

Chairman's Award - Team 2168

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2021 - Team 2168

Team Number

2168

Team Nickname

Aluminum Falcons

Team Location

Groton, Connecticut - 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.

Despite our high school ranking in the bottom 20th percentile of CT schools for graduation rate, 100% of our students graduate. 92% of our alumni attend college and pursue a STEM degree at prestigious colleges like MIT, NEU, Brown, USAFA, RPI, and WPI. 93% went to work in STEM careers at places like Google, SpaceX, and NASA. Over 20 now work for or have interned at companies that sponsor the team. Over 25 mentor FIRST teams

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

Groton, CT is a STEM-rich community with companies including Pfizer, Electric Boat, Thayer Mahan, the BioCT Innovation Commons, and countless STEM startups. Despite this, up to 77% of students receive a free or reduced lunch, the district math proficiency rate is only 39%, and Fitch HS is ranked 114/117 for STEM education in CT. Expanding our impact to more students is our top priority; our program provides a pathway to STEM careers for students who would otherwise have limited opportunities

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 present at every school in our district, to a combined student body of 5,000. We share FIRST with the community at Groton City Day, Groton Fall Fest, and our yearly Pancake Breakfast, reaching over 10,000. We participated in 126 days of outreach totaling 3,894 hours. Our summer camp attendance quadrupled from 2018 to 2019. Due to COVID, the team creatively adapted FLL lessons to work in a virtual format for our summer camp and workshops. Through social and print media, we reach over 250,000

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

We embody Coopertition by sending a taskforce of students and mentors around the pit at competitions to assist other teams. In the past, these crews have substantially helped teams such as 6529, 8023, 7599, 6808, 2523, and 4176. We even collaborated with 4796 to build their entire robot at a competition. As a result, they won their first blue banner. We keep an open door to our shop and practice field. In 2019, we assisted over 100 teams, and despite this year's challenges, we've helped 72

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

We started an FLL Challenge team, #45951, in 2019 and began the process of founding an FLL Explore team, #22165, last year. We mentor 9 FLL teams and have assisted 8 others. We mentor FRC 3719 & 8604, providing both teams with technical expertise, material, and machining resources, as well as a home for 3719. We publish our programming, electrical, and leadership training material online, receiving over 14,000 views from 3,500 unique viewers. We are assisting 1768 by teaching them about controls

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?

Since 2018, students have run our FLL summer camp and workshops to inspire kids from 14 neighboring towns. This year being virtual, we loaned EV3 kits and iPads to campers. We held 4 FLL workshops in the fall of 2019. This fall, we ran 5 virtual workshops during our 20 Days of STEM. We teamed with an innovation club in Kampala, Uganda, donating FLL kits, laptops, and helping in-person for a month. Incoming freshmen involved in our programs join the team especially inspired and enthused in STEM

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 teamed with the school district's grant writing team to apply for over \$9 million in grants. We partner with Rise Against Hunger to hold meal packaging events that provide over 50,000 meals to people in need. 4-H provided us with a facility and kits for outreach. With our Public Library, we organized FLL workshops and tech support sessions that reached 50 people. Assisted the Sub Vets care packaging event for the past 13 years, where we boxed 2,360 packages over the last 3 years

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

We held 13 Women in STEM (WIS) meetings in the past two years, and plan on extending them to other teams. We created a WIS recruitment video and shared it with all middle school girls in our district last spring. We attended a BLM protest and handed out 26 cases of water. We helped create BLM and Pride shirts for charity. We worked with Boneyard Robotics on their mission of autism awareness. We started an FLL Explore team at a school where 77% of students come from low-income families

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

We hold semi-weekly calls for team-wide progress updates. We introduced a new project manager role utilizing LEAN 6 Sigma to further organize our efforts. The role's responsibilities include planning and managing implementation of team projects and objectives. Better organization of our day to day activities frees us to place a larger focus on improving outreach, increasing support for other *FIRST* teams, inspiring and teaching students, and opening and operating our STEM Center

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

We find and recruit potential sponsors via networking platforms like LinkedIn and Bumble, visits to local businesses, phone calls, and emails including team information. We actively foster these partnerships with frequent check-ins, regularly sharing updates on team activities, attending and hosting over 20 facility tours, and showing our appreciation with commemorative plaques and weekly social media posts. We've attained over 100 sponsors and maintain a 92% retention rate

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

We have been actively trying to improve our team organization. This year, our new project manager is in charge of setting deadlines and producing a Gantt chart for our season schedule. In addition, we have charts to show the organization of team members under our different subteams, as well as the three projects *FIRST* has introduced this year. These efforts have so far increased the efficiency of our workflow and provided structure and clarity to our students and mentors

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

We teach a plethora of technical skills like machining, CAD, programming, electrical, marketing, and accounting. We also teach critical soft skills and cultivate interpersonal communication skills through our new Future Leaders Training program. We encourage innovation through creative brainstorming sessions around numerous offseason projects, particularly ones that could have a positive impact on the local or broader community, propelling them to be substantial contributors to society

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.

Many students join our team unassertive and unsure of themselves. We utilise our extensive FLL workshop programs to build up confidence by using peer-taught classes to gradually guide students into becoming teachers. Our Future Leaders Training teaches vital soft skills. Every student becomes capable in a leadership role, facilitating our transition to a fully student-run team, while still increasing our competitiveness. By graduation, these once meek students are strong, respected STEM leaders

Essay

No year has been more challenging or perilous for FIRST teams than 2020, and keeping FIRST sustainable has never been more imperative. Team 2168 has needed to completely restructure how it conducts outreach, assists other teams, and even how organization and communication function within the team. This is not the first year we encountered significant hardship—our team was on the verge of collapse in 2010. Fortunately, we developed the infrastructure, resources, and knowledge to adapt to this year's new challenges. We discovered and improved existing shortcomings in our organization, strengthened our team's communication and cohesion, and most importantly used our experience to help other FRC teams and our community. Despite the massive obstacles, 2168 has used the past year to grow, improve our outreach program, and provide critical support to FIRST teams and our communities, flourishing in spite of COVID.

The pandemic exposed and exacerbated issues with our communication and team organization. Some members neglected to respond to messages or update team leaders. As a result, we decided to hold semi-weekly progress calls with leadership and the full team, and we pushed for conversations to occur in public Slack channels instead of private messages, enhancing overall team communication. Attendance for subteam meetings was already sporadic, but once we transitioned to virtual meetings this issue became even more glaring. To hold our team accountable, we created attendance charts to record and resolve unexcused absences and tardiness.

Team 2168 has consistently held virtual meetings, office hours, and online team socials, leveraging tools like Google Meet and Zoom. In order to support the efforts of our more hands-on subteams, our mentors assembled mechanical kits to lend to learning students. We also installed CAD-capable computers in the homes of our design mentees. In lieu of in-person meetings, our mentors host virtual office hours where students can do homework, ask questions, chat, and even play games. Providing these connections has created unwavering bonds within our team, and helped stave off the loneliness and isolation many contended with during the past year.

We hold monthly Women In STEM (WIS) meetings with the goal of encouraging our female members to pursue STEM careers while providing opportunities that foster teamwork, communication, and leadership. WIS gatherings accomplish this through open dialogue, focused discussions, and mentor-selected games that promote essential soft skills. Influential female guest speakers, such as the Director of Manufacturing and Chemistry at Pfizer, are invited to share how they conquer the systemic disadvantages that women face in the STEM world. We plan on expanding these meetings to include middle school girls from our town as well as nearby FRC teams. In addition, we plan to create an FRC Girls in STEM Discord server in order to build a virtual network of students and alumni. Our team is currently testing this server on a small scale.

The pandemic has made outreach even more crucial and we have amplified our efforts in response. Despite this crisis, we recorded more days of outreach than any other year, with the exception of 2019. We've particularly focused on aiding our town's most isolated and vulnerable community—its senior citizens. Our students composed heartfelt letters and sent care packages filled with toiletries and puzzle books, which we distributed to homebound seniors via the Groton Senior Center. When local libraries closed, we donated games and books to this same senior center. As reported in *The Day* on April 28, our senior citizens felt comforted knowing they're in the thoughts of their community members.

Team 2168 is symbiotic with our local community, dedicating almost 4,000 hours in the past three years to outreach. FLL workshops, summer camps, and mentorship of all participants comprise our primary methods. A key component of our curriculum is "Robots in the Real World", where the main takeaway is that anyone, no matter how young, can use robotics to improve our world. This year, we made summer camp virtual by loaning out EV3 kits and iPads, and we bolstered our workshops with a new advanced course. It was challenging, but incredibly rewarding, to adapt our outreach programs to a new virtual format that aided, inspired, and encouraged the people of our community during these recent hardships.

During the first wave of COVID, hospitals in New York found themselves overwhelmed. The North Shore University Hospital in New York City reached out to us specifically, requesting help. We used 3D printers at our facility to manufacture 200 masks, 150 ear savers, and 350 face shields for hospital staff. Dr. Michelle Sewnarine, M.D., Director of Infectious Disease at the Northwell Health Group, explicitly informed us that our efforts significantly impacted operations.

Although we're immensely proud of the work we've done in our local and regional community, such as donating over 250 lbs of food for workers who lost their jobs during the pandemic, our gaze is also set upon assisting the wider world. Since 2018, we have partnered with Rise Against Hunger (RAH) to package and ship meals overseas to impoverished communities. Our first RAH event started strong, packaging over 21,680 portable, non-perishable meals and donating over 600 lbs of food to the Groton Food Pantry. The second year was a smashing success—we packaged over 27,000 meals. Although COVID restrictions forced us to postpone this year's event, we've utilized this time to plan an even bigger impact at home and abroad. Our proposal involves our high school waging a competition between classes to collect donations for local food banks and fund packaged meals for people abroad.

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In the spirit of Gracious Professionalism, we fully devote ourselves to supporting FIRST programs, and have assisted over 200 teams. As part of our efforts, we started and currently mentor FLL Challenge Team 45951, and are in the process of founding FLL Explore Team 22165. We are mentoring an additional 7 FLL teams. Another way we have succeeded local FIRST teams is through our mentorship of FRC 3719 and FRC 8604, imparting substantial technical knowledge and assistance. We provide room in our facility to 3719, a critically under-resourced team that lost their shop space, giving them access to a practice field—a game-changing asset.

At competitions, we deploy crews of students and mentors around the pit to identify struggling teams. Thrice we've aided teams—5563, 752, and 4796—who arrived with inoperable robots. After assisting 7599 at the Springside Chestnut Hill event in 2019, we mailed them driver stations and robot parts to support them through their next event. Recently, FRC 1768 reached out to us about their lack of controls mentors, asking for support. We helped their students learn about FRC robot controls, providing experience for them to catapult off from to accelerate their progress. We have been dedicated the past few years, assisting FRC teams that struggled even before the pandemic, and now face extinction because of additional obstacles imposed on all aspects of fundraising and robot assembly. In defiance of these tribulations, we have drastically intensified our support for FLL Explore, FLL Challenge, and FRC veteran and rookie teams.

This year, our programming subteam has begun the process of improving our old Java lessons to reflect recent WPILib changes and to assist teams who are adapting their code to the new command-based system. Like the previous curriculum, these new lessons have been published along with supplementary virtual labs that boost comprehension and video recordings of the lessons being taught. Our revamped lessons, including videos, slideshows, and lab activities, are posted on YouTube and GitHub.

While we already provide vast assistance to FRC and FLL teams, we were eager to fortify our commitment, with a specific focus on starting and maintaining teams. In 2019, we sought to achieve this goal by founding the STEM Alliance of New England (SANE). SANE bolsters local FRC teams with funds, materials, and the types of tutorials and advice we traditionally offer. Over quarantine, we assisted not just the teams we've had prior relationships with, but also new teams, like 1768, 246, and 8604, assisting them with CAD, controls, programming, team leadership and structure, and part fabrication. To further our efforts we are excited to finalize our new STEM center, which will offer more space to host outreach events, assist more FIRST teams, and ultimately provide viable STEM career pathways to all students in our region. The pandemic delayed progress on the STEM center, but we still plan to fully open the facility in the fall of 2021. It took a grueling 12 years of work, but we have built a coalition of local organizations that have already invested \$150,000, and have pledged to donate a further \$900,000 to keep the center open and running for the next 5-10 years. This complex will be paramount in all our future endeavors—complementing our current arsenal of resources, allowing us to focus more energy on solving problems, and making a considerable impact on local FLL and FRC teams, our community, and our students.

Team 2168 has surmounted obstacle after obstacle, reviving itself from near collapse as a young team eleven years ago. We thrive despite this year's challenges, restructuring our communication and team organization for exceptional efficacy, rising up to provide vital support to our community and other FIRST teams during this historic crisis. Although the Aluminum Falcons will emerge stronger when the pandemic ends, we will only be triumphant if our community and surrounding FIRST teams soar beside us, more resilient, inspired, and sustainable than ever.