

FIRST Impact Award - Team 8393

2026 - Team 8393
Team Number
8393
Team Nickname
The Giant Diencephalic BrainSTEM Robotics Team
Team Location
Baden, PA - USA
Describe the impact of the <i>FIRST</i> program on team participants within the last 3 years. Think about percentages of those graduating high school, attending college, in STEM careers, leadership skills, and serving as mentors/sponsors in <i>FIRST</i> programs.
BrainSTEM builds STEM programs where traditional education falls short. Over our 10+ year history, 100% of members have graduated, pursued STEM-related degrees, and launched careers at leading companies in tech (e.g. Amazon), robotics (e.g. Astrobotic), research (e.g. Bettis Nuclear), healthcare and start-ups. They remain committed to FIRST—one was a 2023 Dean's List Winner, another leads Penn State's Ri3D, and many return to mentor and fund programs that impact the next generation.
Describe your community along with its unique opportunities and circumstances. Think about your geographic region, diversity of town/school, language barriers, socioeconomic barriers, and cultural expectations.
Pittsburgh's industrial past has created 90+ unique neighborhoods, but opportunity isn't evenly distributed. Seeing local disadvantaged kids struggling to access STEM opened our eyes to the deeper truth that barriers to learning aren't local; they're universal. This realization drives our mission—both within and beyond Pittsburgh—building programs that break down educational, socioeconomic, medical, and geographic obstacles that prevent children from reaching their full potential.
Describe the team's methods, with emphasis on the past 3 years, for spreading the <i>FIRST</i> Mission in ways that are effective, scalable, sustainable, and creative.
Small team, global mandate: engineering outreach to be precise, transferable and sustainable w/o committees. Host 18+ FIRST events yearly and engage 40+ corporate partners for funding, volunteers, and mentorship. We invest in international growth (Belize FLL), showcase FIRST on TV and at industry events, and build pipelines for (formerly) disadvantaged students like Sree, who started on an FLL team we founded, did FTC, and now mentors other teams as a member of 8393 FRC—proof the system works.
Describe your team's goals and the progress you have made towards them to fulfill <i>FIRST</i>'s Vision.
Our goal is to make STEM engaging, accessible, and intense—preparing students for rigorous and impactful careers. We break down barriers to potential—from educational gaps (CS curricula/FLL

events), socioeconomic/racial divides (UPrep4Life/RAP/Westview HUB), medical challenges (Cortical Visual Impairment/Child's Reach/Ronald McDonald House/New Horizons), and geographic disparities (Belize/Haiti/Türkiye/Tanzania). We aim to create pathways that turn potential into opportunity wherever we can.

What impact has your team seen from your efforts described in the above question? How does your team measure impact?

Despite our limited size, our programs reached 7,100+ kids in the past 3 years and we've built lasting partnerships (Children's Home, HaitiH2O, UCRT, M-Powerhouse) to ensure sustainability. We prioritize high-leverage initiatives—unlocking vision for children, exposing STEM to underserved communities and neurodivergent students, bringing resilience to Haiti, creating opportunity in Belize, and offering hope in Türkiye. An alchemy of ingenuity and compassion for a brighter tomorrow.

Please provide specific examples of how your team and team members act as role models within the *FIRST* community with emphasis on the past 3 years. How do you share these best practices with other teams?

BrainSTEM inspires through full ownership and action. Each member logs 90+ outreach hours yearly while pushing technical frontiers: teaching autistic students, creating tools for medically fragile kids, empowering schools in Central America, funding medical teams in developing countries, and rebuilding STEM programs in earthquake-ravaged areas. Best practices spread through global partnerships (SPARC), global conference talks (Inspire Around the Globe, Diencephalic Discussions), and mentorship.

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

BrainSTEM leverages limited manpower to create and sustain *FIRST* teams. In 3 years, we've run 47 FLL events, started 5 FLL & 5 FTC teams, and mentored 24 FLL & 6 FTC teams. Weekly scrimmages drive iterative engineering for 150+ teams. We've funded 18 teams' competition costs; hosted 7 FLL-to-FTC transition camps; provided materials and coach training to *FIRST* Belize to start 20 FLL teams; helped introduce an FLL-based activity for PhD students at CMU—growing STEM leadership at every level.

What other initiatives have you created, grown, sustained, or participated in (*FIRST* or otherwise) to help inspire young people to be science and technology leaders and innovators? What outcomes have you seen from your efforts in the past 3 years?

BrainSTEM programs break barriers to open opportunities. We've developed vision-learning tools for children with CVI, introduced STEM to long-term hospitalized kids, and taught CS/engineering to autistic students, inner-city schools, and kids in transitional housing. Our Univ. Prep Program, refugee STEM workshops, and free robotics camp for low-income students have opened pathways for students to explore STEM and higher education—allowing opportunity, not background, to define kids' futures.

Describe the partnerships and relationships that you've created with other organizations (teams, sponsors, educational institutions, government, philanthropic entities, etc.) and what you have accomplished together, with emphasis on the past 3 years.

We build partnerships to amplify impact. We collaborated w/ 40+ companies at Children's Hosp. and with mission-driven companies (e.g. TiER1, Bayer) to create volunteering opportunities. Nonprofit partners—M-PowerHouse, C2CL, Biotech Bd, Women in Bio, BCAP, & AACC—expand reach. With HaitiH2O, we

first targeted the most critical needs—a medical clinic for 252 patients, farmer training, and flushing toilets for 200+ students—and are now bringing STEM resources and programs to schools.

Describe your team's efforts in the past 3 years to promote *STEM for Everyone*TM within your team, *FIRST*, and your communities.

Breaking barriers with STEM is our specialty. We worked with M-PowerHouse, PPS, Slippery Rock, PTC, and Dark Rhino Security to create a program in disadvantaged schools where students who successfully complete supplemental classes get enhanced admission to 2 colleges and guaranteed jobs in cybersecurity. The first 3 graduates started college and have 3.5+ GPAs. Other initiatives open doors for students from refugee, low-income, inner-city, and transitional housing backgrounds to explore STEM.

Explain how you ensure your team and the initiatives you have created will be sustainable.

We can't prop programs up indefinitely, so sustainability is a prerequisite. As FLL Regional Partner, we engage every FLL student in Western PA. Our FLL-to-FTC transition camps offer scholarships, and rookie-only BrainSTEM FTC teams create steep learning curves & intense mentoring. All members compete in FTC for skill growth. Sponsors value and fund advanced education over promotion, and community partnerships ensure programs in STEM, healthcare, and underserved communities continue long-term.

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

As our impact expands, our greatest risk is dilution—of ownership, depth, & technical rigor—and we refuse to let scale replace substance. We are formalizing mentorship pipelines, subsystem accountability, and documented design reviews so knowledge is transferable, not person-dependent. Outreach excellence cannot compensate for engineering mediocrity, so we are strengthening prototyping, iteration, and fabrication to ensure competitive performance reflects the same precision as our impact work.

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, particularly noteworthy, or had a large impact.

We constantly strive for deeper impact. At Children's Home, we met medically-fragile kids eager to learn but unable to use traditional tech. We engineered adaptive tools—buttons, dials, and a no-touch system for Allie, who could only wave her hand—giving access to learning tools. Digging deeper, we found kids suffering from Cortical Visual Impairment and built a software tool to improve visual processing, now presented at several CVI medical conferences.

Essay

What if the only thing standing between a child and their future was a button they couldn't press?

A classroom they couldn't reach?

An opportunity they couldn't afford?

A dream they couldn't chase—just because of where they were born?

BrainSTEM is obsessed with questions like these—and building real solutions for the children behind

them. We are not a large team; every initiative we start is conceived, built, and sustained by the same students who design our robot. This reality demands we approach transformative outreach like engineering—identify real constraints, design precisely, and build for durability. From adaptive tools for medically fragile children, to education access programs for the underserved, to international programs creating bold opportunities—our Robots Without Borders program breaks barriers keeping children from achieving their full potential.

BREAKING THE BARRIERS BLOCKING CHILDREN

In 2010, BrainSTEM emerged as a beacon of hope in a community lacking STEM opportunities. Starting as a FIRST LEGO League team, we saw STEM unleash potential and create futures—driving us to think beyond borders and dismantle the educational, socioeconomic, geographic and medical barriers that stand between children and opportunity. STEM opens doors and no child should be locked out.

BUSTING BOUNDARIES IN FLL

FLL introduces thousands of kids to STEM, but for 70% of these teams—traditional advancement rules make this first taste also their last—one event, one shot, then it's over. That's not how iterative engineering—or learning—works. So in Western PA, we became the FIRST Regional Partner and built a full season of competitions that increased engagement. When advancement restrictions created setbacks, we created an “all-you-can-eat” season pass for up to 20 scrimmages followed by a championship. This model blends low-stress educational and high-intensity competitive events, transformed student engagement, was adopted by a neighboring region, and reviewed by FIRST. As a region bordering three states, we embrace inclusivity, welcoming teams from anywhere—even hosting a team from Jamaica! Robots Without Borders!

Quantified Impact: Hosted 42 FLL events (incl. 130th event overall). 82% of WPA FLL teams in 3+ events. Started/coached 5 FLL teams, financially supported 23 teams, mentored 13 teams, directly advised 190+ teams, impacted 2400+ students.

BLAZING THE TRAIL TO FTC

Of 600K FLL students worldwide, only 20% move to upper-level FIRST programs. Recognizing the urgency of this issue, we created immersive, one-week FLL-to-FTC transition camps, equipping teams and mentors with skills in CAD, 3D printing, robotics engineering, fabrication, and programming. Mini-classes give hands-on instruction in materials, drivetrains, and programming. Camps culminate with an intense building challenge & competition, igniting passion and providing a workflow, parts plan and mentors who can run teams without us. Camps have produced Inspire & Dean's List winners, bridged the FLL-to-FTC gap, and propelled students deep into STEM.

Quantified Impact: Hosted 11 summer camps, started 7 FTC teams, trained members of 11 additional teams, helped 5 schools start HS FIRST programs, provided free camps to underprivileged kids. Won FTC FIRST World Championship (Game & Inspire). Dean's List Winner. Actively mentor 5 FTC teams.

BREAKING SOCIO-ECONOMIC AND RACIAL BARRIERS AND BUILDING BRIDGES

Poverty casts a long shadow—limiting access to science, math, and STEM opportunities. To change this,

we began teaching supplemental CS classes in disadvantaged Pittsburgh Public Schools. Discovering the transformative impact of student-led instruction, we worked with partners to evolve our curriculum into a program that provides enhanced admissions opportunities to 2 partner colleges and guaranteed employment. Three grads are now in college pursuing STEM degrees as the program expands into RAP (Robotics & Aeronautics Program), bringing drones & robotics to inner-city STEM education.

To embed STEM in underserved neighborhoods, we built a sustainable program at WestView Hub—offering coding, robotics, summer camps, and launching an FLL team where graduates like Sree now do FTC and FRC and mentor others. At Best of the Batch, we introduced robotics, led training on 3D printing and laser cutting, and held a robotics camp for 100+ kids in Munhall. Work with STEM Coding Labs expands tech education for low-income families, creating options where none existed.

For kids without stability, STEM isn't just a subject—it's a survival skill—a route to independence—a chance to build something no one can take away. At Auberle, a transitional housing facility, we helped kids become LEGO superheroes for a day. At a disadvantaged PPS school, we launched an African-American FLL team, providing classes, mentorship, & tournament support—helping them win the New Community Award for impact.

Quantified Impact: Taught supplemental STEM/CS classes to 65+ students, developed college&career path for students from neglected schools (3 grads in college), started STEM programs in low-income areas, provided thanksgiving dinners to 44 families who lost SNAP benefits—because learning collapses when basic needs don't hold.

BLASTING INTERNATIONAL BORDERS AND HUMANITARIAN HURDLES

It wouldn't be Robots Without Borders without tackling some tough geographic barriers! Where you're born shouldn't define your future—so if geography limits opportunity, we design around it. That means listening first, understanding local constraints, and investing in what allows learning to take root and endure.

In Belize, we met with Central American school leaders and saw the bottlenecks holding students back. We provided 20 SPIKE kits for schools, traveled to Belize City, met with 150 students & families, trained FLL mentors and advised FGC Team Belize as they prepared for global competition—so the program grows under local leadership, not visiting volunteers.

In Türkiye, we partnered with FRC Team SPARC to rebuild STEM momentum in earthquake-ravaged Hatay. We provided FLL materials for displaced students and led robotics workshops for children with leukemia. FIRST Türkiye then named us official mentors as they launch a new FTC program—turning disaster recovery into a sustained pipeline.

We set out to bring STEM to children in Haiti—a country grappling with violence and instability—but local experts told us the urgent needs were more basic: medical care, food stability, and sanitation. So we pivoted. Working with HaitiH2O we funded a medical clinic that treated 252 patients, trained 10 farmers in sustainable agriculture, helped launch a bakery microbusiness, and built the first flushing toilets for 200+ students. That foundation created the stability required to begin starting 2 FLL teams in Haitian schools.

At home, we work with refugee communities who've crossed borders to reach Pittsburgh—to build belonging through engineering—developing a model city-building program with Bhutanese refugees and hands-on STEM learning for newly arrived families through Hello Neighbor.

BREAKING BARRIERS FOR CHILDREN WITH MEDICAL CHALLENGES

240 million children worldwide live with disabilities. Many are excluded from learning so we build replicable programs using STEM to break these barriers. We helped establish a makerspace at a children's hospital providing a 3D printer, computer, and instruction for kids facing long-term hospital stays. At Ronald McDonald Houses, we install STEM activity stations so siblings of critically ill children can engage with hands-on learning. "No one thinks about the families," said a grateful RMH director.

Recognizing that traditional classrooms often fail kids with medical challenges, we created sensory-aware STEM classes for students with Autism and started Pennsylvania's Special Olympics Robotics Program.

At the Children's Home of Pittsburgh, we met medically fragile children eager to learn but unable to use traditional learning tools due to severe motor impairment. We engineered adaptive input devices—big buttons, easy dials - even a no-touch system for Allie, a bright and determined girl who could only wave her hand. When a computer finally responded to her movement, she couldn't stop laughing.

Digging deeper we noticed some children weren't just struggling to interact—they were struggling to see. Cortical Visual Impairment (CVI) stole their ability to process sight, turning the world into a blur of shifting colors and shapes. Working with specialists we built a software tool that trains visual processing based on salient features. Useful for both clinical and home use, for the first time, parents can now work collaboratively to improve their children's ability to understand the world around them! Our software tool and adaptive devices have been presented at multiple CVI medical conferences, paving the way for broader adoption.

Quantified Impact: Makerspace at children's hospital with 14K inpatient stays (pilot examined by other hospitals). STEM activity stations at RMH providing services to 1000+ families annually. Programming classes for ASD students. PA Special Olympics Robotics Program. Adaptive educational tools for medically-fragile children. CVI learning software that improves patient visual processing.

ROBOTS WITHOUT BORDERS - CHILDREN WITHOUT LIMITS

From Belizean classrooms buzzing with robots to a clinic in Haiti offering vital care, our Robots Without Borders program—born from a small team of students in western Pennsylvania—is a symphony of action—each note a barrier broken, an opportunity created, a future unlocked. It's a young girl rebuilding after disaster, a disadvantaged student finding a way to college, a medically fragile child giggling as she waves her hand and, for the first time, the world responds. When barriers are shattered and a child's future is no longer defined by what they can't do—but by how far they dare to go. ;

