

FIRST Impact Award - Team 4039

2023 - Team 4039
Team Number
4039
Team Nickname
MakeShift Robotics
Team Location
Hamilton, ON - Canada
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.
100% of graduates pursued post-secondary education in last 3 years, 15/16 in STEM fields 10 Specialist High Skills Major with a Robotics Co-op students 3 graduates offered McMaster FIRST scholarships, 1 won Women in STEM scholarship Last 4 years, 6 students received St. Mary Robotics scholarships(\$18,000) 11 graduates mentor our team & 3 other teams & 1 grad started 3 Windsor teams 10 members volunteer at official FIRST events-ref, announcer, volunteer coordinator 2 alumni now work for sponsors
Describe your community along with how your team addresses its unique opportunities and circumstances.
Hamilton is a steel city of amalgamated smaller towns & is transitioning to tech & manufacturing. MakeShift was the 2nd FRC team in town advocating in our board for financial support for any FIRST team which inspired many more teams. We adopted a collective sponsorship model to support teams in our board (AMD) & FIRST Canada (MDA). Our school is in declining enrolment but our Robotics team attracts students to the school. During COVID we took in students from other schools with online meetings.
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 started Instants of Inspiration, a simple pop-up robot demo like going to a movie or farmer's market with our robot. We reached 6610 people We had a VIP Match with the Dean of Engineering resulting in an FRC district at McMaster University & \$90,000 in FIRST scholarships Our workshops are rated at 5/5 for benefit 11 teams who didn't compete 2021 attended STEMley & are registered this year. Our Robot Featured in Lifetime Movie "The Price of Fitting In." Ratings showed 203,000 saw our robot.
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.

MakeShift's motto "live within your means" helped us manage through COVID. In 2020 we shared our adapted plans for safe meetings & outreach at the Gateway Conference. Our build-a-bumper squad helps teams at events get on the field. We made prosthetic fingers for 2 people through ENABLE & shared this at the conferences. At STEMley, rookies don't pay & use our robot to get off to a good start. Our Anybot program provides FTC rookies with a solid starting point- used by 7 teams in 2021.

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

We start teams through: -multi-year advocacy results in school board funding. Visiting schools, touring events resulted in FRC 7509 & 9098 We assist with: -resources Compass Alliance & FIRST Alliance - FRC Practice Field increase team success -Boost Award, funds we award to team with potential -FLL Practice Tournament We mentor directly: - FLL teams 41339(2021),54588(2021,22), 28055,54588(2022) -FRC teams 9098(2022/23) -FRC 6342(21),FTC 16421(2019,20,21) attended our virtual training & meetings

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?

Sidewalk Science- children find a science topic written on a park sidewalk & chalk to write down their questions & answers appear later, resulted in 38,867 social media impressions STEM workshops: Cubs(2019), Brownies(2019/20) & 4H Club(2019,20), Ron Joyce specialized camps (2020,21,22,23) reaching 259 children earning positive feedback "Inspiring!" FLL mentoring & Practice Tournament - all teams that we supported advanced to provincials. Support & advocacy increased growth of FLL 50% back

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 partnered with Ron Joyce Children's Center - Go Baby Go provides modified, ride-on cars to toddlers with mobility issues. They create their own cars now. St. Joseph's Healthcare infection control & sterile processing resulted in 858 3-D printed face shields for hospitals, nursing homes etc. We work with other teams & Board to offer events – STEMley Cup(40 teams helped to restart), FLL Qualifier (giving them an in-person experience) & practice field supporting teams from Kingston to Niagara.

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

We created an Inclusivity session based on our rainbow theme "every colour brings something to the team" We allow students to join our team who don't go to our school Students research female STEM role models & create videos to inspire for Girls aRe Brilliant campaign. STEMATHON participation & All Girls Summer Camp to empower girls We demonstrated robots at the McMaster Indigenous STEM camp (2018) & mentored 7609 Indigenous STEAM Academy (2018-2020) Mentored Lesthote FIRST Global team (2021)

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

4039 knows we can only achieve goals through relationships. Our strong support in our school board ensured FIRST teams retained funding. Collaborating with our peer teams & FIRST Canada allow us to offer events ensuring ongoing volunteers. Our workshops exist in partnerships ie Ron Joyce, & other FRC teams. In addition, our motto of doing the best with what we have & our business model ensures we have finances to navigate difficult times. Every team member must seek sponsorship & alliances.

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

We suggest collective sponsorship. For example, Innovation Park sponsoring our practice field & PEO sponsoring our off-season event so they can support multiple teams. We create events to strengthen our relationships. For example, a mentor set up a challenge between MDA engineers & FLL teams. Our work extends our sponsors' corporate responsibility. For example, a team member was profiled in the Arcelor Mittal Dofasco sustainability series. We include sponsors in our media coverage

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

We wanted to improve student experiences. We engaged students in a quality review determining our onboarding needed to be more hands on. At a 2019 off-season, we had rookies be the "hands" of our experienced members. We also created student-led pods called CANS (Creating Awesome Now), which strengthened online connections Onboarding interviews done by alum mentors to determine student goals. Ensuring students drive the agenda – determining the direction of biomedical or environmental outreach

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

Our goal was to restart teams. Pre-COVID we set a goal to start a team in every board secondary school. We secured funding, mentored and in 2020, 7/7 of our secondary schools had a team. We started 28 FLL teams Post-COVID we retained funding & interest -6342 attended our meetings, restarted our off-season, & in 2023 5/7 schools have teams. 7509, a non-board team we started, is active again. In 2022, 14 FLL board teams competed, we directly mentored 2 teams in 21/22 & had a practice tournament.

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.

-Inspired segment on the Rick Mercer Report about FIRST 1,082,000 viewers - Efforts brought FIRST to Mexico a team member educated his elementary school there starting an FLL team & our sponsor CIMCORP to sponsor an FLL tournament in Finland 2016 -We Shift the perception of science & technology. Our rainbow branding is this transformation when exposed to FIRST -Well-rounded team - Awards in all areas -3 team members won FLL coach award 2021 -Our shirts are mentor sewn Thanks for volunteering!

Essay

There are so many problems today that seem insurmountable. Solutions seem elusive and the future seems bleak for high school students. We need to feel empowered and our team, MakeShift Robotics FRC Team 4039 empowers us to have an impact. FIRST's mission is to inspire young people to be science and technology leaders to solve the world's complex problems. Our team calls this "Making the Shift" of the perception of science and technology. Empowering our team members to see they can make a difference by working to stimulate, sustain & shift FIRST concepts is how we have an impact.

STIMULATING INTEREST & GROWTH We believe that everyone who wants to participate in FIRST should have access to it. Unique ideas and different voices increase the odds that we will find solutions to complex problems. To facilitate access we need to increase FIRST awareness, teach skills & start teams through our outreach. We didn't let a pandemic stop us. In fact, it inspired us. In 2020 to continue outreach, 4039 facilitated Sidewalk Science. We invited questions about a theme - Dinosaurs or Robots on the sidewalk. With provided chalk, children asked questions through the week & we wrote back answers, providing an unexpected, safe STEM experience. To reach a broader audience in 2021, our robot was featured in a Lifetime Movie called The Price of Fitting In. The story is about drug use. The lead character joins the Robotics club at her school. With less restrictions, we doubled our efforts sharing our robot at the Dundas Cactus Festival Parade, the Santa Claus Parade & participating at the Canadian National Exhibition FRC competition. We also restarted Instants of Inspiration. Our robot shows up where you least expect it. This unique approach finds unexpected audiences. In 2018, we showed up at the Christmas Good Shephard dinner. While families waited for Santa, our robot gave out STEM gifts. Most recently our robot entertained people at the Rockton Tractor Tour. For those who can't access FIRST teams, we provide other opportunities. In 2020, we delivered packages to Brownies & completed a remote electrical workshop. In 2021, we offered an All-Girls Coding Camp & 4-H Robotics Club utilizing FTC SIM. We collaborated with the Ron Joyce Children's Treatment Centre to deliver 2 remote robotics programs for children with different abilities. We are assisting FIRST Canada deliver an in-person program for their clients using Spike Prime this year. As soon as it was announced, MakeShift recognized the potential of having FRC Provincial Championships in our hometown, Hamilton, this year. 4039 mobilized to arrange to bus elementary school children to First Ontario Centre. We will provide the students with a tour of the pits and watch a few matches. We will tie the robot to the class curriculum. We know this will inspire interest in STEM & FLL participation. We were the first FRC team in our school board & advocated for all students to have access to FIRST. We secured school board funding & support for every FIRST program in all schools. We stimulated FIRST integration into the curriculum - FTC training & a robotics co-op. This resulted in exponential growth in FIRST teams in Hamilton until the pandemic. Now we are back to 14 FLL teams, 2 FTC teams & 4 FRC teams in the board. In 2022 we were instrumental in starting FRC team 8089 outside of our board.

SUSTAINING PROGRAMS It isn't enough to start things, we need to sustain them. Prior to 2020, 4039 mentored at least one FLL team annually. We brought the FLL Qualifier to our city hosting, running &/or fulfilling key roles at the event annually. To support restarting, our students mentored 2 FLL teams in 2021, & FLL teams 41339 & 54588 in 2022. Knowing that all teams were restarting & none had in-person experience, we prioritized offering

an FLL practice tournament to prepare them. We supported the restart of the Hamilton FLL Qualifier in virtual format last year & returned to hosting and running an in-person qualifier in 2022. For FTC, our team has participated since it started in Ontario in 2019. We mentored an FTC team & hosted an FTC virtual qualifier for 14 teams in 2021. Following the example of the FRC EVERYBOT, our team did a quick FTC build. FRC Team 118 created the EVERYBOT. Rapidly post release, the game is analyzed and an effective robot is created & shared to assist other teams to be more successful. ANYBOT is our FTC version with a simple design to build a robot with minimal resources to get maximum points. Makeshift has a long history of assisting and mentoring other FRC teams. Pre-pandemic we shared our build space and mentors with 6342, 7623 & 7509. 6342 students attended our meetings in 2020/21 as their team wasn't active. 7509 continued to seek assistance in 2021 with curriculum, fundraising, & outfitting their shop. This year we mentored 9098. Our team also shares our resources to assist others. Our resources are available to others through the Compass Alliance & FIRST Alliance. Since 2015, 4039 secured a practice field hosted in a retired school. Now it provides board teams with build space & a regulation field. For FRC events, last year our team hosted two qualifiers for 29 teams when McMaster was unable to host. In 2022 we returned to hosting and running our off-season FRC event -The STEMley Cup (24 teams) & Overtime Sunday (21 teams). The only off-season offered in Ontario this year where teams could build excitement & develop skills. At the STEMley Cup we encourage pre-rookie teams to attend & use our robot giving them a strong start. We have supported 7 pre-rookie teams over 6 years at the event. This year, we mentored 9098 loaning our robot & supported 11 teams who had not been competing to get back into active participation. MAKING THE SHIFT As previously outlined our team tries to "Make the Shift" in team members. We hope to change culture by applying our STEM skills to solve problems. Our Shift outreach is perhaps where we feel our impact most. We develop our skills while also contributing to real world solutions. Ultimately, we learn that we can make a difference. Our team members wanted to learn more about biomedical engineering driving several projects. Feeling powerless by the pandemic, our team worked with St. Joseph's Healthcare Hamilton to develop approved face shields. We provided 855 face shields to hospitals, nursing homes and other providers when PPE was scarce. We initiated Enable's Build a Hand program matching those who can make a 3-D printed upper extremity prosthetics with those in need. 4039 has made custom prosthesis to enhance 2 individuals' lives so far. The environmental crisis is another area our team felt they needed to make a difference. Last year, approximately 36 billion aluminum cans were landfilled. Aluminum can be recycled using less than 5 percent of the energy used to make the original product. Recycling one aluminum beverage can save enough energy to run a 60 watt incandescent equivalent for 20 hours, or a computer for 3 hours. MakeShift collaborated with the world's largest aluminum can supplier Novelis to create Crush, our can-crushing, recycling-promoting robot that encourages young people to recycle their cans. Not only have we created one robot, we used FRC components and published the plans so that other teams can follow our lead and create their own can-crushers to raise awareness about recycling. Finding solutions requires STEM engagement in under-represented populations. Encouraging girls to pursue STEM careers through strong female role models is the premise of Girls R Brilliant. Since 2017, our students researched & created YouTube videos about 62 women in STEM. Our focus this year was supporting STEMATHON, a FIRST initiative engaging girls in STEM challenges. Our team members assisted with organizing & mentoring several teams. At STEMley we hosted a Women in STEM session again for 26 participants. We strategized to engage indigenous communities. In 2018, we demonstrated our robot at McMaster Engineering Indigenous STEM camp encouraging FLL. We also approached the Six Nations Polytechnic & started FRC team 7509 there in 2019. We inspired them and will support their initiatives going forward. Internationally, over 7 years, 9 team members went to the Dominican Republic with our school's DREAMS project & provided Lego, NXTs, laptops & training to schools in an impoverished area. DREAMS inspired a team member to bring FIRST to the Mexican community where

he grew up. He presented about FIRST at the Polytechnic Institute & introduced FLL to his elementary school in 2018, starting an FLL team in 2019. In 2021, 4039 mentored a FIRST Global Innovation Challenge team in Lesotho Africa. We supported their project to enhance ventilators in their small country. OUTCOMES: What is the impact of these initiatives? Stimulating FIRST activities reached 10,204,672 people over the last 10 years. Based on all the teams started by 4039, a very conservative estimate of students impacted by team participation is 1,332 in Hamilton alone. Hamilton continues to have an official FLL & FRC qualifier. McMaster University was inspired by our advocacy to offer FIRST scholarships up to \$90,000. Sustaining efforts reached 5604 people and resulted in 50% of FLL teams restarting since 2020. In addition, FLL teams we mentored or assisted advanced to provincials this year. 5/7 of our secondary schools have a robotics team this year. 100% of team graduates pursued post-secondary education -94% in STEM. 7989 people have been impacted by shifting initiatives to reach underrepresented populations. Our team make up currently at 29% female team members. The First Nations team 7509 is competing again this year. We have supported STEM and FIRST in the Dominican Republic, Mexico, Finland and Lesotho Africa. Our greatest impact is that team members are empowered to make a difference for complex problems like the pandemic, the environment and inclusion.;

