, we have created four comprehensive initiatives that provide sustainability and have been a guiding light in the past and throughout the pandemic. Eagan FIRST Robotics (EFR) spreads FIRST robotics in our local community, Women in Robotics Empowering Sisters (WIRES) works to increase women in STEM, Robots Without Borders (RWB) spreads FIRST robotics around the world, and STEM in Action (SIA) promotes STEM opportunities for underrepresented students.

The EFR initiative expands FIRST Robotics in our local community. We were the first FRC team in our district. We started the first FTC team at our school and an FLL team in all 19 elementary schools in our district, assisting and providing funding to these teams. We have significantly grown the FIRST program at Eagan High School, as we have FRC, FTC, FLL, and FLL Jr. teams, allowing for the full progression of FIRST, making FIRST sustainable in our community. We support EFR with a 501(c)(3) booster club that offers scholarships to students in need.

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Women are under-represented in STEM and on robotics teams. WIRES increases the awareness and opportunities for young women in STEM by introducing them to robotics and numerous STEM career options. We started our rookie year with 17% girls and have increased to 40%. We have 50% female leadership and have had female captains for five years in a row. This year, instead of meeting in person, we held our Cookies, College, and Careers panel virtually to introduce high school students to female STEM professionals. We continued our work with PACER, an organization focused on supporting and giving opportunities for disabled young adults. We created and assisted with hands-on STEM workshops so girls can explore their interest in STEM. Workshops included a volcano experiment, exploring the physics of roller coasters and coding sphero robots.

Our impact resonates not only in the local community but around the world. We founded RWB to spread FIRST globally. We partner with the Team 5883 to grow FIRST in Poland by demonstrating robots for schools and businesses, and advocating for STEM with government officials. We donated 2 FLL kits to start the first 12 FLL teams in Poland and they continue to build more teams. We presented to potential sponsors and teachers, and demonstrated robots at local schools. We ran FLL and Line Following Robot (LFR) camps in Krasnik, impacting over 40 kids. We ran STEM camps in Gdynia and Gdansk, the first of their kind in N. Poland. We assisted the first ever FTC/FLL off-season event in Krasnik. "Team 2220 has been mentoring us since our rookie year 2016. Thanks to their priceless support 5883 Spice Gears has developed immensely!" ~ Bartosz, 5883 Coach.

Partnering with 5883 and URGE robotics, a non-profit established to develop robotics and STEM, we started 7851, the first FRC team in Ukraine. We introduced FIRST Robotics at two panels for technology leaders in Kiev to inspire starting more teams.

We partnered with Space Kidz India, an organization inspiring students in STEAM, to introduce robotics. We ran summer camps in Chennai including LFR, FLL, and Safety, and conducted robot demos, impacting over 50 students.

We leveraged STEM programs to help the United Nations (UN) achieve the 17 Sustainable Development Goals. At the ECOSOC Youth Forum our input was included in their final recommendations. We met with UNESCO in New York to advocate for STEM opportunities and FIRST, and in Paris we continued our STEM advocacy with Engineers without Borders. We were invited to the UN International Day of Women and Girls in Science, where girls from our team presented 3 STEM opportunities for students in economically disadvantaged countries. Through our established partnerships, we continue to advocate for STEM and FIRST around the world.

We created SIA to change the lives of underserved and under-represented in our local community. SIA provides STEM opportunities for students through innovative events, free STEM camps, and hands-on activities. In 2019-2020, we ran 22 free camps for children including at our local homeless shelter to give them the opportunity to learn about STEM and FIRST robotics. These camps include eight curriculums that we developed (CAD, Website Design, Arduino Programming, Robot Programming, Drone Hacking Workshop, Line Following Robot, and two different pre-engineering camps) as well as FLL and FLL Jr. robotics curricula.

We organized a donation of FTC parts to a local team with students on the autism spectrum so all of their students could build a robot. We ran a SIA Day, where 234 students learned about topics such as Artificial Intelligence, STEM Careers, Cool Tech, and Startups. We partnered with a sponsor to run a Young Female Leaders Workshop, attended by 150 girls.

BUILDING GLOBAL LEADERS
All students on our team become leaders, leaders who make a difference in the world throughout their lives. Team members learn about different cultures, local and international technology companies, and how to engage and influence stakeholders. Students gain hands-on training in robot design/build, safety and outreach, as well as crucial soft skills. "Robotics helped me in every job interview and internship. I would not have been able to get any internships if not for my experience with FIRST & Team 2220." ~ Hans, 2017 Alum.

We have changed the culture of our school, our community, and our world through STEM outreach, student leadership, and the expansion of FIRST locally and globally. We host seminars and share resources with other FIRST teams. We changed the culture of our team to get more girls involved in STEM. We change lives by giving students around the world access to STEM and FIRST. With the global leaders we build, our goal of "lighting up robotics, lighting up the world" has become a reality.