

Chairman's Award - Team 4593

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2021 - Team 4593

Team Number

4593

Team Nickname

Rapid Acceleration

Team Location

Rapid City, South Dakota - 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.

Over the past three years, FIRST has impacted our team greatly with 100% of our seniors graduating high school, with a majority at the top of their class. Of the past 7 seniors, 5 of them have gone into STEM majors which include mechanical engineering, aerospace engineering and computer science. We also have another senior pursuing a major in political science. Two of our past seniors are attending MIT and we've had other students apply and get interviews with other top colleges.

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

Our team is from Rapid City, SD. The two biggest industries are agriculture and tourism so many students are exposed to these career fields. To promote STEM, we go to elementary and middle schools to show off FIRST. Our hope is that an interest in STEM is carried through and past high school. While in high school, we have opportunities for students to meet local STEM companies like VRC Metal Systems and Caterpillar. These opportunities show a different career field that many would not see.

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?

Three years ago there were six FLL teams in the Rapid City area. Thanks to our efforts there are now 33 FLL teams in the Rapid City area. Due to our outreach in the community, especially among the youth, many new bright minds have become interested in the FIRST program. For example, every year we take our robot to Women in Science and Engineering (WISE), and elementary schools for science fairs and STEM nights. We can easily see the results based on the amount of new teams we create yearly.

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

Last season we had five participants mentoring FLL and FLL Jr. teams. The participant's attitudes toward STEM and FIRST gets the younger members excited to be involved with the FIRST organization and STEM in general. In addition to this, we pack backpacks for our local food pantry and visit elementary schools to encourage participation in STEM and FIRST activities to the younger generation. Our team members' passion and eagerness truly gives inspiration to their bright minds.

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

Being the only FRC team in South Dakota, we have placed a huge emphasis on promoting FIRST. In the last three years alone, we started six FLL Jr. and 27 FLL teams. We have had students on our team directly mentor FLL teams. We have reached out to other cities and offered our support for new FRC teams. We have been successful in Meade County, the largest county in South Dakota. They have adopted a FIRST curriculum in their school district creating new opportunities for their students.

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 go to STEM nights at various elementary schools. Our efforts have young kids experience curiosity and excitement, bringing an increase in interest for FIRST. One of our most often attended events is the yearly WISE event that is held by the Rapid City School District (RCAS). As a result we have seen dramatic growth in membership with a 300% increase.

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

Our two main sponsors are Caterpillar and VRC Metal Systems. They have supported us for many years monetarily and with mentorship. Each year we look forward to reinforcing these relationships, because without the support of our sponsors, we wouldn't have been able to attend the 2019 World Championship. We have also worked with our local school district and have successfully become a lettered activity. Our team doesn't just reach out potential sponsors, people contact us to offer support.

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

We promote racial and gender diversity within the team. We attend STEM nights at local elementary schools, some of which are Title 1 schools. To promote gender diversity, we attend WISE. Female representation on the team increased from 20% to 45% over the last three years. We also do not have a fee to join our team which provides equal opportunities to everyone. We provide accommodations for students who are unable to pay for travel fees.

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

Our mentors have been around since the beginning of FIRST, and with their help, students have increased outreach and team growth. Our team has been working with RCAS to recognize robotics as a lettered activity. Recently, the school board approved lettering for robotics which allows members to receive recognition for their efforts. We appear at STEM nights to inspire younger generations. These actions will allow our initiatives and team to run effectively for the foreseeable future.

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

Each year we grow our sponsorship base by reaching out to old and new sponsors. We expand our relationships by hosting an annual open house showcasing what our team and FIRST are all about. We also reach out to many local businesses by taking our robot to the workplace and presenting why supporting our team would be a good investment. Every year, we make sure to let our sponsors know their support is appreciated by promoting them and sending out personal thank you's.

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

One area our team struggles in is a solid base membership. Our team fluctuates when it comes to numbers. Some years, our numbers are higher so we focus less on outreach. Other years, our numbers are small so outreach is our main focus. We have been working to find consistent outreach opportunities to keep our numbers stable. We are trying to have internal mentorship among students. Upperclassmen teach underclassmen valuable skills so we keep the knowledge that would have been lost.

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

We aspire to fulfill the FIRST mission statement by inspiring innovation in young people. To achieve this we provide opportunities to apply STEM skills. We have amazing mentors that inspire all the students to do better in all aspects of life which go beyond robotics and into the real world. But most importantly, students inspire each other to be better leaders, project designers, engineers, friends, and citizens in our community.

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.

One thing we pride ourselves on is that we are more like a family than just a robotics team. Our team members have good relationships with each other and team bonding goes beyond just the lab. We are constantly doing things with each other whether it's going ice skating or having study groups. We all look up to our mentors as we know we can go to them for anything. We are really proud that overall as our team continues to grow, we also grow closer as a family.

Essay

"Education is not the learning of facts, but the training of the mind to think."-Albert Einstein. Rapid Acceleration's main focus is to take the skills learned from FIRST and continue to apply them beyond the program. As the only FRC team in South Dakota, we pride ourselves on promoting STEM and FIRST values by working with local schools. Rapid Acceleration has done many things to promote STEM education in our community including working with FIRST Lego League (FLL) teams and implementing FIRST into a school curriculum.

Although South Dakota largely runs off agriculture and tourism, our local STEM community is growing. We have found many opportunities for sponsorship growth and creative ways to fundraise. Since our STEM community is small, it has allowed us to create long lasting, personal connections with our sponsors. These connections have opened up opportunities which include tours of their facilities, internships or jobs after college, and recognition for the sponsors. These businesses are vital for Rapid Acceleration and STEM in our area.

Over 60 percent of schools in the Rapid City Area School District (RCAS) are Title I schools. This means over half of the 15 elementary schools, 5 middle schools, and 3 high schools are considered low-income. We have worked hard to provide opportunities for young kids to join robotics who would have otherwise never had the chance. We have successfully helped establish FIRST programs in over 66 percent of elementary schools and 60 percent of middle schools. Through our FLL work in the RCAS district, we have grown team recognition immensely, allowing us to become a varsity lettering activity. This is significant for our team as we are the only academic activity not affiliated with the school district able to letter. We hope this recognition will lead to positive outcomes such as an increase in new team members, more FLL teams, and further promotion of STEM within school.

As a FIRST team, we have helped grow our STEM community through FLL. Prior to COVID-19, the FLL program had been growing steadily. These teams are at various schools both in and outside of Rapid City. In order to support the growth of FLL, we needed to host a second regional competition. This is exciting because it shows more interest in STEM at young ages. We support our FLL coaches, especially the new ones, by hosting local expos explaining the FIRST goals and the ways to achieve them and also an annual scrimmage before qualifying events. Our work with FLL continues to impact our team as 75 percent of our new members were on FLL teams in middle school, showing the strength of our FIRST pipeline.

Alongside FLL, we are often invited to STEM nights, which are hosted in local middle and elementary schools to show students that they can be involved in STEM. Our team has been expanding STEM in local schools through clubs and school curriculums. Rapid Acceleration was invited to help RCAS update their high school Pathways STEM curriculum. This has brought recognition to our team and prepared us for implementing STEM into other schools.

One of our team's biggest initiatives in the implementation of STEM is the development of a school curriculum that, at its core, embodies FIRST values. Three years ago, the school board of Meade County, the largest county in South Dakota, asked our head mentor to be a STEM advisor in the writing of their new curriculum. They were curious if FIRST Robotics was just an extracurricular activity or if there were ways to directly implement FIRST values into the curriculum. Our head mentor, along with members of our team and an FLL mentor, presented to the school board and explained the ways FIRST values and the "FIRST Curriculum for Educators using the Standards Alignment Map" easily aligned with the state curriculum and the steps required to integrate various robotics teams into that curriculum as well.

The next steps were securing funding for these new FLL teams that Meade County would be adding and mentoring teachers on approaches to teaching the curriculum. We acquired funding through a NASA consortium grant, Black Hills Energy, and various private donors. These donors allowed us to fund a total of 10 FIRST Lego League Explore and Challenge teams as well as a future FTC team that will emerge within the next three years to add to the FIRST family. Our team worked with teachers on the introduction and application of the FIRST material. The teachers were excited to add a STEM course that applies to real-world situations and teaches kids valuable life skills that can be used beyond high school.

Last year, Meade County began to transition into the new curriculum with an FLL program (consisting of four FLL teams) offered as an extracurricular activity. This was supposed to be the first year when the FLL teams would be added to the new school curriculum, but sadly, they were unable to form due to COVID-19. Despite the pandemic restrictions, they are now using the FIRST curriculum.

Meade County was impressed with the implementation of the curriculum as they have added an FLL-inspired elective class where students experiment with Mindstorm LEGO robots. This has sparked enough interest in the students that they want to add 10 new teams, which is important for continued growth, given that FIRST is new to the county. Meade County is excited to expand the program in the future.

Our involvement with Meade County has opened our eyes even further to the possibilities of FIRST in our state. This year, we planned to travel to the eastside of the state during the FLL State Championship to present to local schools but were unable to due to travel restrictions. In spite of the large FLL presence, no FRC or FTC teams have emerged yet. We anticipate that by going and presenting to the middle and high schools, we can inspire and excite kids and potential mentors about the possibilities that FIRST offers in schools. Meade County has made a major impact on the presence of STEM and FIRST in South Dakota, and we hope that within the near future, there will be a new FTC team in the state.

This year, we had a local entrepreneur reach out to our team with an opportunity to help our community. He is a local chiropractor who has a concept to measure the amount an individual can lift at certain heights called "Fit to Lift." His ultimate goal is to provide companies the ability to prevent workplace injuries caused by muscle strain. He has asked us to help design and build a prototype, which has many mutual benefits for businesses, Fit to Lift, and Rapid Acceleration. In addition to helping a variety of businesses, it could serve as a source of sustainable income and promote our team as well as FIRST robotics.

Businesses who are looking to hire can use this device to measure a baseline of the applicant's movement and lifting abilities. Companies lose, on average, \$300,000 for each workman's compensation claim in addition to the costs of onboarding new employees. Fit to Lift measures the amount of weight an individual can lift safely from several specified common lifting heights so an employer can correctly understand their employees' capabilities. This understanding limits injury, which in turn, keeps employees healthy and safe. As a result of a safer work environment, workman's compensation claims decrease, therefore saving businesses a considerable amount of money.

This project has many benefits for our team as well. Throughout this entire process, we are learning the many sides of business including legal and financial considerations. These details include legal guidelines set by HIPPA, OSHA, and patent law. We are also learning about the complexities of working with multiple parties in a business environment. This project will also ensure that our team exists for years to come as it will provide revenue to support us in addition to providing learning opportunities to members. Within a year, we are expected to produce 10 units that will be put in the field. The next phase will be to mass produce these units for commercial sales, which will provide an income to sustain the team. It has also laid the foundation for future seasons as our team continues to manage the design and business plan. We are glad to carry over the knowledge we acquired from FRC and apply it to this opportunity.

Our team embodies the values of FIRST. We have earned the support of our community, which in turn, has allowed us to provide the opportunity for other kids to explore robotics and pursue STEM. We have worked hard to ensure that FIRST is enduring for years to come. We believe that every student deserves a strong education in STEM, and we are grateful to have helped lay the foundation for future generations. FRC is not just an extracurricular activity for us, it is an essential part of our lives and has helped us to become better leaders of tomorrow.