

Growing up in the small town of Warroad, Minnesota has its perks. As children we had the opportunity to swim in the lake, and ride our bikes around town without worrying about traffic. But, a downfall within Warroad was that as children we didn't have the ability to learn more about STEM than what was taught within our everyday science and math classes. This is one of the many things that our robotics program, Team 2883, or better known as F.R.E.D. (Fighting Rednecks Engineering and Design), has accomplished in its 10 years as a team. Team 2883 has worked with people aging from 10 months to 107 years old, and has given each and every citizen of Warroad a chance to truly dig into STEM. Through the expansion of STEM opportunities within both our community and those around us, we have broken down the barriers for Northern Minnesota, and all small communities, as we have shown that anything is possible.

Team FRED is expanding the minds of younger generations in our high school. Our team has taken the lead on starting up multiple new classes, including: Robotics, Fabrication Lab, Drafting, and Engineering. These classes have given students the opportunity to get real life experience within STEM fields. Two of these four classes are also considered College-In-The-High-School courses; students who take these classes receive college credit through Itasca Community College. If it were not for the collaboration between Team 2883 and Warroad High School, these students would not have the opportunity to receive college credit while getting an in depth look into what STEM is all about.

In an effort to truly show our community just how powerful STEM can be, Team FRED has been instrumental in bringing new technologies into our school. Through grants, our team has brought in almost \$500,000 into the Warroad High School. This money has been used to add new technologies, including various CNC and drafting equipment, as well as a complete Maker Space. We currently have a state of the art technology education wing and it is due to the

time and effort our robotics team has put into this shop. This coming summer, our whole school will be renovated, with over a million dollars of this going towards making our shop the best in the state. One of the driving forces behind passing this referendum was due to the impact Team 2883 has had on the community. Our new shop will be a state of the art institute, and will attract both female and male students equally.

Team 2883 also breaks down barriers by empowering young women to pursue STEM careers. When our robotics program first began we had only one female on our team. Now, 40% of our team, or 17 out of 43 members are female. Our female members work has began to break down the traditional barriers that had been put up for women within the STEM fields. Our team has also created an outreach program to introduce young females into STEM, this program is called Empower Academy. FRED members spend a week working with 3rd through 8th grade female students. The motto within this program is, "You can do anything you put your mind to." Our goal with this outreach is to introduce young girls to STEM by teaching them how to code robots, build objects on Inventor and TinkerCAD, and do other STEM activities. At the end of this outreach students must present one of the projects they have built to the rest of the girls so that they also develop their communication and presentation skills. Team 2883 has opened the doorway into STEM for women within our community and plan on continuing with this mission.

FRED has also broken down barriers by giving special needs students access to STEM within our school. We have worked with teachers in our school to develop a curriculum, involving Lego WeDo 2.0's, that our special needs department could put into place. During the day, a member of our team would go to the classroom and work with the students one-on-one, in hopes of them eventually being able to assemble and run the machines on their own. Last year we worked with our first student named Jacob. We went from having to assemble the parts

ourselves, to Jacob being able to assemble and run the machine on his own. This was a very rewarding experience for everyone involved, and we hope to continue working with more students with special needs this spring.

Another project Team 2883 took on was to turn a battery-powered car into one that a little boy could operate all on his own. A young preschool boy with cerebral palsy did not have a battery-powered wheelchair, so he struggled to independently interact with his friends. When our team transformed this battery-powered car, he now had the opportunity to connect with his friends, become more independent, and also was able to learn fine motor skills in order to prepare him for a future motorized wheelchair.

Not only have we broken down barriers in our high school, but we have also done work in our elementary school. In the summer, we provide a week long STEM camp for 4th through 8th grade students. Our team spends the week showing these students how much fun STEM can be. The students participated in many different activities including: making parabolic hot dog solar cookers, assembling model rockets, and learning how to use GPS technology. All of these activities showed our campers that they could have fun while learning. After the week came to a close, students left with a smile on their face and a greater knowledge of what STEM is all about. There were multiple teachers/mentors who assisted at the camp, and the camp left a lasting impression on them as well. Because of this, we have more mentors in robotics and more hands-on activities that have been brought into the classrooms on a daily basis.

A new initiative this year is “STEM A La Carte.” Team 2883 secured grant funds to organize, purchase, and develop a mobile cart equipped with Sphero Robots, Parrot Drones, Little Bits Electronics, and Lego EV3 Robots in order to initiate programming, engineering and design throughout our entire student body.

Team 2883 also believes in sustaining and growing FIRST programs. In an effort to do this, Team FRED has secured 30 Lego WeDo sets to incorporate within our elementary math and science curriculums. Our team members help train and facilitate the Lego WeDo programs with the classroom teachers. We have found that this has sparked an interest in STEM and FIRST, and has increased the interest in both FLL and FRC within our community.

Our team was able to help start and mentor the first FLL team in our region. This team, Warbotics, Team 21848, under our leadership has been very successful at the regional and state levels. The interest in our community has grown so much that we have also helped start a second team this year, Lego the Woods, Team 34305. This team, under our mentorship has also qualified for state as a first year team. Our team is very proud to be able to say that through our leadership within the community, we have also inspired other communities to start FLL teams. FRED has also had an impact on many of the surrounding FRC teams. For the past 6 years we have assisted the Badger robotics team, Team 5742, and Baudette, Team 3290, with their programming and mechanical design.

This past fall, our members took a trip up to Winnipeg, Manitoba, Canada to present robotics and FIRST to over thirty schools within Manitoba. Team 2883 presented on all four of the FIRST programs, giving schools the opportunity to start at any level they felt necessary. After our presentation, we had many schools asking questions, so we invited them to attend the Great North Regional as VIP members to experience FIRST first hand.

While at competition our members have also been very active. In past years we have had team members who volunteered at competitions as field set up crew and student ambassadors, mentors who volunteered as inspectors, and past alumni who have gone on to become mentors and game announcers for the FIRST program. In 2016, Team 2883 also helped over 10 teams with their programming at the Northern Lights Regional in Duluth.

Through our help, these teams were able to move through obstacles and compete in matches successfully, thus receiving the Gracious Professionalism Award. Last year at the North Star Regional, Team 4626 came to the competition with two team members and only their kit of parts. By the end of the regional, our team had helped them reach the point where their robot could not only move, but also successfully score points and climb. Our members take pride in knowing that with our help, these teams have had more success at competitions. Team 2883 has also been instrumental in helping develop the Great North Regional, we have taken part in organizing volunteers, obtaining tools and workers for the machine shop, and securing sponsors.

Our robotics program has also worked vigorously with Marvin Windows and Doors, and we have been fortunate enough to get materials, mentors, and financing for our robotics program. Over the past ten years over 80 students have been able to go over to Marvin's both during the school day and in the summers to get real work experience in the field of their interest. If it weren't for this huge sponsor, along with others, our robotics program would not have the opportunity to impact the lives of those within our community.

Ten years ago, we started out as only ten kids from a small town with dreams bigger than could be imagined. With our community having only 1,794 people, it is known that we do not have all of the opportunities that a team from the city would have. Team 2883 is very proud of the opportunities we have given past members, but we know that this is not the end for us. Being able to start two new FLL teams in the past three years, shows that we have broken down barriers for small communities. Ten years of FRED has proven that what may start out as dreams, can become reality within the blink of an eye.