

FIRST Impact Award - Team 2202

2023 - Team 2202
Team Number
2202
Team Nickname
BEAST Robotics
Team Location
Brookfield, WI - 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.
2202 encourages individuals to develop their interests, skills, & pursue STEM careers. Rookie members explore sub-teams to find their place. We surveyed alumni to ask what impact 2202 had on them: from 65 responses, 91% pursued a STEM career with 88% attending 4 yr university. Many expressed that 2202 introduced members to new career paths. 2202 also impacts mentors. 14 out of 37 current mentors have remained on BEAST even after their children graduated, & 4 BEAST alumni are mentors.
Describe your community along with how your team addresses its unique opportunities and circumstances.
BEAST unites 2 rival Brookfield Schools. 4 mentors are district educators; this allows grass-root advocacy for STEM education to the school board. Waukesha County Technical College offers dual enrollment opportunities for students. Manufacturing accounts for 26% of employment in our county. Local businesses provide materials & sponsorships for teams & career possibilities for alumni. Proximity to Milwaukee allows us to be ambassadors of FIRST at events like Maker Faire MKE.
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?
From our STEM Camp to visits at local school Science Fairs, we inspire kids to join FLL. Enrollment lists show 58 campers who attended our STEM Camp joined FIRST in our district. During COVID, we adapted to create a STEM Camp At Home experience on YouTube, with a video gaining 43,000+ views. We reach 12,000+ people annually in the July 4th Parade. We showcase FIRST at the Holiday Market, & to 3,000+ visitors at Discovery World National Robotics Week.
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
2202 leads workshops at FRC Training Day; KOP & programming. Students & mentors volunteer at FLL, FTC & FRC competitions & mentor district FIRST teams. We practice sustainability using solar-powered batteries for shop tools & advocate for solar panels in our new robotics space. At past competitions, we

offered teams \$500 grants to be more environmentally sustainable in their communities. We lead by example to reduce stigma around mental health by joining AFSP's Out of the Darkness Walks.

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

We mentor team 13201: started by 3 BEAST students in '17. In '20, we started FTC 16310 & 16460. 2202 logged 4,600+ hours for the past 3 yrs mentoring & supporting FLL & FTC in our district. After 200+ hours planning & hosting our FLL scrimmage, we assist our subsidiary teams to run similar events. In '23 we spent 68 hours volunteering at FLL Lakeshore Qualifier & BEAST members assisted FLL team 55696 prepare for judging at State. A mentor of 7+ yrs is on the FIRST WI Board of Directors.

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?

In '17 a student started our STEM Camp for 4th-6th graders to gain exposure to FIRST & has since passed that leadership to BEAST members. 17 FLL teams & 5 FTC teams were created in our district. We've documented a 27% conversion from Camp participation to FIRST teams in our school district. A child's parent shared "as soon as she came home she downloaded the programming software & was so excited to show the work she did...Thank you for providing the training to make this possible."

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

BEAST Robotics played a role in the development & growth of a program called LAUNCH; an experiential learning program in our community that provides students with academic & technical knowledge & skills, to engage in hands-on projects, guided by professional mentors. We helped inform the design of the robotics & IT strand within the program & facilitated business partnerships. Both 2202 & LAUNCH set up students for real-world applications of skills that will help them "Go Pro".

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

Inclusion & equity are core values of 2202. Both team captains in '20 were transgender students. We normalize girls in STEM; this year 50% of student leadership is female. During the '22 STEM Camp, we saw our largest increase in female camper participation: 217%. We spent 1100+ hours in '22 & '23 mentoring FTC 19417, the first all-girls team in our district. In '22 & '23, Girl Scouts toured our shop, saw a robot demo, & created FIRST buttons.

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

Our "Feeder System" sets the foundation for FIRST growth from the youngest levels up. As an intro to FIRST, 2202 participates in local elementary school science fairs. Another FIRST experience is our summer STEM Camp, which leads students to join or start FLL teams. In the past 6 yrs, we've seen a progression of students into FIRST teams with an explosion of FTC teams in our district. We've made FIRST an integral part of our community by inspiring new STEM leaders & innovators.

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

past 3 years

We're proud of maintaining a diverse portfolio of 49 sponsors. With an average relationship of 4.14 yrs. Our top 10 contributors have given 71% of our lifetime income & our 2 biggest donors, GE & ABB, have given 30% (\$93k). We engage our sponsors with robot demos, shop tours, advertising, & newsletters. Sponsors partner with 2202 by machining parts, providing tools, & sharing industry knowledge. Sponsors utilize our team as a talent pipeline hosting company information sessions for 2202.

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

Historically, 2202 has struggled with rookie engagement. Since '21, we've seen a 31% increase in team membership. With our large team of 76 students, we divide our team into an A/B split. Each half meets separately during the week allowing a 2:1 Student-to-Mentor ratio & enabling sharing of institutional knowledge. Rotations during pre-season allow rookies to learn about & find a subteam of interest. Since '20, we noticed a 70% conversion rate of rookies continuing to a 2nd season.

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

2202 strives to make FIRST available to every student in our district & has advocated to include integrated Robotics education for the past 5 yrs. This year, we achieved our goal with the addition of our school district's new Robotics & Automation course so 4,173 students in our middle & high schools now have access to STEM classes. Introducing students to robotics & seeing our members work on BEAST projects for class credit will motivate other students to join FIRST.

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.

Through community support, the school's auto shop will be renovated into a dedicated robotics space & full FRC practice field. 4 school board members toured our existing space to identify 2202's needs & the district facilities head attended BEAST meetings. We participate in ongoing roundtables w/ administration, the superintendent, & LAUNCH to develop STEM courses & further shared goals. We met w/ the superintendent in '19 & LAUNCH in '21 to discuss integrating robotics into the curriculum.

Essay

Mission To spread FIRST to every student in our district, so they learn STEM skills, leadership & teamwork in an engaging environment while making a positive impact on our community & having fun!

Intro 2202 embodies the message of FIRST in our actions, initiatives, & outreach by sharing FIRST skills & benefits to students across our school district. We advocate for positive change in all levels of society & government, & honor the community built by our team over the years. Each season, we work diligently to cultivate & maintain that growth in our community.

Our goal & mission remain: invite & engage all students interested in exploring STEM to join FIRST Robotics. Rookie participation accounts for 51% of BEAST this season & we've seen a jump in membership from our subsidiary FTC teams. BEAST remains a growing model for STEM education in our community.

Inclusion 2202 began at Brookfield East as B'East Robotics. In '13, we opened enrollment to Brookfield Central & became BEAST: Building Education & Awareness for Science & Technology. Our schools are fierce rivals in sports & academics but on BEAST we are united.

Our goal is to promote STEM beyond stereotypical demographics. 2202 sets high standards, demonstrating how non-males can excel as members & leaders of our team. Our team of 76 students - 22 females, 53 males, & 1 non-binary - is organized into self-directed sub-teams to fulfill team goals, beyond building a robot.

Technology tools adopted during the pandemic season continue to be incorporated into our team culture making collaboration more effective & outcome driven. This season brought cross-team ideation & design prior to robot construction.

2202 welcomed 12 rookie mentors this season. 2202 captures institutional knowledge by retaining 14 long-term mentors: 9 w/ 5-9 yrs, 3 w/ 10 yrs, & 2 w/ 15+. Our 37 mentors include 4 FIRST alumni, 6 BEAST alumni, & 17 sponsor employees. We nurture long-term relationships w/ sponsors who provide custom machined parts in addition to funding. In return, we promote these sponsors in our community. In '22, we participated in MKE Tool's FIRST day, Trace-A-Matic's facility tour, & Boyle-Fredrickson visits annually to teach BEAST patent law. Through our community-driven newsletter, we keep sponsors informed on progress while also publicly thanking them for their donations.

Equality 2202 has a unique sense of belonging & community. Ensuring equal opportunities on the team is a core value of 2202. 50% of our student leadership is non-male. All are seen & heard on BEAST regardless of seniority or gender. We're proud that both team captains in '20 were transgender students; by emphasizing representation we support the LGBTQ+ community.

Mental Health Reducing the stigma around mental health is more important to us after a team founder died by suicide. BEAST serves as a support network for students to talk about personal struggles. We work w/ the American Foundation for Suicide Prevention, where 104 members, family & friends walked w/ BEAST in the annual Out of the Darkness Walks. We raised \$6K+ to increase awareness about suicide prevention.

Interaction STEM Camp BEAST students volunteered 6,700+ hours to run our annual FIRST Summer STEM Camp over the last 9 yrs. Campers build & program LEGO EV3 robots & do STEM experiments. This program is an introduction to FIRST; students grades 4-6 see demos of FLL, FTC & FRC robots. Our camp effectively boosts interest in FIRST in our school district: we have documented a 27% conversion rate from participation in STEM camp to membership in FIRST & 10 campers have already

joined BEAST. ⅓ of our district's all-girls FTC team, Superstellar, attended prior camps.

To empower other FRC teams to create their own camps, we launched a free website w/ instructions, activities, & schedules. Teams utilize our documents to easily run a camp & spread FIRST to drive FLL enrollment in their communities. The site has 858 lifetime pageviews from 316 unique visitors.

In '20 we pivoted to STEM Camp At Home. We created 15 experiments on YouTube that campers could do using household items. Topics ranged from coding to chemistry. Continuing to make an impact, our model lung video has grown by 26K+ views over the past 10 months to a total of 43,000+ views.

Supporting FIRST Programs Over the past 4 seasons, 2202 logged 4,600+ documented hours mentoring & supporting FIRST in our district.

2202 Started: 3 FLL teams. Assisted: 27 FLL teams. Mentored: 12 FLL teams. We 3D-print parts for their projects & help them w/ CAD.

In '17, we achieved a long-standing goal of starting FTC. We now have 5 FTC teams in our district: 13201, 16310, 16460, 21180 & 19417. BEAST secured a classroom for FTC teams to practice. 2202 mentors FTC teams, machines parts, & help them secure grant money. 2202 volunteers at FTC qualifiers. All teams qualified for State in '23. 2202 maintains a partnership w/ FTC; we volunteer at their scrimmages & they volunteer at our STEM camps.

BEAST started FRC teams 5188, 4095 & 6223 & mentored teams 1747, 171 & 4247. We support FRC teams by volunteering 32+ hours at FRC Rock River Offseason Competition & the WI Regional Competition.

Community Outreach & Service At Discovery World's Robotics Week, we demo our robot for 3000+ patrons. In the July 4th Parade, we impact 12,000+ people annually. 2202 serves our community. We stocked 1,500 food boxes & ran food drives raising \$3,300+ for Hunger Task Force, & played volleyball to support the Elmbrook Rotary Club's annual Spikes for Tykes fundraiser.

Annually, we demo at Maker Faire's Robofest & we wow kids at Dixon elementary's science fair. Girl Scouts toured our shop & designed FIRST buttons. Attending MKE Tool's demo day, we showcased our robot & they gave a tour of their facilities. Alumni remain connected, we gave tours on Alumni day to former team members' families. At a STEAM Event by the Elmbrook Education Foundation, participants saw our robot in action; connecting community partners & students through hands-on experiences, to increase exposure to aspects of FIRST.

School Partnerships We successfully advocated for paid Robotics FTC & FRC coaches at our schools. Our team secured a dedicated FIRST space in the school for our shop. We regularly communicate w/ school administration & the director of LAUNCH, a Center for Advanced Professional Studies program, to discuss shared goals. Our team helped inform the design of the Robotics & IT strand w/in the program & facilitated business partnerships.

Government Relationships Inspired by our action at the '19 FIRST National Advocacy Conference, we became a founding member of the WI FIRST Advocacy Committee in '19. The goal is to grow the number of FIRST teams in WI by advocating for increased funding & support for FIRST. A team member

led the "Dos & Don'ts of Talking w/ Congresspeople " workshop at the FIRST WI Advocacy Day in Feb '21. BEAST spent 92 hours planning for & implementing the '23 WI Advocacy Day where they led meetings w/ elected officials & drafted a document to the Governor proposing increased funding for the DPI grant.

Investment 2202 is dedicated to shaping STEM education through the lens of FIRST. Advocating to incorporate Robotics & Automation into school curriculum, 2202 capitalized on partnerships w/ the Elmbrook Education Foundation, LAUNCH, the school board, & administration. Leveraging our competition success we influenced administration to utilize the curriculum renewal process to increase engineering opportunities. Through partnerships w/ local industry leaders such as ABB & Gateway Manufacturing, a curriculum closely aligned to industry work will train students for STEM careers. 2202 is not only a club but a mainstream pursuit. For the 1st time in our school's history, all 4,173 middle & high schoolers can take advantage of Robotics & Automation from the '23/'24 course catalog, & all 7,196 students district-wide have this opportunity going forward.

Our team began w/ 10 students, 2 mentors, & a toolbox. As our team has grown, we expanded from toolbox to hallway, class woodshop to shared theater. Our school's auto shop will be renovated, w/ construction beginning June '23, into a dedicated robotics space to meet FIRST field measurements. Serving as a collaborative area, classes on Robotics & Automation will run through the day & function as team space after school. Through initiating interactions w/ school administration, lobbying at school board meetings, & support from community partnerships, the district passed \$1.6m without referendum. After recognizing 2202's success, the board accommodated a full field, pushing the project beyond tentative estimates for a half field.

Environmental Sustainability Our Sustainability Initiative is: reduce single-use plastic consumption, use solar-powered batteries for our cordless tools, & redistribute unused team apparel. In '20, we awarded 2 grants for FRC teams at the Duluth Regionals to become more "green." Teams submitted a form describing their environmental initiatives & what positive changes they could make w/ the grant. 2202 proposed an Environmental Sustainability Award to FIRST. This year, we further our initiative by partnering w/ LAUNCH to propose our district's 1st net-zero space. With 2 mentors on the design team, BEAST aims to include solar panels & low-e glass for our new robotics space.

Conclusion We met the goals we set 7 years ago to establish a strong progression of FIRST programs in our district. 2202 will continue to make FIRST inclusive for every student in our district. We are nurturing relationships with our elected officials to ensure support for FIRST. We are continuing our plan to incorporate sustainability within our team & community. 2202 instills a culture of FIRST & STEM in the world around us, building a long-lasting program that will sustain innovation & collaboration for years to come.;

