

## Girl Powered: Girl Powered: Now, for future

It was the week before Thanksgiving, our last event for the year 2019. Our coach was away on a business trip, but we were looking forward to a successful competition before the end of the year! The competition started with well performing robot, and we were in second place after winning the first two games. Our autonomous was working perfectly and our driving was much improved. We were competing in our third match that morning and had just begun collecting cubes in the driver control period. Suddenly, the motor on our intake – one of the most complex and crucial systems on our robot – stopped rotating. Motor on one side of the intake was running too slowly and weakly for the robot to be able to intake any cubes. Sriya, our driver, furiously clicked the buttons of the controller in an attempt to pick up the cubes. Momentarily, the motor stopped running altogether. After the match, we began discussing how to solve the issue. Since we motor was not functioning, we decided to replace the motor, which took about an hour and caused us to miss two matches. With the new motor in place, we found that the intake still wasn't working, but we pressed on and continued to search for other potential causes of the problem. We then exchanged the ports that the right and left intake motors were connected to, and the problem shifted to the other side of the intake, informing us that the port was the issue. We then reconnected the working port to one side of the intake and connected the other side to a spare port, adjusting the code along with that, and this solved the problem. We were relieved to be able to return to competing in the matches. As we started driving, however, the chain on our intake broke into 3 pieces, and scattered on the field. Our robot couldn't offensively contribute to the match any further. We again returned to our table to remove the remnants of the chain and replace it, after borrowing some tools from a neighboring team. Finally, our intake mechanism was fixed. Even in this time of stress, we were able to come together as a team and carry out our

solutions to the problem. We quickly took control of the situation and made sure everything was taken care of, including sending a team member to the field to represent us in the matches we missed. After spending much of the morning on the issue, we finished mending the intake and were able to play in the next few matches, including the elimination rounds, one of which we won. This experience was an important learning moment for us all, but we also succeeded in our ability to keep calm in a stressful situation, identify and fix the problem, and collaborate effectively.

To us, Girl Powered means that girls have the ability, the confidence, and the drive to



accomplish and innovate in STEM. We are an all-girls middle school team, and robotics has given us the platform to learn, grow, and strive to be our best. We approach robotics with a desire for learning and progress. Girl Powered in this robotics competition means bringing our abilities to the table and working to create a more inclusive and collaborative environment for ourselves and others outside our team.

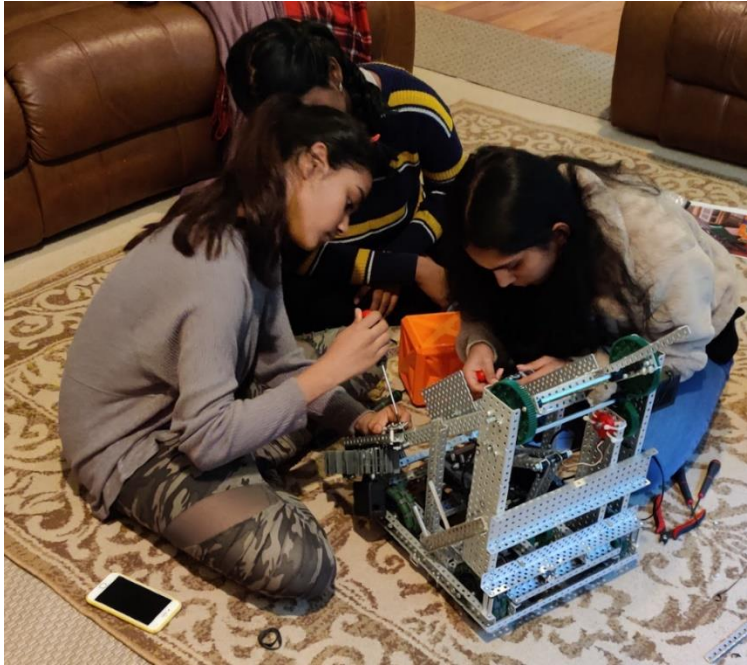
The defining characteristic of our Girl Powered team is teamwork and collaboration in solving tough engineering problems. In our team, we each have our own roles that we carry out during meetings and during competitions. We support each other through wins and losses and encourage each other to be the best we can

be. Our team has been competing in VRC for three years, and we get new members every year, so we are able to bring in new and diverse perspectives and talent. This helps us leverage everyone's abilities to build a smoothly functioning team. More senior members on our team, some of who have been doing robotics for five years, take on leadership roles in terms of including everyone and gathering everyone's opinions. Even as the team changes, we work hard to be a collaborative, inclusive group. We also follow key values in our team that we define at the beginning of the season and that we have learned and established throughout our robotics experience. These include respect for each other and each other's opinions, especially when discussing or fixing problems; professionalism at competitions, such as with judges, alliances, and opponents; and responsibility, by carrying our our respective tasks and keeping our tasks organized. Our cohesiveness as a team has fueled our success in terms of complex robot designs as well as victories in competitions.



Another characteristic of our Girl Powered team is a growth mindset. This means constantly working to improve as a team and improve our designs, seeking out opportunities to learn from others, and taking on the challenges that come our way. As we finish seasons in April and start the new seasons in June, we continue working together year-round. Throughout the season, we emphasize learning and iteration. We spend the summer brainstorming, researching, prototyping designs, and taking notes in our shared notebook. These discussions take place with the entire team, and we share our findings and ideas. Throughout the season, we constantly seek to build and improve our designs. After every competition, we write a detailed analysis of our performance in our engineering notebook, and the immediate meeting after the competition is

when we hold discussions of what we need to change and improve. This recurring process guides us to our goal of the continuous improvement of each component of the robot and of the way the five of us function together in order to grow as individuals and as a team.



Another component that is important to our Girl Powered team is connecting with and supporting other teams in the competition by sharing our expertise with students, in and outside of the competition. Because we are not part of a multiple-team organization, we network with high school teams that we meet at competitions. One high-

school team, 10955M, has been mentoring us for the past three years. We have met them to discuss designs and have helped and supported them in coding. We also inform and inspire younger children interested or involved in robotics. Our team members helped a young FIRST LEGO League (FLL) team with their project and coding. We also invite elementary school students with a passion for robotics to a few of our meetings. They are very excited about robotics and have many ideas about the challenge. We introduce them to the competition in hopes of giving a platform to continue to pursue their passion for robotics. By encouraging young students to get involved in youth robotics competitions, we hope to inspire them to pursue STEM in the long term and to use their passions to take on real-world problems.

All of these characteristics of our team help us work together and achieve success in the competition. We look at the world as full of interesting things for us to discover. We are passionate and look for an adventure in learning in everything we do. As a Girl Powered team in VEX, we intend to translate our curiosity for learning and experience with engineering designs into solving the world's problems.

#### Credits

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Team Number: 191A (CoZmic RoboticZ)

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