Loveland Robotics

Teams:

5040 Nuts & Bolts

10464 Bionic Tigers

Business Plan 2018-19

loveland robotics

Team Contact

1 Tiger Trail, Loveland, OH 45140
lovelandrobotics.com
robotics5040@gmail.com
bionictigers10464@gmail.com
stewaram@lovelandschools.org

Mentor Contacts

Pete Kavouras
peter_kavouras@yahoo.com
John Rasmussen 513-658-3904
jd.rasmussen@gmail.com

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1.0 Introduction

Loveland Robotics has two *FIRST* Tech Challenge teams: Team 5040 Nuts and Bolts and Team 10464 Bionic Tigers. In the 2018-19 season, they will be building robots to compete in the Rover Ruckus game, building on their success in previous seasons and embracing new challenges.

1.1 *FIRST* Tech Challenge (FTC)

FIRST was founded by Dean Kamen as a non-profit organization whose main goal is to inspire young people's interest and participation in science and technology. Along with informing them about STEM and aligning them with a career path, it also teaches them skills in problem solving, teamwork, and innovation. *FIRST* accomplishes this through their programs: *FIRST* Lego League Jr (FLL Jr), *FIRST* Lego League (FLL), *FIRST* Tech Challenge (FTC), and *FIRST* Robotics Competition (FRC). Through these programs, *FIRST* is able to teach both children and adults about STEM and everything it has to offer them in their everyday lives.

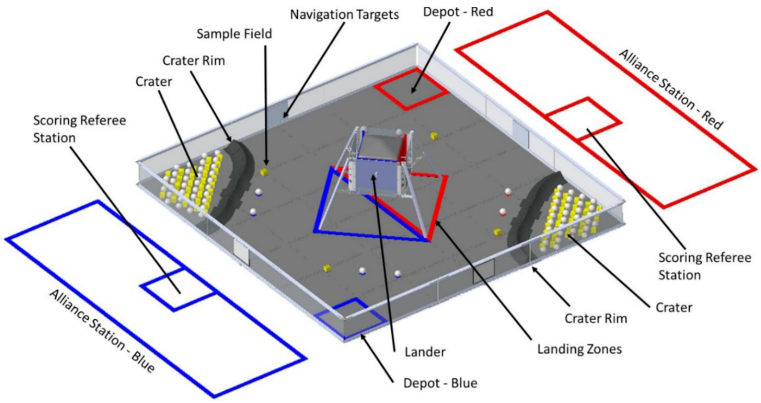
Dean Kamen is an entrepreneur, inventor, and tireless advocate for science and technology. His passion and determination to help young minds discover the excitement and rewards of science and technology created the cornerstones of *FIRST* (For Inspiration and Recognition of Science and Technology).

The *FIRST* Tech Challenge is an annual challenge held between competing teams, connecting schools and communities across the globe. Teams are responsible for designing, building, and programming their robot. Awards are given to teams for outstanding performance in aspects such as programming, the engineering notebook, interaction with their community, and general robot performance. Each competition provides teams with multiple tasks to be completed during a match. Teams are awarded points for the different tasks they accomplish. The game itself changes from year to year, allowing the students to continue growing in their problem solving and innovative ideas.

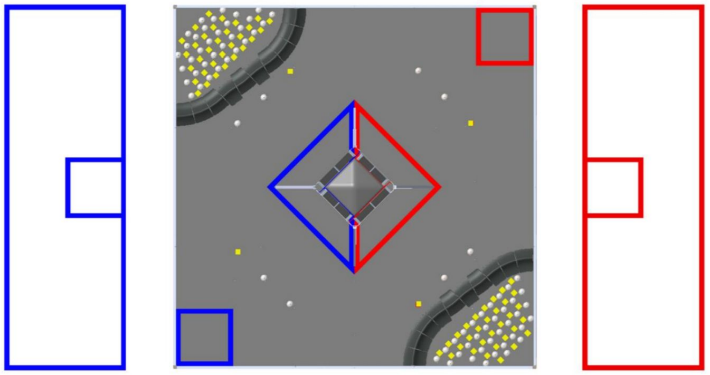
FIRST®
TECH
CHALLENGE

1.2 FTC 2018-19 Game: Rover Ruckus

Rover Ruckus is the *FIRST* Tech Challenge Game for the 2018-2019 season. This game consists of objects such as Gold and Silver minerals, Depots, a Lander, Cargo Holds, and much more. The minerals are randomly placed into two Craters, with an even distribution of minerals in each. There is a large Lander in the center of the field, with two alliance-specific Cargo Holds on on each side. Each cargo hold is either marked for Gold or Silver Minerals, with one Cargo Hold of each type for each alliance. The Lander is 29.5 inches tall with a hook attached for hanging that is 23 inches off the ground. The Gold Minerals are 2'x2'x2' cubes and the Silver Minerals are spheres with a 2.75 diameter. The Crater rim is 3 inches tall and 9 inches long per piece. This game is entirely played on a 12 ft x 12ft playing field with foam tile flooring.

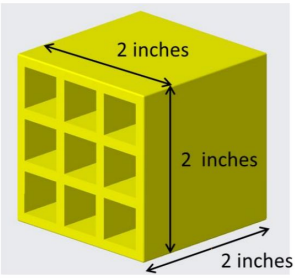


Isometric View



Top-Down View

Each season there are many rules and regulations each robot must abide by in order to compete. One of the new rules this season is that the weight of the robot must be 42 lbs or less. As in previous years, the robot must be 18'x18'x18' inches or smaller before competition. However, after the game has started robots are able to expand to any size while competing. Robots are only able to have and use up to 8 motors and 12 servos on their robot.



Gold

Silver

The first 30 seconds of each match are the autonomous period in which robots operate using only preprogrammed instructions and sensor feedback. During the autonomous period, alliances can earn points in several ways: by landing (the robots lower themselves from the lander onto the playing field) to score 30 points, by sampling the gold mineral (detecting the correct mineral and moving only it from its starting position) to score 25 points, by claiming

their depot (placing the team-designed maker into their alliance's designated depot) to score 15 points and by parking their robot in the crater to score 10 points.

At the end of the autonomous period, the teleop period which is 2 minutes and 30 seconds long. During the Teleop (driver-controlled) portion of the game, teams are allowed to have up to two drivers and one coach while in a match. The two drivers cohesively drive and control the robot to score points on the field. The coach helps strategize and keep both drivers updated on everything going on, including time, mineral collection, and strategy. The two main objectives within Teleop are depositing Gold and Silver minerals in either the Mineral specific Lander for 5 points each or the Mineral nonspecific depots for 2 points each. The Lander is located in the middle of the field relative to each alliance side. The two alliance specific depots are located in the two right corners of the field, relative to the Alliance Station. Alliances are only safe to put any and all minerals into the specific depot if both alliance partners are able to put their team markers within the depot. If only one team marker is present, the opposing alliance is able to steal minerals out of that depot and place them in their own.

In the endgame period, which is the last 30 seconds of the match, robots can still do everything they could during the teleop period, but with a few additions. Robots can choose to end the match either parked in one of two positions or hanging off of the bracket on the lander. The parking positions include partially parked (Any part of your robot is touching the crater rim or crater) or fully parked (Every part of your robot is inside the crater.) Those options score you 15 points and 25 points, respectively. The most difficult, but most rewarding, option in the endgame period is hanging your robot off of the bracket on the lander. This takes quite a bit of design and effort, but rewards you 50 points. At the end of endgame, all robots must stop and drivers must remove their hands from controllers, and the match is over.

1.3 History of Loveland Robotics

Loveland Robotics is dedicated to spreading *FIRST* and the ideas of STEM throughout the community. Loveland Robotics was established eight years ago, and over the past four years the program has expanded massively in many different directions. Loveland Schools now have two FTC teams, eight VEX Robotics teams, and two FLL teams. *FIRST* has helped all students and mentors involved in the program to increase their knowledge not only in programming and building, but in all areas of STEM. While preparing for this year's competition, the team members are strategizing, designing, and executing better than ever.

Team 5040 Nuts & Bolts first competed during the 2011-2012 season. The team then consisted of nine members and two coaches, but that was just the beginning. By the end of 5040's fourth year, they had advanced to the state championship 3 times winning a variety of awards along the way.

At the beginning the the team's fifth year in 2015, due to the huge interest within the high school, Team 10464 Bionic Tigers was established. Both teams competed in the 2015-2016 season, Res-Q. Throughout qualifying matches, both teams saw success and advanced to the state competition, a huge accomplishment after the program had undergone so much growth.

In the 2016-2017 season, both teams competed in Velocity Vortex. It was an amazing year of firsts for both teams, as it was the first time that either of them had traveled out of state, bringing with it new and exciting challenges. Team 10464 traveled to the Kentucky State Championship, and Team 5040 traveled to the West Virginia State Championship. Both teams were able to see a whole new level of competition and spirit at each competition. This was also the first year that Team 5040 advanced beyond State level and got to compete at the North Super Regional Competition and World Championship.

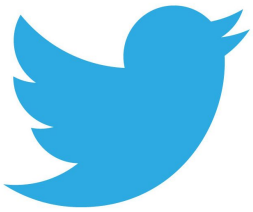
Last year, in the 2017-2018 season, both teams traveled far and had many successes. Not only did both teams travel to West Virginia, 10464 also traveled to Pennsylvania to compete at the qualifying level. Loveland Robotics has made new headway within a whole new level of competition, this being the second time Team 5040 traveled to both the North Super Regional Competition and World Championship. Both 10464 and 5040 won or placed in every award category throughout the season, not only making this one of the most successful seasons yet, but also one of the most memorable.

As we transition into another season, the impact of *FIRST* robotics within the Loveland School District is flourishing at all educational levels. With the involvement not just limited to students, the network of parents and industry leaders who are now assisting as mentors continues to grow. As the program evolves, the never ending passion for STEM within Loveland Schools will always have a place to flourish and succeed.

1.4 Web Presence

Both teams utilize social media to help reach out to other *FIRST* teams across the globe, our community, and our sponsors.

Twitter



https://twitter.com/robotics5040
https://twitter.com/BionicTigersFTC

Through sharing updates, asking questions, or just sharing pictures, Twitter allows Loveland Robotics to keep their community engaged and spread awareness of STEM and *FIRST*. The teams are able to notify members in the community when and where future outreach events will be. Twitter gives them the ability to connect with the local community, the school, and other robotics teams from across the country. Teams 10464 and 5040 are active on Twitter during every competition and are open to answering any questions other teams may have, exhibiting gracious professionalism.

Website

http://www.lovelandrobotics.com

The Loveland Robotics website provides a wealth of information about both teams, 5040 and 10464. The website showcases the teams' past accomplishments and events while promoting the future events and competitions they will attend. Within each team's section, people are able to see the members of the team and learn what role each member plays. Sponsors are highlighted and information is provided on how companies can become involved with the Loveland Robotics program. This website is very informational and very useful to anyone who wants to learn what Nuts & Bolts and Bionic Tigers are all about.

2.0 Community Involvement

Loveland Robotics is dedicated to actively spreading *FIRST* and the ideas of STEM in their own community and throughout Ohio. Both teams actively create and participate in various events that reach many members of their community which enables them to effectively to spread *FIRST* and STEM in their hometown of Loveland, Ohio and across the state. The teams are able to raise awareness of *FIRST* and STEM, and actively see it develop within the youth of the community.

2.1 Local Community

The Bionic Tigers and Nuts & Bolts both actively spread *FIRST* in their own school district, Loveland City Schools. The Bionic Tigers have been mentoring Loveland Middle School's *FIRST* LEGO League (FLL) teams through the summer and plan to continue throughout the season. Members of Bionic Tigers attended the FLL team meetings and assisted, educated, and connected with the students while the FLL teams created their robots and presentations. During the summer, members of the Bionic Tigers and Nut & Bolts also helped run a summer camp at Loveland Middle School, STEM Robotics Camp. At the camp, members of the teams helped students design and program their robots and troubleshoot any problems that arose. By the end of the camp, all students had functional and competitive robots, and they had fun! During the school year the Bionic Tigers hosted a session for Loveland Intermediate School's annual Science Day. The Bionic Tigers ran a room which had robotic and STEM related activities where the team was directly able to educate students at the school about robotics.

This year both teams, Nuts & Bolts and Bionic Tigers, were invited by the Loveland City School District to participate in the district's annual State of the Schools event. This event highlighted the innovative activities and accomplishments by students throughout all of the schools in the district. At the event, both teams were able to educate members of the community about what *FIRST* is and the benefits that robotics offers students and schools. Loveland Robotics also gave a presentation during a Loveland City Schools Board meeting. At this meeting, they were able to shed light on *FIRST* and STEM to the leaders of education within the school district and other leaders in the community of Loveland.

In the city of Loveland, the teams have been able to reach many people. The Bionic Tigers and Nuts & Bolts were invited to the city of Loveland's Fourth of July Celebration. At the festival held at Nisbet Park, the teams were able to run their robots for children to play with and connect with members of the community about what *FIRST* is and the opportunities in STEM through *FIRST*. The Bionic Tigers also helped with the local Amazing Charity Race where they ran a water station. At the event, the team was able to reach hundreds of people and create an

awareness of what robotics is and its presence in their community.

2.2 Extended Area

Loveland Robotics is very dedicated to sharing *FIRST* and STEM with others and supporting the community around them. On many different occasions, the two Loveland FTC Robotics teams have participated in events to spread STEM education to all parts of their community. Whether this be a simple robot demonstration or an elaborate educational session, Loveland Robotics hopes to continue reaching out to the community and spreading not only STEM education but also the lessons that *FIRST* embodies inspiring young people to be science and technology leaders and innovators.

One of the most important meetings the Bionic Tigers, Team 10464, got to present at was the Hamilton County Superintendent meeting held at Hamilton County Educational Service Center. This event gave 10464 the opportunity to present to superintendents throughout Hamilton County about why their schools should start an FTC Robotics Team. The presentation included resources, financial support, and space needed to host an FTC Robotics team. They also included many educational benefits the students would gain if they were to get involved with a *FIRST* Robotics program. The shared how FTC programs have helped them develop self confidence, communication skills, and leadership ability. Not only was the audience intrigued and excited, they also had many questions the team was happy to answer. After this event, one of the audience members asked 10464 to present their FTC program at a conference held at the Sharonville convention center. This event was called “Success Bound” and showcased how education and industry can go hand in hand and be beneficial to both parties, and it was attended by many leaders in education and business in the area.

As mentioned earlier, both teams have demonstrated their robots at many different places. During these events, the teams show people of all ages what it means to be on an FTC robotics team, and how it has benefited them individually as well. The teams inform them about the game and season, giving them all the successes and failures they have to go through to get where they are. These events are significant because it allows the team members to connect with children and adults and help them find a new passion they didn’t know they could have. Examples of these demonstration events include the Ohio State Fair, the Dayton Air Show, Proctor & Gamble Bring Your Child to Work Day, HAMVention, Symmes Library Robotics Open House, Bethany House Women’s Shelter, Stewart Elementary School, iSpace day, and the Dayton Maker Faire.

Another series of events that Loveland FTC hosts are workshops to enable Girl Scouts and Cub Scouts earn their new Robotics badges. Girl Scouts and Cub Scouts each have new badges this year to learn the basics of designing ,building, and programming robots. The Bionic Tigers host an event at least once a month for Girl Scouts in grades kindergarten through fifth grade. They use activities such as games, NXT Lego Robots, challenges, and puzzles to help the girls fully understand the complex ideas robotics encompasses. The Nuts & Bolts have worked with Cub Scout dens to earn their robotics badges. Both teams plan to continue building on these events and making them as clear and concise as possible, inspiring the next generation of engineers and programmers in the STEM field.

For the 2017-2018 season, both 10464 and 5040 hosted presentations at iSpace’s kickoff

event for the FTC Relic Recovery Game. Team 10464 presented on seasonal planning and 5040 presented on the design process. Both of these elements are crucial to having a successful season as an FTC Team. The purpose of 10464's presentation was to give new teams an idea of how they should be organizing and planning their seasons. 10464 has learned from past seasons that having a schedule of when certain tasks should be done pushes team members to grasp the idea of deadlines and time management. Team 5040 hosted a presentation based on how to go about the design process; this piece is central when thinking about the robot itself. Both teams plan to continue hosting presentations at iSpace FTC Kickoff Event, giving back their experience and knowledge to those just entering the program.

3.0 Financial Plan

In order to successfully field to FTC teams this season, Loveland Robotics must raise thousands of dollars each season. They do this through sponsorship and a variety of fundraisers. The fundraisers help raise needed funds, but also give the teams a chance to give back to the community. For example, at the Loveland Robotics Veteran's Day pasta dinner with the American Legion, veterans are invited to dine free. The teams are extremely grateful to all their sponsors and those who offer fundraising opportunities.

3.1 Sponsorship

Your contribution to Loveland Robotics is not just a contribution to the dedicated students on the Nuts and Bolts and Bionic Tigers, but also a donation to the community. Loveland Robotics tirelessly works to promote STEM and FIRST to the young people of our community and create awareness among students regarding this program. Your benefaction will amplify your STEM support by investing in robotics teams that are committed to inspiring younger generations of students. The sponsorships they seek can take many different forms. They currently seek:

- Professional expertise and guidance in engineering and programming
- Professional expertise and guidance in marketing and branding
- Guest speakers and business field trips
- Financial donations
- Donations of food, parts, and supplies

Investing in Loveland High School Robotics not only helps the teams but it helps you as well. By sponsoring, you will have access to the next generation of leaders, communicators, educators, engineers, scientists, marketing professionals, and team players. Sponsorship can come in many different forms: monetary, parts, credit for product, mentorship, or an invitation for us to visit your company. Loveland Robotics hopes that you consider becoming partners with them as they push to make their teams the best that they can be.

Team 5040 and Team 10464 would like to give a big thank you to all of their sponsors for making their journey up to this point possible. Throughout the year, the teams have gained many new sponsors for the Loveland Robotics Program. They have connected with many business, big and small, throughout the Cincinnati area. The teams knew that if they linked business and education it could result in something much more valuable for the teams and their core values. Both teams, 10464 and 5040, didn't just reach out to sponsors for donations, they reached out to businesses they thought could aid them in spreading *FIRST* and STEM programs throughout the
Community.

Questions about sponsorship should be directed to Amy Stewart, Mentor
1 Tiger Trail
Loveland, OH 45140

stewaram@lovelandschools.org 775-476-2681

Donations are tax-deductible, all checks should be written to Loveland Robotics Boosters or Loveland City Schools.

3.2 Sponsorship Levels

Sponsors of Loveland High School Robotics are promoted to the large audience of Loveland Robotics with business logos displayed on banners at all events, the Loveland Robotics website, and the robots themselves. Throughout the season, sponsor logos will be exposed to a large number of people throughout the state of Ohio, and hopefully be shared with a worldwide audience.

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Sponsorship Benefit	Bronze $50-$99	Silver $100-$499	Gold $500-$999	Platinum $1000-$1999	Diamond $2000+
Logo displayed on our website as a sponsor	loveland robotics	loveland robotics	loveland robotics	loveland robotics	loveland robotics
Logo included in competition documents	loveland robotics	loveland robotics	loveland robotics	loveland robotics	loveland robotics
2 free ticket to Loveland Robotics Dinner Fundraiser	loveland robotics	loveland robotics	loveland robotics	loveland robotics	loveland robotics
Logo displayed on competition banners		loveland robotics	loveland robotics	loveland robotics	loveland robotics
Updates on teams progress through newsletters		loveland robotics	loveland robotics	loveland robotics	loveland robotics
Shoutouts on Twitter sites for both teams			loveland robotics	loveland robotics	loveland robotics
Framed Letter of Appreciation			loveland robotics	loveland robotics	loveland robotics
Logo displayed on Robot Transports				loveland robotics	loveland robotics
Plaque recognizing organization's contributions				loveland robotics	loveland robotics
Robot Demonstration at Company (if applicable)					loveland robotics
Logo displayed on Competition Robots					loveland robotics
Logo displayed on website homepage with Links to organization website					loveland robotics

3.3 Budget

Loveland Robotics FTC Budget

2018-2019

Loveland Robotics 2018-2019 Budget			
Item	**Budget Amt.**	**Category**	**Rationale/Explanation**
Registration Expenses - FTC			
FIRST	$550.00	FIRST Registration	FTC registration fee (required). $275 x 2
State Qualifiers	$750.00	Qualifier Fees	$125 each event, 3 events per team
State Tournament	$1,500.00	State Fee	approx $250 for each event, up to 3 events per team
Worlds	$4,000.00	Worlds Registration	$2000 each x 2 teams
Sub Total	**-$6,800.00**		
Individual Team Expenses - tools, robot parts, etc			
Team 5040	$3,300.00	Team Expenses	Robot Parts and other team expenses including pit
Team 10464	$3,300.00	Team Expenses	Robot Parts and other team expenses including pit
Sub Total	**-$6,600.00**		
Miscellaneous			
Field elements for 2018-2019	$366.00	Field	Game field for 2018-2019 season
Team T-Shirts	$500.00	Team Supplies	To promote the teams and show spirit.
Food	$600.00	Team Supplies	$100 per qualifying tournament, lunch for team and mentors
Misc Organization Expenses	$423.14	Supplies	Replacement Field Pieces, Batteries, Zip Ties, and other misc expenses
Sub Total	**-$1,889.14**		
Proposed Income			
Available Carryover from 2017-2018	$789.14		Maintain $4000 reserve
Team Fees	$6,500.00		$250 per team member x 26
Fundraising	$3,000.00		FLL concessions, American Legion Dinner, Restaurant nights, and others
Sponsorship	$5,000.00		Sponsorship
Sub-Total	**$15,289.14**		
Total	**$0.00**		

4.0 Moving Forward

The goal of Loveland Robotics is provide sustainable opportunities for students to pursue their interests in robotics and become leaders and innovators in science and technology in programs that develop their self-confidence, communication and leadership. The FTC Teams each set their own goals for the season and beyond.

4.1 Team Goals

Team 10464

The Loveland Robotics team 10464 Bionic Tigers has several goals which they plan to accomplish over the course of the season. In competition, they hope to accomplish two sets of goals: one on the field and one with the team. Their goals on the field include succeeding as a final Seed Alliance Captain and moving on to the next level of competition — the World Championship; either competing in eliminations or being nominated for an award at the World level. In addition to the first team goal, they intend to obtain one of every award throughout the entire competition season. This would ensure that at every competition we place in at least one aspect. Other goals for their team consist of creating an intricate and detailed Engineering Notebook that documents their entire season. The team also plans on being more organized in all aspects of their season; This includes code documentation, ensuring all daily entries are done before the next meeting, and an organized build schedule. Last season, the team had a goal to complete a community outreach event once a month. They achieved this goal, and this year they decided to aim for a total of 1000 outreach hours or more. This advanced number of outreach hours raises awareness of the STEM and *FIRST* programs all throughout the Tri-State area. The production and completion of these goals not only improves the team's performance in competition, but also their relationships with one another and the community around them.

Team 5040

Team 5040 has learned a lot from the past two years at higher competition; one thing they have learned is that they need more than just a robot. This year the team is going to put a larger focus on outreach. The team has always done outreach but not to the extent of many teams they saw at the Worlds competition. Now they are focusing on creating a lasting impact in their community. 5040 has been working to improve the scope of their outreach beyond current levels and continue our tradition of working with the community. Their goals include both working with local community members and spreading FTC cheer to people who are far, not just near. They are expecting to help start other *FIRST* teams, including a local FLL Jr. team. Making it to the world championship for the past two years has made team 5040 more eager to make it back. Using mass documentation from previous years, we are keeping our robots performance to its current level, on top of looking into our business situation to make our team more well rounded, and giving our team a sustainable route to the future. Sponsorship is the bulk of funding for the

robotics program, and sponsors also provide great engineering concepts and techniques. Adding three new sponsors would make the robotics program not only more financially solvent but richer in ideas and techniques that will propel us to the next level, along with providing new outreach opportunities. With last season being by far the best the team has ever competed, Team 5040 does not plan on slowing down their level of growth or dedication on and off the playing field. Last season they made it to Worlds for a second time and they plan on maintaining that level of competition throughout future years.

4.2 Sustainability

One of the most important aspects of creating a robotics program is ensuring it will be self-sustaining in subsequent years. Loveland Robotics has several ideas on how to sustain their program, one of which is obtaining long-term sponsors in hopes of permanent support for the program. When gaining long-term sponsors, the main focus is to continue a professional and respectful relationship in order to gain a stable, constant source of income for every team in the Loveland Robotics organization. Maintaining contact with our sponsors through letters and meetings is one of the ways that we keep this relationship between sponsor and team thriving. Our sponsors also plan to engage in as many outreach events as possible to increase the interest in STEM and robotics.

One of the main reasons schools discontinue robotics programs is due to a decline in interest. By holding these events and interacting with our younger audience, we spark an interest in STEM and FIRST, ensuring that there will never be a shortage of children who wish to participate in the program. Loveland Robotics also holds tryouts for potential new members that wish to join our cause. Not only is Loveland Robotics adamant about interacting with younger generations, but also about interacting with the families and administration that support Loveland Robotics in many ways. Through sending out a newsletter to the families of those in Loveland Robotics, we are able to inform and keep in contact with those who are directly involved in our program. Loveland Robotics also posts regularly on Instagram and Twitter to inform sponsors, families, administration, and kids who follow these accounts.

Having a steady flow of kids joining Loveland Robotics is not the only thing that Loveland Robotics wishes to continue. Outreach to the community through community service for not only younger generations but all generations ensures that the Loveland Robotics name reaches farther with every service event that we do, we also find new people who may wish to be a mentor to one of the Loveland Robotics teams.