



Team 578
Red Raider Robotics

2014/15 Team Handbook

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Fairport Red Raider Robotics

Fairport Red Raider Robotics (R³), Team 578, is comprised of high school students from Minerva Deland and Fairport High School who choose to participate in the FIRST Robotics Competition. The purpose of R³ is to introduce students to careers in Science, Technology, Engineering and Math. This is accomplished by having the students work side-by-side with mentors from a wide variety of technological and business disciplines. These mentors are experts in their fields and bring a wealth of information, guidance and expertise to all team activities. Engineers, skilled craftsmen, computer professionals and others provide direct guidance to the students so that the students can confidently complete the tasks that they are given.

While building a robot seems to be the centerpiece of the R³'s efforts, it is not the sole focus of the team. Students volunteer and participate in one or more sub-teams to contribute to the overall success of R³. These sub-teams include exposure to physics, computer-aided design (CAD), computer graphics, 3-D animation, journalism, marketing, community service, fundraising and many others. Students increase their confidence and skill base in personal communication, interpersonal relationships, teamwork, networking, outreach, strategy development, critical thinking and problem solving. The skills the students learn are the most sought after and highly regarded in the global community we live in today.

Fairport Red Raider Robotics is a not-for-profit organization who receives financial support through the Fairport Central School District. The District provides the team with use of district facilities, transportation of equipment and students, as well as faculty support from the Martha Brown Middle School and Fairport High School. Additionally, the Fairport community, local business and the Rochester community provide mentors to the team passing on their expertise to the students.

R³ seeks additional funding from local corporations and businesses to help defray the costs that the school district does not cover. These costs include competition entry fees, robot construction costs, etc. however, the team also participates in numerous fundraising activities throughout the year as well as community service projects to support local programs. Fairport Red Raider Robotics is a completely volunteer program.

Team 578 Mission Statement

- To advance respect for science, technology, and engineering within our school and community.
- To give students the opportunity to work with adults in engineering, marketing, public relations, problem solving, software engineering, etc., in order to foster student learning and help them to explore a career path.
- To spread the Core Values of FIRST within the Fairport Central School District and the community at large.

- To build positive relationships through volunteering, community service and providing a medium of education through mentoring.
- To make a positive impact on the Fairport & surrounding communities through outreach efforts both related and not related to FIRST.
- To inspire students to find their true passion.

About FIRST

FIRST

FIRST is a national organization founded in 1989 to promote student interest in math and science. FIRST is an acronym for “For Inspiration and Recognition of Science and Technology.” The program was founded by Dean Kaman, FIRST seeks to stimulate interest in science, technology and mathematics through fun, and engaging problem solving programs including FIRST Robotics Competition (FRC), FIRST Tech Challenge (FTC), FIRST LEGO League (FLL) and Junior FIRST LEGO League (JFLL). Each program is designed to meet different developmental age levels and continuously promotes FIRST Core Values and Gracious Professionalism. These programs promote the possibilities and challenges of technology and provide an opportunity for student success.

The four main divisions in the FIRST organization are:

- Junior FIRST LEGO League (JrFLL) is a program for elementary students to create a presentation and build a model to demonstrate and expositions to increase their problem solving skills.
- FIRST LEGO League (FLL) is a LEGO robotics competition for middle school students. The competition involves building a robot using LEGO Mindstorms around a central theme. Some past themes have included; nano technology, Nature’s Fury, Senior Solutions, etc. We currently have two FLL teams at the middle school level; Raidercraft at Martha Brown and XXXXX at Johanna Perrin.
- FIRST Tech Challenge (FTC) is a robotics competition for high school students. In this competition students create a smaller, more affordable robot.
- FIRST Robotics Competition (FRC) is for high school students. This is the division the Team 578 competes in. In this division students create a robot alongside adult mentors to compete with other FRC teams.

The FIRST Robotics Competition (FRC)

The initial FIRST Robotics Competition was held in 1992. In its inaugural year teams from 13 states participated. Since then the program has grown to over 2,600 FRC teams in 80 countries. This competition is as exciting if not more exciting than any sporting event complete with referees, time clocks and teams cheering their robot on to victory. FIRST competitions have been featured in major television markets including segments on ABC, ESPN, Discovery, The Science Channel and A&E.

Each year the “game” changes so students start from scratch to produce a robot to compete with. The rules and the challenge of the game to be played remain secret until the kick-off event on the first Saturday of January. From that point, teams spend the next six weeks conceptualizing, designing, prototyping, fabricating, building, and field-testing their robot. A standard kit of parts is provided to each team containing a variety of motors, sensors, pneumatic components, fasteners, a highly sophisticated control system and other materials teams may want to use on their robot. Within the size and weight constraints prescribed by FIRST, teams are free to design their best solution for the game. Teams can choose to use the kit of parts and/or any other materials approved by FIRST. This six-week build season is a very intense, labor intensive time of the year for the team.

A comprehensive FRC rule manual is posted on the Internet. During robot design, the team’s game strategy must be considered and factored into the robot solution. Executing the requirements for that particular game can appear to be simple on the surface but most often very difficult and quite challenge.

FIRST also offers a competition that rewards excellence in content, creativity and master of multimedia through the use of Autodesk 3D Studio Max Animation software. As with the robotics competition, the theme of the animation challenge is announced in January. Completed 30-second computer animation projects are submitted six weeks later. Animations are judged by peers at regional competitions. Regional winners and others selected by Autodesk are advanced to the championship competition for judging by peers and industry professionals.

Why Should I Join Team 578?

Fairport Red Raider Robotics

Participating in a FIRST program is a unique experience. Nowhere else will you get the opportunity to be part of a high school project that has all of the intensity of a real-life, time-crunching, problem solving engineering challenge. Being a part of this team will open you up to experiences in fundraising, time management, teamwork, community service, problem solving, creative thinking, critical thinking, strategizing, cooperative groups and too many more to mention here.

This Experience:

You will experience first-hand what it is like to be an engineer, programmer or business person. You will work side-by-side with engineering and other professionals who will share their expertise in a hands-on setting. Finally, you will learn about college programs and potential employers in the technology field.

Learn:

You will learn new skills and perhaps fine tune current skills while developing your problem solving abilities. Along the way your self-confidence will grow and you will be able to interact more effectively with peers, adults, mentor and professionals. Finally, you will learn how to work with others, sharpen your time management skills, and see how to set realistic goals and how to achieve them.

Application:

More than anything, Team 578 allows you to put to work what you are learning in the classroom, have lots of fun, and be involved with something that you will never forget!

Try it Out:

Try something that you never considered doing before. There are new opportunities that exist in every facet of Team 578. Not only does the team focus on engineering, but there are needs for individuals interested in journalism, photography, videography, community & public relations, fundraising, web design, marketing and many more!

Scholarships:

You could receive a scholarship to attend college! Many universities view participation on a FIRST team very favorably. FIRST participants are eligible for scholarships that are not available to others. Some scholarships require an interest in studying Engineering; however, many are not restricted to a particular course of study. Nearly \$15 million in scholarships were available to students who participated in 2012 and more become available every year.

According to a study conducted by Brandeis University comparing students with a FIRST background to students without a FIRST background:

- Are more than three times as likely to major specifically in engineering;
- Are roughly times as likely to have an apprenticeship, internship or co-op job in their freshman year;
- Significantly more are likely to expect to achieve a postgraduate degree;
- Are more than two times as likely to expect to pursue a career in science and technology;
- Are nearly four times as likely to expect to pursue a career specifically in engineering;
- Are more than two times as likely to volunteer in their communities; and
- One in three students coming from a robotics team who apply for a scholarship through FIRST will receive the benefits of said scholarship.

Team Members

Students who attend Minerva Deland and Fairport High School are eligible to participate. Students must be in good standing both academically and behaviorally in order to participate on the team. All students who have an interest in being involved and have a willingness to actively participate in team activities in a constructive manner are encouraged to join.

The team will also consist of mentors who will share their knowledge with students. College students & professors, engineers & skilled craftsmen, parents and others from the community with an interest and applicable skills may serve as mentors.

Faculty advisors are one of the best resources to the team. At least one faculty advisor must be Technology Education certified in order for the club to function. All faculty advisors serve as in-school support and seek to maximize the educational aspects of the process for all students.

Team Expectations and Commitments - General

Being a part of Red Raider Robotics is a privilege and each member is expected to conduct themselves to the highest standards at all times. The team's reputation has been built over 16 years of participation in FIRST. Specific guidelines are listed below.

1. All members will be held to the highest expectations for behavior while at team events, at school and in the community as defined by the Fairport Central School District Code of Conduct found in the student handbook. This includes but is not limited to:
 - a. Team Uniform – team t-shirt is to be worn to any team event. The team logo **MUST** be visible at all times.
 - b. Emails – each team member **MUST** read their email at least 2 times/day (once in the morning/once in the late afternoon). Important information will be shared with team members and mentors through email.
 - c. Safety – follow guidelines as set out by Faculty Advisors, Mentors, and FIRST at all times.
 - d. Grades – maintain your GPA. Seek help if needed through either a team tutor or the Faculty Advisors.
 - e. Blue Sheet Eligibility – follow all guidelines as set out by the Fairport Central School District.
2. Be on time for all meetings and events. This means that you arrive at least 5-10 minutes prior to the start of the meeting or event. Meetings will begin promptly at the scheduled start time with an agenda. Meetings will end with a debriefing of

what was accomplished at the meeting/event and will promptly end at the scheduled time.

3. All members will participate in team activities and will co-lead at least one event including but not limited to; community service, fundraising, demonstration events, build season, summer workshops, etc. Participation hours will be tabulated on a monthly basis to determine each member's participation in order to determine the "Raider of the Month". This honor will be given to the team member that has accrued the most participation hours for that month and will be given their own Raider hat. Each team member can only win once per year but can earn a pin for additional month with high participation. Participation is considered as follows:

- a. *After School Meetings – must attend all meetings, however, each member can miss one meeting per month with written notification to the Faculty Advisors.*
- b. *Kick-off Event – this is a MANDATORY meeting for all members. This meeting is held the first Saturday in January and is broadcast across the USA to all FIRST teams. During this event the new game for the year is revealed in the morning and we return to MB for lunch and brainstorming in the afternoon. The yearly team photo is taken at this meeting.*
- c. *Workshops – must attend if your sub-team has scheduled work (either Synergy-season or Build-season). Joining your secondary sub-team meeting is optional but you should plan on attending some of the meetings.*
- d. *Build Season – all members are expected to attend all meetings scheduled on Tuesday, Thursday and Saturday. Sub-team specific tasks will be scheduled to be completed during these meetings as well as other team events (button making, bumper covers, etc.). The Monday is not required, however, certain sub-teams and/or individuals will be asked to attend in order to work on project-specific tasks in order to meet our time schedule. Team members must have at least 80 hours of attendance documented during the build season in order to participate in our competition season.*
- e. *Fundraising – all members must participate in fundraising during the year. These fundraisers are scheduled in order to help the team purchase additional robot parts, team t-shirts, supplies for FLL teams, etc. There are three fundraising opportunities for team members to participate in (one mandatory/two optional) so members can choose which they would like to help with. Fundraisers will be led and organized by students with parent/adult assistance. This activity serves as both a means to raise money and to promote team cohesion.*
 - i. *Chalk Raiders – takes place in the fall (around homecoming) and in the spring (around graduation). This is a MANDATORY fundraiser for all team members. Team members must participate both in the fall and spring.*
 - ii. *Car Wash – takes place in the fall on the first Sunday in September. This is an OPTIONAL fundraiser for all team members.*

- iii. *Spaghetti Dinner* – takes place in the spring sometime in April. This is an **OPTIONAL** fundraiser for all team members.
 - iv. *Can Drive* – an ongoing fundraiser for the team. This is optional but we will have a collection date at MB the Saturday after the Super Bowl in February.
4. All members will purchase their own pair of safety glasses. These are to be worn when working on any part of the robot, while using tools and machines, in the pit area at competitions, or any other place where a potentially dangerous situation may arise.
 5. All members will contribute to the workload through mentors and/or sub-team leaders. If a member finds that they have “nothing to do” they will check with the following people in this order.
 - a. *Sub-team Leader*
 - b. *Sub-team Mentor*
 - c. *VP of Engineering/VP of Outreach*
 - d. *Flagship Council Member*
 - e. *Faculty Advisor/Lead Mentor*

If the team member still has nothing to do, that team member will call their parent to be picked up from the meeting. They will sign out of the meeting before they leave with their parent.
 6. Team members are to sign in at each event/meeting with the Communication Specialist or event organizer when they arrive. Failure to do so will result in those hours not being counted. **No other team member can sign you in!** If a team member leaves early, they must sign out when they leave so that the correct number of hours are credited. Team members must have their timesheets signed by their sub-team mentor, Faculty Advisor, Lead Mentor or event organizer at the end of each meeting/event so that those hours are counted. No time will be counted without an adult’s signature.
 7. Team members will familiarize themselves with all facets of the team. Cross-training with a sub-team will be a requirement.
 8. All team members **MUST** familiarize themselves with all aspects of FIRST and other FIRST teams; knowing Core Values, Gracious Professionalism, Coopertition and Team 578 Mission Statement, etc.
 9. Team members **MUST** always put school before Robotics. Schoolwork is the priority and if a teammate is struggling, we can help you with team tutoring or a Faculty Advisor can step in to get a team member additional help. If grades become an issue, a meeting with the Faculty Advisor(s), student and parent will be scheduled to plan for the next steps.
 10. Team members will notify their teachers when they will be out of school due to a Robotics event/competition. Each team member will be responsible for making up any work missed while out of class. Typically, team members will miss 3 to 6 days of school per year in order to participate in FIRST events.
 11. Team members will **ALWAYS** ask questions! You are here to learn. Mentors and veteran students want to help you to be successful in whatever you are doing!

Team Expectations and Commitments – Build Season Meetings

1. Personal laptops will not be allowed at build site unless specified by a mentor.
2. Team members will not play video games during build season meetings.
3. Team members will not distract others or be unproductive.
4. Team members will work productively. If there is not work immediately, see the list above to help gain direction.
5. Team members will handle tools with care and safety. All tools are to be put back in their correct storage location when finished being used.
6. Team members will be kind and courteous to each other and our mentors at all times.
7. Team members are expected to find positive ways to resolve conflicts.
8. It is okay to disagree with a decision that is made by the team or sub-team. However, once that decision has been made it is important to put aside any personal opinions once team consensus is achieved. If you are absent during a decision making time, you missed your chance to give input and there is no going back once a team decision team is finalized.

Team Expectations and Commitments – Attending Competitions

1. Students who are not on the drive team or pit crew will help the team by:
 - a. Cheering for the drive team and robot when they are on the field competing.
 - b. Helping with scouting. Contact the lead scout for instructions.
 - c. Helping to hand out team buttons and going around in the mascot suit. When a student is in the mascot suit there must be at least one other student with him/her at all times.
 - d. Talking to other teams in the pits. Most teams will be more than willing to show off their robot if you ask politely. Increase your knowledge and network with other people! Scouting sheets will be provided to gather and organize information. Everyone will be required to fill out a certain number depending on team members in attendance. This is very important as it helps us decide who to partner ourselves with and therefore help us win elimination matches.
2. Students will be active in helping the team (cheering, scouting, networking, etc.).
3. Students will always bring safety glasses to competition and will wear them in the pits.
4. Students not on the pit crew or judge presentation team will stay away from our team pit to avoid clogging the area.
5. Students are expected to stay within the competition arena and not wander off.
6. Remember, at competitions you represent our team and FCSD, and you should always behave in a way that makes our community proud!

Team Expectations and Commitment – General Safety

- Our first build session of the year, which is held at PMD, will be dedicated to safety procedures and rules led by the Safety Captain- *all students* are required to attend this meeting.
- Students must be aware of and take actions to protect themselves against the dangers of making the robot. Examples include working with power tools, carrying heavy equipment, etc.
- Students will ask a mentor if they do not know how to use a machine.
- Students will not put other students or mentors at risk of injury by distracting them while they are in a build area.
- Students will have a pair of safety glasses on them at all times and must wear them in build areas.
- Students must not wear open-toed shoes in the build area.
- Students must tie their hair back when using machines to avoid getting hair caught.
- Students will use machines (including laptops) for productive tasks which benefit the team, and not use machines for personal tasks.

Team Consequences

Individuals who violate the rules and guidelines of Red Raider Robotics are subject to disciplinary action, ranging from a verbal reprimand, up to and including separation from the team and all team-related activities. Such disciplinary action will be determined by the Faculty Advisors, Lead Mentor, Flagship Board and FCSD Administration.

Expenses

Team Expenses

The FRC program is a well-organized operation that culminates in competitions that rival any professional sporting event. The costs for teams to participate are substantial. The entry for one event, including the kit of parts, is approximately \$6,000; additional competition fees are \$4,000 - \$5,000 per event.

The costs to individual teams for materials, tools and the professional services needed to build a robot are also significant. Generous donations of materials and services from local companies and the skills of our mentors have helped minimize costs.

In past seasons, corporate and FCSD contributions have covered many of the costs incurred by the Team. In these financially challenging times, continued support from our large corporate supporters is uncertain and can change from year to year. While Team leadership will continue to seek corporate support from a broad range of companies, it will be necessary for students to conduct fundraising activities to help cover costs .

Participant Costs

There is no fee for students to participate on the Team. However, each student will be required to purchase their own pair of safety glasses. These are a requirement to work on the robot and in the pits at regional competitions. Each new member will be given two (2) team t-shirts and veteran members will be given one (1) team t-shirt at the beginning of each season. This is a requirement for each student to have and should be considered as your team “uniform” to participate in team events. Additional items will be available for purchase from a Team “store” at the expense of the student, mentors and family members.

The only other expense that may be incurred is for transportation, food and lodging if students choose to attend a competition. Typically, a student can expect to pay \$200 to \$300 to participate in an “away” competition. Travel costs are dependent upon distance travelled and duration of the trip.

Red Raider Robotics Leadership Structure

Flagship Board

The Flagship Board consists of a team of students and mentors that make decisions and set the guidelines for the team. The positions that make up the Flagship Board are:

President:

- *FIRST* contact and face of the team
- Works with Faculty Advisors and Student Leadership to manage and run team

Vice President of Engineering:

- Oversees Drive Train, Electronics, Programming, and Structures sub-teams
- Delegates tasks to sub-team leaders
- Facilitates communication between sub-teams, understands “big picture” of robot
- Ensures space allocation on the robot
- Works with mentors and sub-team leaders to organize and run training sessions

Vice President of Outreach:

- Oversees all Marketing activities
- Assigns students to lead events, fundraisers, and community service
- Works with President and leader of Marketing sub-team to ensure documentation of team through written and social media
- Ensures positive sponsor relationships
- Coordinates award submissions (Chairman’s Award and others)

Treasurer:

- Creates robot Bill of Materials for regional competitions

- Works with President to manage sponsor relationship funds
- Works with VP of Outreach to coordinate fundraisers
- Oversees team business plan and business award submission
- Balances team budget and accounts

Communication Specialist:

- Works with President to maintain relationships with school district, mentors, community members and corporate/business sponsors
- Maintains social media and website
- Records and maintains documentation of team member’s hours for the year
- Records attendance at meetings and team events

Sub-teams

Team 578 divides the work each year among several different sub-teams. Training sessions are held over the summer and during the fall through evening workshops. Students are encouraged to investigate many different sub-teams and learn as much as possible about what each sub-team does before committing to work on a sub-team. Generally students are able to be on the sub-team of their choice. Team leadership and mentors may shift students to different sub-teams if needed.

- **Structures:** Designs & builds the mechanisms of the robot that play the game.
- **Drive Train:** Builds the basic frame and designs/assembles the components that allow the robot to move. Also designs and makes the bumpers to protect the robot.
- **Electronics:** Wires semiconductors and logic controllers along with drive system sensors.
- **Software:** Designs and creates code (in Java) that controls the robot in both autonomous and wireless modes.
- **Spirit:** Maintain and improve the team so that it functions cohesively, works on maintaining relationships with other FIRST teams, creates cheers & dances, etc.
- **Marketing:** Creates and maintains the team’s media, such as the team website, social networking, photos, etc. Oversees sponsor relationships and team branding.
- **Competition:** Analyze and develops game strategies, organizes scouting of other teams, and helps the drive team with alliance selections based upon data.
- **Safety:** Makes sure that the team is OSHA and FCSD compliant in all work areas and monitors team members/mentors for safe practices and emergency preparedness. Tasks include maintaining inventory of first aid kit(s), issuing safety reminders and monitoring the pit during competitions for safety and crowd issues.

Flagship Board Elections

Elections of new Board members takes place in April of the current school year. Each person seeking a Flagship Board position must fill out a short application and give it to the Faculty Advisors at least two (2) days prior to election day. A brief commentary

will be shared to the group and all members will cast their vote for the candidates on written, private ballot. These will be tabulated and be published on the Team website the following day.

The outgoing Flagship Board will overlap leadership responsibilities with the new Flagship Board members for approximately 4 – 6 weeks. This will allow the outgoing leadership to mentor new Flagship Board members to ensure seamless transition from year to year.