



THE GREEN MACHINE

Edina Robotics *FIRST* Team 1816 - The Green Machine Team Handbook

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TEAM OVERVIEW

Edina Robotics *FIRST* Team 1816 *The Green Machine* is a wholly-endorsed activity of Edina High School, complete with Minnesota State High School League sanction. The team is comprised of students interested in math, science, engineering, programming, business and marketing. With the help of adult volunteers and mentors, the team builds a robot to compete in the *FIRST* Robotics Competition. Team 1816 supports itself by raising funds through corporate sponsorships as required of all *FIRST* teams.

FIRST stands for “For Inspiration and Recognition of Science and Technology.” The *FIRST* Robotics Competition is an international organization that brings together professionals and students to solve an engineering design problem in an intense and competitive way (www.usfirst.org). In 2011, it is anticipated that the competitions will include more than 55,000 high school students placed on 2,200 teams throughout the world. There are 44 regional and state events, and one Championship competition. The competitions are high-tech spectator sporting events, the result of brainstorming, teamwork, mentoring, and project deadlines. The *FIRST* mission is dedicated to changing the way high school students regard science and technology. *FIRST* inspires an appreciation for the real-life rewards and career opportunities in these fields.

The team begins in the summer by securing funds to pay for the costs of a robot starter kit, competition fees, robot parts, and possibly some travel expenses. They also familiarize themselves with *FIRST* and the tools and software they may be using. At a *FIRST* kick-off event in January, the team learns the competition game scenario and game rules when they pick up their robot kit.

The team has only 6 weeks to complete their robot before it is shipped to a regional competition site. Using a *FIRST*-provided kit of parts including motors, sensors, cameras and electronics, as well more than \$3,000 of additional purchased materials, the team builds a full-scale robot. The team designs, builds, and programs their robot for the competitive game play.

A typical regional competition brings together 30-60 high schools and their robots at a coliseum-type facility for three days. The facility holds spectators, an arena for the robot competition, and a “pit area.” The pit area provides each team with a 10' x 10' station to fine-tune their robot between events. Teams compete with and against each other using their robots to play the game.

The team completes their season in the spring with a follow-up to their corporate sponsors. Various activities and events are planned throughout the summer, including fundraising, in preparation for the next competition season.

Team Mission Statement

The foremost goal of the Edina Robotics *FIRST* Team 1816 – The Green Machine – is to offer students positions of leadership and responsibility, and to create an environment that encourages creative problem-solving while promoting this unique atmosphere to fledgling teams. The Team will also furnish opportunities for students to work and build relationships with adult mentors possessing professional expertise. Additionally, the Team will strive to develop and apply the students' knowledge of science, math, and business; and to spur interest in technological fields and environmentally supportive measures for the future.

Team History

In 2005, Edina High School junior Chris Miller, with a nucleus of friends, formed a robotics team at the high school for the purpose of competing in the *FIRST* Robotics competitions. Chris, who was team captain, applied for and received a \$6,000 seed grant from NASA. This allowed the team to attend the kickoff in Milwaukee, WI in January 2006 and to receive the kit of parts and instructions about the competition game "Aim High." The Edina team was assigned the *FIRST* number 1816, and the team adopted the nickname "*The Green Machine*."

During our 2006 rookie season, 16 Edina students collaborated to design, build, and field a 5-foot tall robot. The team built the robot in the newly remodeled kitchen in the home of Chris Miller's father. Our major sponsors in 2006 were NASA, Medtronic, Inc., and Edina Education Fund. We had an outstanding season, emerging as the winner of the Wisconsin Regional Competition with alliance partners Team 111-Wildstang and Team 1625-Winovation. At the Championship competition in Atlanta, the team finished as the 6th seed out of 85 teams in Archimedes Division and earned the "Highest Rookie Seed Award."

In 2007, the team more than doubled its size to 35 students. Using warehouse space donated by Honeywell Inc., the team built a robot to compete in the game "Rack 'n Roll." We recruited and mentored seven new Minnesota teams, and helped host the first-ever Minnesota Kickoff at the University of Minnesota. We also participated in the first-ever Fuel Cell project, winning second-place for a game design using hydrogen fuel cell powered robots. This participation earned us a trip to the Championship, where our team's alliance finished as Division Finalists in the Newton Division. Our team ended the season by moving into shared construction workshop space with the EHS Thespians in Edina High School, while our computers are housed in a nearby classroom.

In 2008, the team's 30 members poured much of its energy into Outreach efforts, including development and presentation of Minnesota Splash, a first-ever pre-season event focused on technical and non-technical topics to help new and returning teams prepare for the *FIRST* competition season. Team 1816 was selected to be part of the inaugural *FIRST* President's Circle, and helped develop "go-to" resources for rookie teams; mentored two *FIRST* Lego League teams; encouraged future scientists through an elementary school science fair, demonstrated the 2007 robot at community events, took part in programs aimed at improving the environment, and mentored *FIRST* teams locally and worldwide through its Web forum, videos, and email. Team 1816 also volunteered to create, develop and maintain the website for the *FIRST* Minnesota Regional. All of the team's outreach efforts were acknowledged when Team 1816 was awarded the regional Chairman's Award at the inaugural *FIRST* Minnesota Regional, March 2008. The Chairman's Award is the most prestigious award a team can earn, stemming not from being on the winning alliance at a competition, but by reaching out beyond building a robot to the community-at-large. This honor is one that every *FIRST* team strives for because the team that wins it is recognized as having done the most to spread the ideals and goals of *FIRST*, by inspiring young people to become leaders in science and technology. And as robots go, the 2008 robot designed and built for *FIRST* Overdrive succeeded in reaching the quarter-finals at the March 2008 Wisconsin Regional as well as the quarter-finals of the Minnesota Regional. Winning the Chairman's Award earned Team 1816 a trip to Atlanta, where the team was a Galileo Field Participant in the 2008 *FIRST* Robotics Championships, April 2008. The team wrapped up its

summer 2008 activities by earning the title of “Minnesota State Fair Robotics Competition Champion” in September.

In Fall 2008, Team 1816 once again was involved with a *FIRST* pilot program. The team was one of only 18 “beta-test” teams in the nation to test the new control system, the Compact cRIO. Beta-test teams put together seminars on the new control system to help ease the transition that teams faced switching to the new technology. The Green Machine collaborated with two other veteran *FIRST* teams -- Team 2220-Blue Twilight, Eagan High School, and Team 2129-Ultraviolet, Southwest High School, Minneapolis -- on six weeks of testing. In November, the three teams presented all they had learned about the cRIO at the University of Minnesota’s Willey Hall to regional *FIRST* teams. In early December, Team 1816 also demonstrated the cRIO as the host of a series of pre-season seminars known as “Minnesota Splash.” Splash features veteran *FIRST* teams presenting on a variety of relevant *FIRST* robotics topics to new and inexperienced teams. Standing-room only audiences (approximately 500 to 600 people) crowded into Anderson Hall at the University of Minnesota to learn about the cRIO, electrical wiring, pneumatics, marketing, websites, animation, outreach and the Chairman’s Award.

The Green Machine in September 2008 helped launch Edina’s first-ever *FIRST* Tech Challenge (FTC) team. Team 2887- The Bucket Brigade is composed of students in grades 7 – 9 at Edina’s Valley View Middle School. Their robot, “Betty,” competed in March 2009 in the Minnesota Snow Drift FTC Regional Tournament, Prior Lake, Minn. The team not only held its own at the tournament, competing against teams composed entirely of high school students, but came away from their first-ever competition with two awards. The PTC Design Award, which recognizes a robot that is both functional and aesthetically-pleasing, and was named a finalist for the Inspire Award, FTC’s highest-ranked award. This award recognizes a team’s “spirit of gracious professionalism” and inspiration to others.

After finishing in the quarterfinals at the Wisconsin Regional, Team 1816 felt confident an improvement in standing could be accomplished. While “Zeus” entered Wisconsin as a “shooter” with the ability to shoot balls into opponent’s trailers, the team decided a dumper would allow the team to score much higher volumes than had been scored previously. A small group of builders designed and created a dumping mechanism to replace the shooter. The time spent re-building Zeus was well worth it. The Green Machine finished with a 6-1 record in qualification rounds at the Minnesota North Star Regional, placing it in fourth place overall and able to select its own alliance for the elimination rounds. Aided by alliance partners Team 2472-Centennial Sr. High School, Circle Pines, Minn., and Team 2418-Minot, N. D., the team reached the finals. However, Zeus lost in the final match to the second-seeded alliance composed of Team 79-Krunch, Tarpon Springs, Florida; Team 2970-Kenosha, WI, and Team 2549-Millerbots, Washburn High School, Minneapolis.

In addition to success on the playing field, the team did well in non-build related areas. After winning the award at the Wisconsin Regional for “Best Website,” the team repeated, also receiving the award at the North Star Regional. The team also took home their first-ever Autodesk Visualization Award for our animation “Green Power.” Both the animation and website were entered in their respective categories at the *FIRST* Championships in Atlanta in April; at Championships, the website earned a “Web Excellence” award in that round of judging. At the North Star Regional, Mark Lawrence, one of Team 1816’s founding mentors and the Director of Technical Operations, was named the winner of the Woodie Flowers Award, presented by Woodie Flowers himself! The award, named after the *FIRST* cofounder and MIT professor emeritus, celebrates mentors who “lead, inspire, and empower using excellent communication skills.”

Our 2010 season began long before the annual January kickoff. Zeus and the team made appearances at various events, including the Minnesota State Fair, Valley Fair, the Mall of America, and at Southdale Mall for the *FIRST*-ever *FIRST* Robotics showcase. The team stayed true to its “going green” theme by volunteering at the Bakken Museum for “Bike to the Bakken Day” and at the Wood Lake Nature Center. Weekly “green” tips became a popular feature on the team’s website.

In September 2009, we were again selected by *FIRST* as a beta testing team. This time, we tested updates to the Windriver programming environment, as well as a brand new driver station. Green Machine programmers presented findings to FRC teams statewide through two different

pre-season events: Minnesota Splash, a day of seminars and presentations hosted by 1816, and at the Twilight-Star Mini-Regional.

The Green Machine also faced a new challenge that wasn't strictly related to robots: Two thirds of the team graduated in June 2010. The team as a whole devoted many more hours mentoring four Edina *FIRST* Tech Challenge teams, and we plan to welcome the first of many FTC veterans onto the FRC team beginning in September 2010.

The 2010 game challenge was robots playing soccer. The CAD sub-team went into overtime using Solidworks to assist with computer-aided design possibilities. The workshop filled up with prototypes, and by ship date, the 2010 robot Zazu was almost fully built. As soon as the pits opened at the Wisconsin Regional in Milwaukee, the robot builders began fine-tuning the robot. However, we were not able to get the robot working on the field until seeding matches on Friday. The team discovered that Zazu's kicker, despite countless readjustments, wasn't quite the capable offensive player, but made an excellent defensive robot. Despite several well-played matches, we didn't catch the eye of any of the top eight teams, and we were not picked for an elimination alliance. That gave us valuable insight into game strategy as well as a laundry list of fixes to be made to the robot with an eye toward a better outcome at the Minnesota North Star Regional.

The 2010 Minnesota North Star Regional, staged at Mariucci Arena at the University of Minnesota, overall went quite well for 1816. The team fixed up the roller and the kicker so that Zazu could successfully kick soccer balls into the goals, improving the robot's performance both in autonomous and tele-operated mode. These improvements were noted by other teams, and 1816 was picked by the fifth seeded alliance lead by Team 2418-Northern Lights, Minot, N.D., to be their alliance partner in the elimination rounds. Unfortunately, in each of the two elimination matches only two of the three robots were moving, as Zazu lost communication in the first round and another robot on the alliance had a similar problem in the second round. Team 1816's attitude and service off the field was recognized as well. We received the "Best Website Award" for the second-year in a row, and the Johnson & Johnson "Gracious Professionalism Award" for our outstanding support for other teams in the competition.

In Atlanta, the first day of the Championships was the polar opposite of the team's struggles in Wisconsin and Minnesota: Zazu won all three of its matches with a reliably working kicker and maneuverability around the field. Unfortunately, on day two, Zazu once again succumbed to various technical mishaps. Despite the fact that Zazu turned out to be a reliable robot that could score well (Zazu even scored in autonomous in its last match, much to the delight of its programmers), there were simply many other robots that were similarly skilled, and 1816 was not selected to be in the elimination rounds.

Competition was tougher than ever this season, but 1816 benefited from valuable learning experiences. We expect the Green Machine to be fully prepared to take on 2011's *FIRST* Robotics challenge.

FIRST AWARDS

At all Regional and Championship competitions, *FIRST* recognizes “FRC teams for excellence in design, creativity, innovation, culture changing behavior and competition performance.” Since its founding in Fall 2005, Team 1816 has been honored with the following *FIRST* Awards:

2006

Winner, 2006 Wisconsin Regional Competition, March 2006, Milwaukee, WI
Highest Rookie Seed Award, 2006 *FIRST* Robotics National Championship, April 2006, Atlanta, GA

2007

Daimler Chrysler Team Spirit Award, March 2007 Wisconsin Regional, Milwaukee, WI
Newton Division Finalist, 2007 *FIRST* Robotics National Championship, April 2007, Atlanta GA
Silver Award, Fuel Cell Game Design, "Lazer Maze Craze"

2008

Regional Chairman's Award, March 2008 Minnesota Regional, Minneapolis, MN

2009

Winner, Best Website, 2009 Wisconsin Regional
Finalist, 2009 Minnesota North Star Regional
Winner, Best Website, 2009 Minnesota North Star Regional
Winner, Autodesk Visualization Award, 2009 Minnesota North Star Regional
Mark Lawrence, Woodie Flowers Award Winner, 2009 Minnesota North Star Regional

2010

Winner, Johnson & Johnson Gracious Professionalism Award, 2010 Minnesota North Star Regional
Winner, Best Website, 2010 Minnesota North Star Regional
Laurie Shimizu, Outstanding Volunteer Award, 2010 Minnesota North Star Regional

TEAM AWARDS

In the spirit of *FIRST*, Edina Robotics in 2008 established team awards to recognize team members who demonstrate extraordinary commitment and contributions to the team, as well as excellence in creativity, innovation and competition performance. They have all gone above and beyond what was expected of them in their role on the team.

Christopher Miller Leadership Award: Our team's highest honor, named for Christopher Miller, the Edina junior who founded Team 1816 at Edina High School in 2005. This award is presented to the student who demonstrates outstanding leadership skills, a high-level of responsibility and commitment, and the ability to inspire others to become involved with science, technology, engineering and math via *FIRST* Robotics.

2008: Andrew Peter

2009: Daniel Purdy

2010: Emily Benson

Distinguished Service Award: To a student who goes above and beyond what is expected of a Team 1816 member. This student takes on leadership, seeks opportunities, encourages team members to learn things outside their first area of interest, mentors team members, exhibits grace while in stressful situations, and dedicates an extraordinary amount of time to the team with a strong passion for all things robotics

2008: David Cook

2009: Matt Hornung

Distinguished Achievement Award: Presented to the Team 1816 member who has achieved a high level of aptitude in one or more areas, and has made significant contributions in those areas.

2009: Gregory Budd
2010: Anna Waldo

Excellence in Engineering: Presented to the student who not only exhibits strong technical skills but also demonstrates motivation, flexibility, and dexterity by learning about engineering systems and processes. The student receiving this award demonstrates strong creativity and inventiveness in engineering design.

2008: Ross Neal
2009: Matthew Hornung

Gracious Professionalism Award: This award celebrates outstanding sportsmanship and gracious professionalism both on and off the competition field.

2009: Anna Waldo
2010: Dan Purdy

Volunteer Award: Presented to a Team 1816 member who has given generously of their time, energy, resources and talents in support of the mission and values of *FIRST*.

2008: Evan Shimizu
2009: Evan Shimizu
2010: Andrew Peter, Evan Shimizu

Creativity Award: Celebrates creativity and design by a student, who demonstrates development of innovative skills and the blending of art and science.

2009: Ross Petersen
2010: Clara Lee

Judges' Award: During the course of the season, the mentors may decide a student's unique efforts or performance merits recognition.

2009: Alistair McIntyre
2010: Emily Condif

Rookie All-Star: To a student that learns as many different aspects of the team as possible, demonstrating dedication, motivation and responsibility.

2010: David Fogg.

Rookie Achievement: To a student that excels in a specific aspect of the team.

2010: Joel Morton

Outstanding Rookie/Rookie Inspiration: To a student that demonstrates enthusiasm, commitment, and the willingness to give everything a try.

2008: Remington Goodenough, Amy Zhang
2009: Terry Guan, Emily Benson
2010: Michael Woolsey

1816's Chairman's Award: The *FIRST* Robotics Competition is about much more than the mechanics of building a robot or winning a competitive event. It is about the impact *FIRST* has on those who participate in the program as well as the community at large. *FIRST*'s mission is to change the way America's young people regard science and technology and to inspire an appreciation for the real-life rewards and career opportunities in these fields. Our team's Chairman Award is not for working on the chairman's award submission or presentation. This award is about outreach. It is given to the team member who best exemplifies the true meaning of *FIRST*.

2008: Sophie Burke

MEMBER REQUIREMENTS

Code of Conduct

“Gracious professionalism,” one of the founding precepts of FIRST, is essential to team participation. “It’s a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community” (www.usfirst.org). Disciplinary actions, to be determined by team mentors, may include suspension from team activities, ineligibility to travel with the team, or removal from the team.

1. Students will display “Gracious Professionalism” – the motto of FIRST – at all times and promote the ideals of FIRST.
2. Students will sign an agreement and follow the same rules as dictated by Edina High School and the Minnesota State High School League, including those in regards to alcohol and chemical substances.
3. Students will not violate the racial / religious / harassment / violence / and hazing bylaws of the Minnesota State High School League (<http://www.mshsl.org/mshsl/index.asp>).
4. Students are expected to behave in a courteous and cooperative manner.
5. Students are expected to be respectful of others and behave in a way that protects the health and safety of themselves and others.
6. Students shall be respectful of the facilities, tools, equipment and all things being used by the team.
7. Students shall not use profane, obscene or vulgar language in written, gestured, or verbal form. Edina Robotics abides by Edina Public School’s Acceptable Use Policy for all communications, including all social media and Internet usage. Students’ Internet/social media/online communications are team communications, and will be regarded as such.
8. Students visiting or working at corporate sites are guests of the corporations and must be courteous and respectful. While at a corporate site, students are expected to follow the general rules and safety rules posted at the site.
9. Students are expected to keep current with team activities and requirements by checking the website and their email frequently.

Student Eligibility

1. Students must be a high school student in the Edina School District.
2. Students must maintain a minimum of a C- average.
3. Students are expected to make a significant time commitment to the team, actively participating in meetings, workshops, and events. Commitment to the team increases significantly during the months of January – April.
4. Students are expected to be reliable (on-time, prepared to work, clean up, positive attitude, assist newer members, responsive to mentors and other adult volunteers) and assist with team administrative tasks.
5. Students and parents must complete the necessary paperwork and pay the required fees including the annual registration fee, t-shirt costs, and travel expenses.

Lettering and School Recognition

1. The faculty advisor and operations director, with input from all team mentors, will determine which students receive an Edina School letter and/or school and team recognition awards.
2. Students must be an active participant of the team (absences are noted) and member in good standing for each of two years.
3. Student must attend the *FIRST* Minnesota Regional (Minneapolis) competition in its entirety for each of the two years.
4. Student must maintain a minimum of a C- average.

Team Organization

Faculty Advisor:

- A teacher or Edina High School-appointed volunteer who acts as the liaison between the team and the school.
- Monitors the standing of each member (grades, behavior, and attendance).
- Communicates to the schools and schedules school facilities.
- Assists with grant proposals.
- Coordinates yearbook page with school yearbook staff.
- Determines appropriate school and team recognition awards.
- Supervises team activities.
- Serves as “alternate contact” with *FIRST* organization.
- Serves as “shipping contact” with *FIRST* organization.
- Maintains open communication with parents, mentors and students.
- Coordinates parent and adult volunteers for team activities.
- Coordinates mentors for build and sub-team meetings.
- Supervises travel plans for team.
- Co-signer on team checks.
- Supervises handbook updates.
- Maintains registration, attendance, safety contracts, and other private student records.

Operations Director:

- Chief mentor to the team (both robot and business operations).
- Supervises technical mentors.
- Co-signer on checks.
- Is present at competitions and other *FIRST* events.
- Coordinates with Faculty Advisor, Communications Manager and Team Manager on all things detailed regarding *FIRST*.
- This handbook may not contain all possible team procedures and processes, nor can it address all situations coming before the team; the operations director is entrusted with ensuring that there are responsible adults overseeing the ongoing operations of the team.
- Chief arbiter of all team business. Has final approval of all official team communications and functions (including animations, videos, and outreach).

Communications Manager:

- Primary contact with *FIRST*.
- Primary contact with *FIRST* Minnesota Regional Planning Committee.
- Submits registration for *FIRST* events.
- Distributes *FIRST* information to appropriate adult and student team members.
- Oversees communications with community and business partners.
- Maintains team email distribution lists and rosters.
- Maintains team history.
- Works closely with student leaders to update team website, forum and calendar.
- Coordinates building requests with Edina School District.

Technical Mentors:

- Adult volunteers with an engineering or technical background.
- Provide professional expertise and supervision.
- Guide and teach students new skills.

Other Mentors:

- Are adults that direct the team in business, marketing, animation and media.
- Provide professional expertise, guidance, supervision, or training to students.

All Parents:

- Are expected to provide additional support of the team, including chaperoning, making travel arrangements, providing meals, transportation (people and robot), general

supervision (non-mentorship), donation of general supplies/snacks/water, craft-type expertise (including sewing) and assisting team mentors as requested.

Sponsors:

- Are corporations and individuals that contribute funds, services, supplies, or support to the team.

Team Captain(s) And Sub-Team Leaders:

- Are students that lead a group of students on a sub-team.
- Attend mentor/student leader meetings.
- Mentor younger students and set a good example.
- Bring problems to the attention of adults.

Selection of Leadership

The leadership of Team 1816 will be determined by secret ballot voting of the membership at a publicized team meeting and supervised by the Faculty Advisor and the Operations Director.

Students wishing to hold a leadership position must announce their candidacy during a designated team meeting prior to the voting and publish a statement of candidacy. All candidates must be members in good standing. The Co-Captain makes a unique two-year commitment to the team as a “shadow” the first year and Captain the second year. All other positions are for a single year. The Captain is not re-voted on in his/her second year. Further, it is strongly recommended that a candidate for sub-team leader have served on that sub-team in the past.

Sub-team leaders and team members are divided into sub-teams based on their interests and expertise. Sub-teams are developed based on the size of the team, the nature of the year’s competition, and the availability of mentors. Every team member is expected to participate in Outreach events and mentoring of *FIRST* Tech Challenge and/or *FIRST* Lego League teams. Mentoring of these teams above 15 hours will be considered for community service credit. Returning team members are sorted onto sub-teams before new team members are placed. The process will involve a random draw of names, beginning with seniors. Each student will select a position from the available positions. New members will be placed on sub-teams based on an application and interview with the Faculty Advisor, the Operations Director, and team member representatives as selected by the Faculty Advisor and the Operations Director. All team placements will be based on availability of positions.

Description of Leadership, Sub-teams

Captain

Represents Team 1816 in all official capacities, including *FIRST* competitions. Is chief spokesperson for the team. Supervises all business and build activities.

Responsibilities:

Run meetings; make broad sweeping decisions; make shipping arrangements; keep track of what needs to be done for build including monitoring of *FIRST* manuals; prepare BOM – the Bill of Materials (a complete listing of all robot parts and supplies and their exact cost) for *FIRST* competitions and present this BOM at competitions; maintain software licensing; as robot build leader, oversees members assigned to chassis and manipulator sub-teams; supervise sub-team leaders; maintain ongoing email correspondence; coordinates and communicates regularly with team mentors; includes team’s faculty advisor, operations director, and mentors in all team decisions.

Time Commitment:

All team meetings; all build days; minimum of 7 hours on *FIRST*-related business weekly, more during build period; all outreach events.

Co-Captain

The co-captain position is a two year commitment - 1st year as co-captain and 2nd year as team captain. The team does not elect a captain, only the co-captain. During the 1st year, the co-captain "shadows" the captain to understand the duties and obligations of managing the team. In the absence of the captain, the co-captain will be called upon to represent the team.

Responsibilities:

Serves as team's treasurer and helps manage team finances. Leads and manages team's corporate sponsorships and funding efforts. Develops and sustains relationships with the team's sponsors; maintains team's brand identity across all media, formats, materials, forms. Coordinates team members on marketing materials, newsletters, videos, giveaways. Arrange jobs for competitions in consultation with Faculty Advisor and Operations Director; help organize Outreach and other events; order parts, tools, equipment; help supervise sub-team leaders; coordinate Bill of Materials with Captain and Build sub-teams; maintain ongoing email correspondence; act as captain when the captain cannot be present at events or meetings.

Time Commitment:

All team meetings; all build days; during non-build season about 7 hours per week; all outreach events.

Build Leader (Chassis & Manipulator)

Leads design, construction, and adjustment of the robot's drive-train and manipulator systems. Monitors Web sites (*FIRST* and Chief Delphi) for vital information and weight control of the robot.

Responsibilities:

Organize and supervise meetings of chassis (drivetrain and frame) and manipulator (including sensors, pneumatics) sub-teams; track and buy parts; supervise work in pit during competitions; coordinate & supervise building of the chassis/drive train/manipulator; monitor weight of robot; keep current with Chief Delphi, The Blue Alliance, and other pertinent web communications; maintain an ongoing list of materials used in building of robot in preparation for *FIRST* Bill of Materials (a complete listing of all robot parts and supplies and their exact cost) for *FIRST* competitions; maintain a build schedule and keep sub-team to the schedule through supervision and communication; coordinate with mentors; work closely with CAD and Programming sub-teams.

Time Commitment:

All team meetings, coordinating and supervising summer practice build, summer workshops/trainings, all build sessions – full time; busy with coordination of activities and communication all year round 2-3 hours per week, outreach events.

CAD (Computer-Aided Design/Drafting) Sub-Team Leader

Leads design of robot's structure, creates CAD models of design, aids in design process, assesses feasibility of design choices, simulates motion and analyzes weight of robot.

Responsibilities:

Give vital input into robot design; model robot on computer using *Solidworks* CAD software; help construct prototypes; supervise sub-team meetings; maintain build log; keep current with Chief Delphi and other *FIRST*-related websites and team web forum; maintain communication with manipulator, chassis and programming subteams.

Time Commitment:

All team meetings, every build session, CAD training during the summer, work with practice robot in summer, outreach events.

Communications (Secretary)

Responsibilities: Oversees internal team communications, meeting minutes, team calendar and schedule; primary content provider (writer) to 1816's website and *Buzzwords* (newsletter published by the Edina Parent Council); may contribute to Minnesota Regional website; coordinate with co-captain regarding team marketing materials.

Time Commitment:

All team meetings, writing and communicating all meeting minutes, write stories for Web site(s) on tight deadlines; year-round 2-3 hours per week, outreach events.

Facilities Management Sub-Team Leader

Interprets *FIRST*-supplied blueprints of the playing field and builds parts of the field according to those specifications. Designs and sets-up pit area at competition. Constructs shipping crate.

Responsibilities:

Organize and supervise design and build of all non-robotic materials including: crate, pit, and practice field; design and construct bumpers for robot; manage workshop and inventory of tools; coordinate with marketing the pit design regarding and placement of corporate logos on robot.

Time Commitment:

All team meetings, during summer and fall 2-3 hours per week on pit and crate, during the build season all build sessions until field and crate are constructed, and final pit is designed and ready; outreach events.

Media Sub-Team Leader

Coordinate team photography, team video and DVD production, website, and animations. Develops, maintains, and submits website and other media projects for competition entry.

Responsibilities:

Build and maintain team's website; coordinate/execute the filming and editing of marketing and other promotional videos; maintain team's "You Tube" page; coordinate the taking/editing/filing of pictures from all team events; collect and manage all team media from other sources; supervise and coordinate production of team animations (Safety, Visualization, and other themed animations) using Maya and/or Autodesk 3D StudioMax software; liaison with professional media.

Time Commitment:

All team meetings, year round responsibilities. Busiest during team events, kick-off, and competitions; two to eight hours/week, up to 5-15 hours/week during build/design periods, all team/outreach events and competitions.

Outreach Sub-Team Leader

Promotes technology and engineering through various activities. Coordinates events, seminars and activities to raise awareness of *FIRST*; assists other FRC, FTC and FLL teams.

Responsibilities:

Organize and supervise outreach events and projects; handle all tasks associated with Chairman's Award submission, including essay, scripts, visual aids; coordinate with Business Captain on fundraising activities (car wash, et al.).

Time Commitment:

All team meetings, year round Outreach activities. Outreach events diminish during build, when Chairman's Award preparations take precedence. On average, 4-6 hours per week, year-round.

Programming Sub-Team Leader

Designs and builds robot electronics, wiring, circuitry, and sensor systems. Develops and updates robot computer programs (C++, LabVIEW, Java, et al).

Responsibilities:

Plan and supervise sub-team meetings; keep current with Chief Delphi; assure all programmers learn how to and participate in programming; program the robot; work on wiring in conjunction with manipulator and chassis sub-teams; program and wire practice robot in the summer; maintain communication with CAD, manipulator and chassis sub-teams, both verbally and electronically.

Time Commitment:

All team meetings, summer programming workshops and practice robot build sessions, weekly sub-team meetings until build; then 4-5 days a week during actual build; attend outreach events.

Safety Captain

This position is required by FIRST for all FRC Teams. See: <http://www.usfirst.org/roboticsprograms/frc/content.aspx?id=470&terms=Safety+Captain>.

Responsibilities:

Plan and deliver team safety seminar at beginning of season; be Safety Captain and Pit Boss at all competitions; distribute and collect safety glasses; buy safety glasses and other safety equipment; monitor websites (*FIRST*, Chief Delphi) for vital information, tools management. Download and print-out current year safety manual, including safety (MSDS) information about batteries. Coordinate work with Facilities Management sub-team on safety plan/equipment for pit; supervise the safety of the workshop during build sessions.

Time Commitment:

All team meetings, limited activity during the summer, safety seminar plan and execution takes 8-10 hours, supervision of workshop safety during build intermittent 2-3 hours/week; attend all competitions, and outreach events.

Scouting & Strategy Leader (position assigned by team leadership)

Responsibilities:

Organize pre-scouting activities; develop scouting database and data collection system; assign and coordinate scouts during competitions; monitor The Blue Alliance, Chief Delphi, and other *FIRST*-related websites and Forums; prepare database of teams/capabilities during competition; and preparation/delivery of scouting report. Must stay current on all game rules and communicate information to team. In cooperation with Business Captain, organize and coordinate team spirit (team mascot) at competitions, including peer-to-peer awards given to other FRC teams at competitions; oversees team giveaway items (i.e. Roborags, pins, keychains).

Time Commitment:

All team meetings, preparation begins when teams are posted before each competition – 3-4 hours per week for regional competitions and more for national competition, all competitions, and outreach events.

Business Functions

Outreach	Promotes technology and engineering through various activities. Coordinates events, seminars and activities to raise awareness of <i>FIRST</i> ; and assists other FRC, FTC and FLL teams. Includes organization of team activities and fund-raisers outside of corporate sponsorships.
Corporate fundraising	Responsible for soliciting sponsors. Maintains sponsor relations and recognition before, during, and after the building phase (see detailed sponsor information). Prepares grant proposals, and obtains other commercial donations of supplies and services.
Marketing	Provides marketing collateral materials, including logos, t-shirts, team giveaways. Supervises team brand identity, including t-shirts and mascot.
Treasurer/Finance	Co-Captain and designated team members work in conjunction with adult financial consultant.
Media	Coordinates team photography, team video and DVD production, website, and animations. Develops, maintains, and submits website as well as other media projects for competition entry.
Animation	Produces Safety, Visualization, and other themed animations using Maya software.
Communications	Oversees internal team communications, meeting minutes, team calendar and schedule. Is primary content provider to team's website; contributor to school newsletter(s). Coordinates team newsletter(s) and other team communications.

Build Functions

CAD	Responsible for design of robot's structure, creates CAD models of design, assesses feasibility of design choices, simulates motion and analyzes weight of robot.
Drive-train and chassis	Responsible for designing, constructing, and adjusting the robot's drive-train system and the skeletal structure of the robot. Monitors Web sites (<i>FIRST</i> and Chief Delphi) for vital information and weight control of the robot.
Manipulator	Responsible for the design, building and incorporation of any manipulators (including pneumatics) and sensors on the robot.
Electrical, sensors and programming	Responsible for electronics, wiring, circuitry, and sensor systems. Develops and updates robot computer programs.
Facilities Management	Interprets <i>FIRST</i> -supplied blueprints of the playing field and builds parts of the field according to those specifications; designs and sets-up pit area at competition. Constructs shipping crate. Manages and maintains school workshop area and team tools.
Safety	Safety captain and designated team members monitor competition manual for robot compliance and safety considerations. Coordinates team's annual safety seminar. Monitors Web sites (<i>FIRST</i> and Chief Delphi) for vital information, tools management & inventory of parts.
Strategy, Scouting & Spirit	Includes game rule monitor(s), provides competitive information for the competition team prior to and during competition, and develops scouting database and data collection system. Leads spirit at competition, including team peer-to-peer interactions and mascot.

Team Organization – During Competitions

Pit crew positions	<p>Students may rotate in and out of the pit.</p> <ol style="list-style-type: none">1. Mentor (type will vary).2. Safety captain – student in charge of safety glasses, cleanliness of pit, keeping aisles clear, monitoring persons in the pit.3. Mechanical – student(s) in charge of drive-train, chassis and manipulator.4. Electrical – student in charge of electrical pre- and post-match checklist as well as keeping batteries charged.5. Programming – student programmer responsible for system checks and programming changes.6. Runner – student in charge of acquiring any items needed including tools, parts, help, etc. Coordinates communication in and out of pit and rotation of pit crew.
Field crew	<ol style="list-style-type: none">1. Driver – *student operating the robot using the remote controls.2. Coach – student providing feedback during the game.3. Human player – student participating in the game as a human player.4. Other (such as robot accessory operator). <p><i>*Driver(s) will be determined by pre-competition try-out, possibly using the previous year's robots.</i></p>
Media crew	<ol style="list-style-type: none">1. Digital photographer2. Videographer3. Updates Web blog with competition news4. Seminar Coordinator
Awards crew	<ol style="list-style-type: none">1. Pit rep – talks to judges2. Chairman's Award – 3 students responsible for team interview and presentation before judges
Scouting and Spirit Crew	<ol style="list-style-type: none">1. Strategy Lead – coordinates scouts and presents conclusion.2. Data input – updates information to database.3. Collectors – watch matches and collect needed information.4. Robot Documenter – photographs and collects basic data on all robots at the competition.5. Mascot (wears costume, leads cheers).6. Peer-to-Peer Awards.7. Team representatives as requested by <i>FIRST</i> as guides and hosts to visitors.

FUNDING AND FINANCIALS

FIRST requires its teams to secure funding from corporations and other business sponsors. As such, funding for the Edina Robotics Team comes from these sources:

1. Corporate and Educational Sponsors – corporations, education-related and other non-profit organizations that donate funds. This constitutes the majority of the funds. Our sponsor levels for the 2011 season are noted in the section that follows:
2. Team member registration fee, travel expenses (transportation, hotel, and meals), t-shirt costs, field trip expenses, and miscellaneous costs are all funded by the team member. The typical cost per student is \$500 to \$1,200 depending on the student's travel. Scholarships are available. Please see Faculty Advisor.

Team 1816 deeply thanks its Corporate Sponsors for their ongoing support of our participation in the *FIRST* Robotics Competition. Every year, our team must solicit corporate sponsorships and donations to support a \$40,000+ budget to design and build a competition-ready robot. This budget does not include travel expenses to up to two regional competitions and/or the Championship event in St. Louis, MO. Listed here are a few of the budget line items:*

<i>FIRST</i> registration (entitles team to robot kit-of-parts and one competition)	\$5,000
Each additional regional event attended registration fee	\$4,000
Championship competition registration fee (if qualified)	\$5,000
Practice Playing field construction	\$1,000
Robot construction	\$3,000
Computer hardware, software	\$6,000
Team promotional items (banners, giveaways, mascot, fliers, etc.)	\$3,000
Administrative costs (video, website fees, photocopies, postage, etc)	\$2,000
Outreach events (trailer, hitch, presentation materials)	\$5,000
Total:	\$34,000

*This estimate includes two regional competitions and one Championship competition. It does **not** include travel costs for students, mentors, chaperones. All competitions require travel.

Sponsorship Levels

Level	Amount
Platinum Sponsor	\$15,000 and up
Gold Sponsor	\$10,000-\$14,999
Silver Sponsor	\$5,000-\$9,999
Bronze Sponsor	\$1,000-\$4,999
Contributor	\$1,000 or less

SAFETY

1. Team members will act in a safe manner AT ALL TIMES. This includes during any team-related activity while traveling to team events, and during competitions.
2. Team members will be respectful of the Safety Captain(s) and adhere to any reasonable requests made by the Safety Captain(s).
3. Team members will be expected to attend a safety seminar and pass a Safety Quiz. Power tools or equipment may only be used under the supervision of an adult mentor.
4. Team members will be expected to wear safety glasses at work sites and in the pit area at all competitions. In addition, team members may be asked to wear gloves, face masks, and ear protection during certain tasks.
5. Horseplay will not be tolerated at any time.
6. All work areas will be cleaned up at the end of every day including sweeping the floors and work surfaces, putting away tools and materials, and throwing away trash.
7. Students will not socialize or linger in the workshop once the designated task(s) are completed.
8. Team members will not directly or indirectly give out personal information about themselves or other team members while using any form of online/Internet communications or media. This includes all social media (Twitter, Facebook, et al), Team 1816, other *FIRST* teams or other *FIRST*-sponsored Forums, wikis or any Internet/Web/mobile device (smartphones, cellphones). As Team 1816 members, students' communications through any media are representative of the team and should not negatively reflect on the team and should at all times reflect the tenets of *FIRST* and "Gracious Professionalism."

SEASON CALENDAR

September, 2010	<i>FIRST</i> releases its calendar of events and other competition information. Team organization begins.
October – December, 2010	Team meetings: Regular team meetings will be held in Room 165, Valley View Middle School. Sub-team meetings and/or other group sessions are scheduled as needed. The web calendar and meeting notices via Facebook are regularly updated. Special events include Minnesota Splash, training sessions, field trip(s), guest speakers, Homecoming parade.
January 8, 2011	<i>FIRST</i> Kick-off
January 8February 22, 2011	The 2011 Build Season Work sessions and meetings daily.
March-April, 2011	<i>FIRST</i> Regional competitions Lake Superior Regional: March 10 – 12, 2011* Minnesota North Star Regional: March 31 – April 2, 2011. The Minnesota Regional coincides with Edina's Spring Break. All Members are required to attend.
April 28 – 30, 2011 May, 2011	Championships, Edward Jones Dome, St. Louis, MO* Sponsor recognition, school recognition and post-season team celebration
June-August, 2011	Summer activities may include training, community outreach, and corporate fundraising.

*Team registration for these competitions is possible.

TEAM TRAVEL

Travel	<p>Students are required to attend the <i>FIRST</i> Minnesota Regional. They are given the opportunity to travel to other competitions, including the Championship Event. All transportation, hotel and meal expenses are paid by each student and adult traveling with the team. Travel itinerary and information will be provided mid-season. Student MUST attend the Minnesota Regional (in its entirety) each year for <u>two years</u> to meet lettering requirements.</p>
Expectations of student while traveling	<p>Be a member in good standing (see Member Requirements).</p> <p>Pay for their transportation, and hotel (in advance), and meals while there. (<i>Scholarships are available</i>).</p> <p>Arrange ahead of time with their teachers to make-up any work missed (students will miss Wednesday, Thursday and Friday of school for competitions).</p> <p>Complete all necessary paperwork for travel (permission slips, <i>FIRST</i> consent form, medical and health liability release, student behavior expectation form, etc).</p> <p>Attends mandatory travel meeting(s).</p> <p>Abide by all rules of conduct for traveling with the team (to be distributed prior to traveling).</p> <p>Exhibit team spirit and “Gracious Professionalism” at all times while traveling.</p>

COMMUNICATIONS AND RESOURCES

Communications expectations:

All team members and mentors are required to have an email address (Google's Gmail is the preferred email server) and check it daily. In addition, the team website, including the forums, blog, and calendar, should be checked frequently.

Any distributed roster of the team members, parents, and mentors is designated as for *team use only*.

General Team contact: contact@edinarobotics.com

Resources:

www.edinarobotics.com = Edina Robotics team website, includes: news and a calendar

<http://www.facebook.com/pages/Team-1816-The-Green-Machine/113912638660613> = The team's Facebook page. This page will post announcements, schedules, meetings, events.

www.mnfirstregional.org = official website of the *FIRST* Minnesota Regional Competition includes upcoming events, information about *FIRST* Robotics in Minnesota.

www.usfirst.org = official website of the *FIRST* Robotics Competition (FRC), includes:

- information about *FIRST*,
- information about *FIRST* Robotics Competition,
- video of last year's championship games,
- competition manual.

www.chiefdelphi.org = a website of a veteran team with helpful information and forums on many topics.

www.thebluealliance.net = a website that archives videos of previous years' competitions and source of much helpful information.

www.firstnemo.org = a website with information for non-engineering mentors.