



Guide to Running a *FIRST*® Robotics Competition Team

FIRST® is a global robotics community that prepares young people for the future.



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Overview of *FIRST*® Robotics Competition

Teams of students are challenged to design, build, and program industrial-size robots and compete for awards, while they also create a team identity, raise funds, hone teamwork skills, and advance respect and appreciation for STEM within the local community. Volunteer professional mentors lend their time and talents to guide each team. It's as close to real-world engineering as a student can get. *FIRST*® programs gain access to education and career discovery opportunities, connections to exclusive scholarships and employers, and a place in the *FIRST* community for life.

Please visit our [Vision and Mission webpage](#) for more information about *FIRST* and our core values.

Typical Season Calendar

This calendar is intended to help mentors know some of the major events that occur each season. View the [FIRST® Robotics Competition Calendar online](#) for exact deadlines each season.

Year-Round Activities:

To help ensure team sustainability, these are the things that teams should focus on year round:

- Fundraising (see the [Budgets & Finances](#) section)
- Outreach

May – September

May – September is considered part of the off-season and some teams may choose to take a break while others may continue to meet. Check out the [Off-Season](#) section for more information.

- Create/Update your new/returning team (login to the [FIRST Dashboard](#) to get started)
- Fundraise and apply for grants (see the [Budgets & Finances](#) section)
- Lead mentor 1 and 2 Youth Protection Screening (due every 4 years)
- Connect with your [Program Delivery Partner](#) on off-season events or local training opportunities

September

September is when teams generally start meeting again (if they took a break) and begin preparing for the upcoming season. This is a great time for team to build new skills and engage with sponsors and the community.

- Recruit students and mentors (see the [Team Recruitment](#) section)
- First round of event selection (check out this [User Guide](#) for step-by-step instructions)
- Select your Kit of Parts options (check out [this calendar reminder](#) for more information)
- Select which Kickoff you plan to attend (check out the [Kickoff webpage](#) for instructions)
- Team member skill development
- Review available grants (see the [Grants](#) section)

October

October is when season prep continues to pick up with many teams continuing to develop skills and beginning to focus on inventory and equipment.

- Select additional events
- Safety Animation Award opens (check out the [Safety webpage](#) for more details)
- *FIRST* Championship Waitlist Registration opens (check out the [Championship Eligibility Criteria webpage](#) for details on how to register)
- Inventory tools and materials

November

November is when teams start to finalize plans for the season (with numerous signup deadlines) and may begin working on awards submissions.

- *FIRST* Impact Award, Woodie Flowers Award, and Dean's List Award submissions open (see the [Awards webpage](#) for more details)
- Event Registration Closes
- Initial Event Payment Deadline
- Deadline to select which Kickoff your team plans to attend (check out the [Kickoff webpage](#) for instructions)
- Deadline to select how your team is receiving your Kit of Parts
- Pre-Kickoff Vouchers are available (check out the [Kit of Parts webpage](#) for more details)

December

December is when teams make final preparations for the season such as finalizing shop hours, plans to attend kickoff, and complete any pre-season equipment or material purchasing.

- *FIRST* Choice Round 1 (check out the [Kit of Parts webpage](#) for more details)
- Safety Animation Award closes (check out the [Safety webpage](#) for more details)

January

January not only starts the year, but it also kicks off the *FIRST* Robotics Competition season with the release of the game and the start of Build Season.

- Kickoff (see the [Kickoff](#) section)
- Replacement Parts
- Additional Kickoff Vouchers available (check out the [Kit of Parts webpage](#) for more details)
- Game Q&A Opens
- *FIRST* Choice Round 2 (check out the [Kit of Parts webpage](#) for more details)
- Build Season Begins (See the [How to approach Build Season](#) section)
- Additional Event Payment Deadline

February

February is a continuation of the build season and there are some award submission deadlines as well.

- *FIRST* Impact Award, Woodie Flowers Award, and Dean's List Award submissions due (see the [Awards webpage](#) for more details)

March – April

March – April is when teams attend local District and/or Regional Events. The culmination of the season is the *FIRST* Championship which brings together tens of thousands of students, mentors, and volunteers of all ages for the ultimate celebration of science and technology.

- *FIRST* Championship Waitlist Registration closes (check out the [Championship Eligibility Criteria webpage](#) for details on how to register)
- District and Regional Events (check out the [Events](#) section)
- *FIRST* Championship (check out the [FIRST Championship](#) section)

Overview of Document

Mentoring is an integral part of the *FIRST* program and largely contributes to the program's success. Every adult on a *FIRST* team is a mentor, simply because they lead through guidance. It is important to remember students need guidance, structure, encouragement, and most of all, a fun experience! When done correctly, this learning process builds and expands team members' self-confidence and knowledge. If the process has a strong foundation and works properly, mentors come away with as much as students do.

This document will focus on information to help successfully run a *FIRST* Robotics Competition team and help ensure students have the best experience. Be sure to also check out the [Effective Mentoring Document](#) for tips and tricks on mentoring. We also encourage you to share both resources with other mentors on your team.



The Lead Mentor Role

The role of the lead mentor(s) varies by teams. Each team will need two adults to act as lead mentors that are registered in the [FIRST Dashboard](#). Some teams have one person who does the majority of the role, others may have school administrators listed as the lead mentors but the work is done by other mentors, and some teams even have multiple mentors who share the workload. How you divide up the work is completely up to your team, but these are the main responsibilities of the lead mentor(s):

- Act as the primary point of contact for the team
- Register the team for the season
- Preference events for the team to attend
- Organize team meetings
- Assign team roles
- Delegate team tasks
- Manage team roster via the [FIRST Dashboard](#); invite youth, ensure they register and complete Consent & Release forms
- Read team email blasts and blog posts
 - Both lead mentor 1 and 2 are automatically signed up for email blasts, other mentors can subscribe by [signing up here](#).
- Ensure team meets deadlines for events and award submissions
- Assign designated question asker for the Q&A Forum
- Follow information related to the Game and Season, including Team Updates
- Utilize voucher codes to access software and other Kit of Parts elements for the team
- Maintaining a safe and inclusive team environment

Youth Protection Program

Part of your role as a lead mentor is to ensure safety for the students. *FIRST* strives to create an environment in which team members can grow, learn, and have fun with minimal risk of injury. The two lead mentors (for teams within the US & Canada) must be screened by our *FIRST* Youth Protection Program (YPP) but teams may choose to have all mentors screened. Teams can reference the [Youth Protection Program page](#) for a step-by-step guide and FAQs.

FIRST requires a minimum of two mentors to be with students at all times. If they are in different locations at the build site those two mentors should be within sight lines and be interruptible. *FIRST* recommends screening non-lead mentors if they are present for 30% or more of the team's meeting time and/or activities. Lead mentors can request mentors complete the YPP screening by following these steps:

1. Log in to the [FIRST Dashboard](#)
2. Click on the blue "Primary Contacts" link located under the Team Contacts/Roster column
3. Locate the mentors contact card
4. Click options in the upper right-hand corner of contact role card
5. Select "Request Screening." The non-lead mentor will receive an email invitation to go directly to the screening vendor.

The [FIRST Youth Protection Program](#) has clear guidelines regarding adult and student interaction. Adults working in *FIRST* programs must be knowledgeable of the standards set by the *FIRST* YPP, as well as those set by the school or organization hosting their team. As a lead mentor, you must understand these policies as well as how to enforce and communicate them to every adult working with the team. *FIRST* has also put together these [Youth Protection Training Videos](#) which are intended to enable adults working with *FIRST* teams to recognize situations that may pose a threat to team member safety and take the actions necessary to prevent and report injuries.

Equity, Diversity, and Inclusion (ED&I)

Part of your role as a mentor is to be an example and to welcome and include all team members. *FIRST* is committed to fostering, cultivating and preserving a culture of equity, diversity, and inclusion. We embrace and encourage differences in race, ethnicity, national origin, sex, gender, gender identity, gender expression, sexual orientation, disability, age, religion, income, language, learning difference, or any other characteristics that make our adult-force and students unique.

FIRST collaborated with the National Alliance for Partnerships in Equity (NAPE) to develop training for mentors, volunteers, partners and other key stakeholders who work directly with students and are committed to creating a sense of belonging for students on teams.

We ask that all mentors take our complimentary, three-part training module course titled [Strategies for Inspiring Success for All](#). These modules will equip mentors with specific strategies to support community outreach, student participation, motivation, engagement, and success through engaging and reflective activities on interactions with students. *FIRST* recommends mentors take this training when they first start engaging as a team mentor. It is also recommended that mentors retake this training on an annual basis to refresh on the tools and strategies provided to best work with all students.

We also recommend that all team members take the [Inspiring Youth Voice](#) training designed for all *FIRST* students. It is intended to educate *FIRST* students about the importance of equity, diversity, and inclusion while providing strategies and recommendations to help *FIRST* create a more inclusive and diverse environment.

FIRST teams should be mindful of being inclusive to all team members which includes being cognizant of their backgrounds including but not limited to: their pronouns, sexual orientation, cultural norms, and more. To learn more about understanding gender identity terms teams can check out [NPR's Guide to Gender Identity Terms](#).

For additional resources visit the [Equity, Diversity, and Inclusion Training & Resources webpage](#) to find links to other resources for increasing your knowledge and practice on creating inclusive environments for all.

Safety

Instilling a culture of safety is a value that every individual in the *FIRST* community must embrace as we pursue the mission and vision of *FIRST*. Safety is a vital part of the *FIRST* culture, having established the framework for safety leadership in all aspects of the programs. Teams should use the [FIRST Safety Manual](#) to understand and implement safe practices. *FIRST* has also worked with UL to establish online safety training for team members and mentors through the [Safety Learning Portal](#).

Team Recruitment

Diversity in Team Recruitment

Exploring, developing and implementing strategies to become more inclusive and ensure access to our programs to all students (as well as access to key supports) is critical for *FIRST* to reach its goal and mission. ALL young people should have the opportunity to become science and technology leaders.

As a lead mentor, you have a vital role in ensuring that your team embodies this commitment.

Finding Team Members

When recruiting students for a team, it is important to understand the population of the school or local community and focus recruiting efforts on attracting a broad range of students. Make sure recruiting

efforts reach a cross-section of the school or community by targeting the entire school and welcoming individuals with different skills and experience. Include and encourage a diverse range of individuals to help with recruiting. Students are more likely to be interested in participating if they see and hear from their peers.

Suggestions for Recruiting Students:

- Utilize the [FIRST ED&I Student Recruitment Strategies Tip Sheet](#).
- Use [FIRST videos](#).
- Hang posters in the school, at the local library, in businesses, and in sponsor organizations.
- Include promotional materials in school newsletters or on school web sites.
- Hold a student assembly where there is a *FIRST* Robotics Competition video and demo.
- Have a local or previous year's team put on a demonstration at a school or community event.
- Give an overview of *FIRST* Robotics Competition in a series of classes where a variety of students are enrolled.
- Engage adults from local corporations, university students, and *FIRST* Alumni to speak about the value of participation.
- Enlist *FIRST* Alumni and participants on other *FIRST* teams to spread the word.
- Utilize [FIRST stories](#)

Youth Registration

All youth team members are required to complete the online youth registration to participate in *FIRST* team meetings, events, or competitions. Learn more about the [youth registration system](#) and how to get started. If you have a student or parent who cannot complete youth registration electronically, please reach out to your [local Program Delivery Partner](#) to request an exception and obtain a hard copy of the Consent and Release Form.

For assistance in completing the youth registration please direct the parent/guardians and students to contact Team Support by phone at 1-800-871-8326, [via email](#), or via the chat feature on our www.firstinspires.org website.

Recruiting Mentors

Anyone can be a *FIRST* Robotics Competition mentor. Time and interest are the only requirements. Having a diverse pool of mentors only benefits the team; some mentors bring business expertise, some technical expertise, and some are great at marketing. A *FIRST* team can use all these skills. Lots of adults may want to help but may be unable to commit to every meeting, so understanding the strengths and weaknesses of the mentors and the team's needs will help to identify the areas where additional support will be needed. Mentors may be parents, teachers, engineers, college students, scout leaders, *FIRST* Alumni, or members of the local community. Make sure recruiting efforts reach a cross-section of the community. Team members may be more comfortable if there are mentors on the team with backgrounds and interests similar to their own. Students can also learn a great deal from individuals with varied life, work, and learning experiences.

Always start by identifying the help you need and the time commitment that assistance will require. It's important that you know your community. Start by polling your team's parents/ guardians and families to see if there are any potential mentors in that group or if they know someone who may be able to help with either technical or non-technical aspects. Teams or mentors from your surrounding area (or even around the globe) might also be willing to video chat to help.

Some teams don't need technical help; they need support for administrative work, marketing, trip planning, driving to events, fundraising, etc. Or they might need help developing a Business Plan or learning about college and career preparation. As mentioned earlier, always start by identifying the help you need and the time commitment that assistance will require.



The *FIRST* Mentor Network sponsored by NI

Another avenue to help with finding mentors is the [FIRST Mentor Network sponsored by NI](#). It is an interactive platform allowing teams to find mentors to work with virtually or face to face, locally or across the country, for a few hours or for a season. Lead mentors can build a team profile highlighting successes, goals, and desired mentor skill sets and experience.

Setting your team up for success

Building a robot is just one of the many elements involved in being a successful team. Teams require roles, time management and plans to ensure sustainability.

Develop Roles Within the Team

Develop roles so that team members feel as though they have a part in the process. Talk about skill sets, projects and subprojects, sub teams, enjoyment, time constraints, and rules set by the school or *FIRST*. Check out the [How To: Organize a Team](#) or the [How To: Effective Leadership](#) resources.

Meeting Schedule

Each team should decide on a meeting schedule that works for them. Some teams may decide to meet both in-person and remotely depending on the tasks. Remote collaboration has its positives and negatives so teams should evaluate what works best for each task. Teams can see the [How To: Conduct Online Meetings guide](#) for tips on how to structure remote meetings.

The number of meetings a team needs will vary depending on what the team is trying to accomplish. Many teams meet once or twice a week in the summer/fall but will meet more frequently during build season. Check out the [Error! Reference source not found.](#) section for help with planning your team's meeting schedule.

Tasks, Strategies, and Stress

Help team members clarify tasks and develop strategic plans for individual jobs. Defining a task list that includes complexity and showing their relationship to the timeline may make it easier for team members to plan and work together toward successful job completion. Remember, you are not just building a robot, but also building a team. Fun tasks and team building activities should be incorporated for a change of pace.

Watch for signs of serious stress among team members. This may be a time to intervene and ask if they need help or suggest that they take a break. 17% of youth (6-17 years) experience a mental health disorder ([NAMI, 2020](#)) and it's important to ensure students (and mentors) can take a break.

Suggested Tools

One of the most important things you need in order to build a robot is tools. We worked with Team 3847, Spectrum, to create the [Tool Recommendations for FIRST Robotics Competition Teams document](#). This document is intended to help teams that are newer to *FIRST* and includes a list of beginner tools as well as suggestions for more expensive tools and machinery that teams may want to acquire.

While the Rookie Kickoff Kit contains a computer that can run all of the software necessary to program and operate the robot, we recommend that teams have at least one additional computer for programming if possible. Teams may also wish to have additional machine(s) available to run CAD software or other tools used to support the team (e.g. photo or video editing software). Some software programs are made available to teams for free via the [Virtual Kit](#).

Ensuring Sustainability

Sustainability is key to ensure the program's longevity within a school/community and the impact the program has on students. Ensuring sustainability means that a team is focused on team retention for both students and mentors.

Sustainability starts with the culture of the team, to be welcoming to new members and a home for veteran members. The size of the team is unique to each individual team's situation and depends on funding, resources, and space to meet. The size of the team may ebb and flow as seasons progress. Mentors should be aware of their graduating vs recruitment rate to ensure the team does not get too small or too big. Reference the [Team Recruitment](#) section for tips on how to recruit new students and/or mentors.

Lead mentors are critical to guide the teams through the seasons, but teams should also be able to run if that lead mentor ever needs to step down or take a break. The team should have a plan in place to transition mentors as needed.

Budgets & Finances

Running a *FIRST* Robotics Competition team is like running a small business so it's important to set a budget. Each team's budget will vary depending on what they are trying to accomplish and the resources in their area.

Develop a team mission statement and business plan (check our Section 1.2 of the [Fundraising Toolkit](#) for an overview and examples), and decide what your team goals are. These will help you develop a budget and determine fundraising targets. To see average costs, please see the [Example FIRST Robotics Competition Budget](#).

Check out our [Fundraising Toolkit](#) or our [Fundraising 101](#) for ideas on fundraising and check out our [Sponsor Relations](#) guide for ideas on how to structure sponsorship opportunities.

Grants

FIRST has a variety of grants to help teams. To see what grants your team may qualify for, please visit our [Grant Opportunities page](#). This grants page is updated regularly, so check back often to see new team grant opportunities. In addition to *FIRST* grants, teams should consider checking for grants offered by companies in their area and/or checking with their [local Program Delivery Partner](#).

Kit of Parts

Each season, *FIRST* Robotics Competition teams receive a Kit of Parts (KoP). The KoP is not designed to be a "bolt together" solution to play the game, but is a starting point, containing mostly donated components from Suppliers across multiple industries. The Kit of Parts System consists of three parts available to teams through a variety of sources:

- Kickoff Kit – A box of parts delivered to teams at the start of the season
- *FIRST* Choice – Items available via an online menu in exchange for credits issued to all teams
- Virtual Kit – products available directly from the Supplier either via download or custom order.

For more information about the Kit of Parts, including deadlines, check out the [Kit of Parts webpage](#).

Kickoff

Kickoff is the event that starts the *FIRST* Robotics Competition season and is when the new game is revealed! During the broadcast, teams will hear from special guests and the details of the season's game.

Local areas may host Kickoff events to allow teams to come together to watch the broadcast. Local Kickoffs are most important because this is typically where teams receive their Kickoff Kit. These events may also choose to host workshops to help teams. Teams may choose to have their whole team attend a Kickoff event or they may send a few people to pick up their Kickoff Kit or they may choose to not attend a Kickoff and instead have their Kickoff Kit shipped directly to them, but fees may apply. Local Kickoffs are typically publicized in September/October and teams should sign up to the event that works best for them. Teams can reference the [Kickoff webpage](#) for instructions on how to signup for a Kickoff event.

How to approach Build Season

Build season is the time teams work on designing, building, and programming their robot. It begins immediately after Kickoff and goes through the first event the team attends.

Here is one very high-level schedule for how to approach the Build Season. Many factors affect this schedule including years of experience, number of students/mentors, machining resources, actual time between kickoff and your first event, etc. You should feel free to modify this timeline to what works best for your team as there is no single right way to how a team should approach Build Season. It's up to your team to figure out what may work best for you.

Table 10-1: Build Season Timeline

ACTIVITY	Week							
	1	2	3	4	5	6	7	8+
Initial Strategy (~First 2-3 days)	■							
Mechanism Brainstorming + Choosing prototype concepts (~2 days)	■							
Prototyping		■	■					
Detailed Design		■	■	■				
Mechanism Fabrication			■	■	■			
Assembly (includes wiring)				■	■			
Initial Programming		■	■	■	■			
Test and Finalize Programming					■	■	■	
Practice/Testing						■	■	
Iterating						■	■	

Some resources you may find helpful to guide specific aspects of the robot design process include:

- [Design 101](#)
- [Prototyping 101](#)
- [Programming 101](#)

If your team is attending multiple events, you may decide to make improvements to your robot between events. Using what you've learned from testing (i.e. your event) to iterate and make improvements is a crucial part of the engineering process!

Post-Event

One of the best ways to create and sustain team morale is to host a team debrief after an event. This debrief should be used to celebrate your team's successes and get feedback on what aspects you could improve. Use this as an opportunity to change the narrative if an event did not go as planned. This could include everything from the robot to logistics to interview with judges. If your team is going to multiple events, the debrief may help your team decide what areas to improve prior to that event. Teams may choose to do one debrief after each event, or one at the end of the season but it's highly recommended to hold at least one debrief to let all members voice their opinions.

Events

Going to an event is one of the highlights of being on a *FIRST* Robotics Competition team. All teams are expected to follow the [Event Rules](#) at all official *FIRST* events. Teams should make sure they are prepared for the event and can do so by reading the [District and Regional webpage](#) for more information on how to preference events, what to expect including judging, scouting, robot inspection, what to bring to events, and more.

Some events may be day trips for your team whereas others may require an overnight trip. Check out the [How To: Arrange Team and Robot Transportation](#) guide for tips on organizing travel to events.

FIRST Championship

FIRST Championship is the culmination of the season's *FIRST* programs, bringing together tens of thousands of students, mentors, and volunteers of all ages for the ultimate celebration of science and technology. Teams from around the world earn spots at *FIRST* Championship by participating in District or Regional Events. For more information check out the [FIRST Championship website](#).

Off-Season

Some teams may take a break during the summer and/or fall whereas some teams choose to meet year-round. If your team decides to meet year-round, here are some ideas for your team to focus on:

- New student recruitment
- Fundraising for the next season
- Training – this could be machining, CAD, wiring, presentation skills, etc.
- Outreach to your local community
- Organizing Build Space
- Adding/Maintaining Team Resources
- Off-Season Events – Off-season Events are unofficial gatherings that utilize *FIRST* program content for which there is a participation fee or sponsorship funding. Many local teams or local Program Delivery Organizations may choose to hold Off-Season Events. For more information check out the [Off-Season Events webpage](#).
- And more!

Resources

This guide is intended to be a starting point for mentors. Mentors should also consider looking at the following resources:

- [FIRST Robotics Competition Email Blasts](#) – Archive of *FIRST* Robotics Competition team email blasts.
- [FIRST Robotics Competition Blog](#) – Blog posts from the director of *FIRST* Robotics Competition and guests.
- [Season Materials Webpage](#) – A link of resources related to each season's game including the manual, team updates, and more.
- [Team Management Resources](#) – A collection of resources to help teams with some of the aspects of running a team such as organizing your team, fundraising, and more.
- [Technical Resources](#) – A collection of both mechanical and software/electrical resources to aid teams.
- [WPI Lib](#) – Control System and Programming documentation to help with wiring and programming your robot.
- [FIRST Robotics Competition Awards Page](#) – A page that shows all of the current *FIRST* Robotics Competition Awards, award deadlines, and links to the guidelines for the awards.
- [Find Local Support](#) – A page to find your local Program Deliver Organizations that partner with *FIRST* in each community that include Program Delivery Partners (PDPs) and *FIRST* Senior Mentors.
- *FIRST* Robotics Competition Social Media:
 - o [FIRST Robotics Competition YouTube](#),
 - o [FIRST Robotics Competition Twitter](#), and
 - o [FIRST Robotics Competition Facebook](#)

Teams can contact [Team Support](#) for any additional questions.