



PREDICAMENT PLAYBOOK

An Essential Guide to Overcoming
Common Challenges and Achieving
Sustainable Success in FIRST Robotics.

Welcome

Welcome to The Predicament Playbook
The CyberKnights comprehensive guide, designed to equip FIRST Robotics teams with strategies to tackle common challenges and achieve sustainable success. Whether you're navigating build season hurdles or competition setbacks, this guide offers tips and practical advice to elevate your team's performance.

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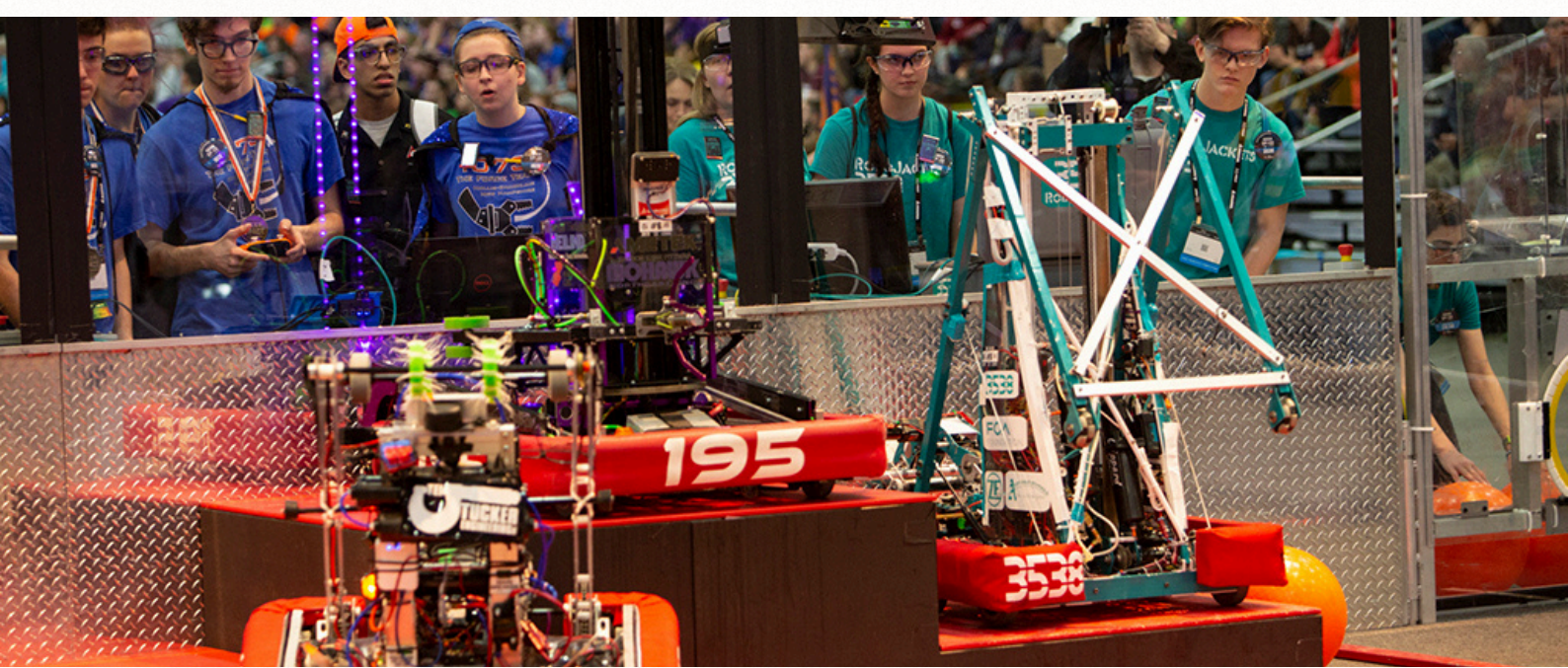
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Getting Parents Involved



FIRST Robotics is an international organization dedicated to inspiring young people to pursue interests in science, technology, engineering, and mathematics (STEM) fields. FIRST Robotics Competition (FRC) is one of its flagship programs, where high school teams design, build, and program robots to compete in dynamic challenges. These competitions foster teamwork, innovation, and problem-solving skills as students collaborate to overcome obstacles and achieve common goals, all while gaining real-world engineering experience and mentorship from industry professionals.

FIRST has programs for students grades K-12. The programs are FIRST Lego League, FIRST Tech Challenge, and FIRST Robotics Competition. You can find more info at www.firstinspires.org.





OUR TEAM

The CyberKnights, also known as FIRST Team 195, is a robotics team from Southington, CT. The team has actively participated in regional and championship FIRST competitions since our first season in 1998. This is our 25th year participating in FRC! Each year, the FIRST Robotics Competition releases a new game that challenges teams of young people to build a robot using a common set of rules. Over 2000 teams around the world design, build, and program robots to compete in the challenge. Our team is made up of 47 students on different sub teams and 38 mentors of various skill sets.

The CyberKnight's mission is to bring the celebration of science and technology to the forefront of our community. Our team is dedicated to providing STEM opportunities to everyone in our town and currently supports 11 FIRST Lego League teams at local elementary schools. In addition, we run community outreach events and have strong relationships with local assisted living centers, Veteran organizations, and the local food pantry. Our international outreach efforts expand all the way to Uganda, where we partner with Guiding Light Orphans. All of this work, along with the costs of building a robot, requires plenty of funding. We rely upon and are lucky to have a network of over 50 sponsors.

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GETTING STARTED

Starting an FRC (FIRST Robotics Competition) team is exciting but also quite challenging. Below are some quick tips to help you get started efficiently. You will find more detailed information about each of these topics in this guide.

- **Learn about FRC:** Make sure you understand the goals, rules, and expectations of the FRC program. Visit firstinspires.org to read through documentation
- **Find Mentors:** Seek out adults with experience in engineering and programming. They will provide guidance and support to you and your team members. Many other areas of expertise are helpful, but getting started with the basics is okay.
- **Recruit Team Members:** Reach out to students who are interested in robotics, engineering, programming, and other related fields.
- **Secure Funding:** FRC can be expensive, so it's crucial to secure funding early on. Reach out to local businesses, community organizations, and potential sponsors to support your team.
- **Set Up a Workspace:** Find a suitable workspace where your team can meet regularly. Make sure it's equipped with tools, materials, and resources needed for building and programming.
- **Attend Workshops and Training Sessions:** Take advantage of workshops and training sessions offered by FIRST or other experienced teams in your area.

Starting an FRC team is a rewarding experience, but it requires careful planning, dedication, and teamwork. By following these tips and seeking help from experienced mentors and teams, you can set your team up for success in the exciting world of robotics competitions.

RECRUITING STUDENTS

- **Guidance Counselors** – providing counselors with recruitment flyers and information is a great way to recruit as they are generally aware of which students may be interested in or benefit from robotics.
- **Posters/Announcements** – Posters with recruitment information posted around the school or other areas in the community can generate attention. A QR code to your website or an online application is good, too.
- **Social Media/School Website** – Ask the school to share information about the team on the school website, social media page and/or morning announcements and emails
- **Teacher Recommendations** – Similar to guidance counselor recommendations, teachers that know about your team can share info with students that may be a good fit.
- **Advertising** – Ask local FIRST Lego League or Tech Challenge teams to share info to kids are aging out of FLL have a program to join.
- **Social Media Posts** – Post information about joining your team on your social media accounts.

No matter which method(s) you choose, it's important to provide clear instructions on how to join your team. If you have an application, make it easy to access and complete it. Be sure to set deadlines for registration so all new students are onboarded at the same time. We use Google forms for our online application.

RECRUITING STUDENTS *cont.*

- **Activity Fairs** – If you're team is associated with a school, be sure to find out the dates for any activity or club fairs. These events are held to promote different activities and teams for students to get involved with. This is the perfect opportunity to bring a robot (if possible) and some flyers about your team and get in front of crowds of students. If possible, have a way to collect email addresses so that you can follow up with interested students.
- **Interest Night** – You can hold your own open house for your team in your shop. Promote it with posters and announcements and invite interested students to come for a tour of your shop and learn about your team.

Depending on the size team you are able to manage, and the interest in robotics/STEM in your town, you may get more applicants than you can handle. Alternatively, you may not get as much interest as you'd like. Either way, it is up to you whether or not you will have an application or accept every interested student. This is something you can revisit and decide upon if the demand for space on your team grows.

Our team holds Interest Knight in our shop the first week of September. We have an online application that opens in August and the deadline is typically the 2nd Monday in September. Our lead mentors review the applications, make decisions, and notify students within two days of the application closing.

RECRUITING STUDENTS cont.

Preparing for Interest Knight

We post a "Save the Date" on social media and our website a couple of weeks ahead of time. We also ask our school to share the information on their website and during morning announcements. Due to the timing of this event, school is not in session for long prior to the chosen date. We do our best to share the info as much as possible. We also post about it in our town's facebook group.

We post about Interest Knight on our Instagram and Facebook pages the week leading up to it.

We also spend this time cleaning our shop to make it safe, exciting, and welcoming to visitors. Each department decides what they would like to focus on, and how they would like to present info to potential members. Mentors and student leads talk with current team members to see what they liked or thought could use improvement during Interest Knight if they attended prior to joining. Mentors also make sure to ask students for their thoughts on what will appeal to potential new students.

Sample advertisement for Interest Knight

frcteam195
Mohawk Northeast

**DESIGN.
BUILD.
COMPETE.
REPEAT.**

Come learn about **Competitive Robotics**
& how to join the team at **Southington High School!**

September 7th - 7:00 PM

Mohawk Northeast
170 Canal Street
sville

FIRST **195**
CyberKnights

Liked by kyliejohnson201 and 78 others

frcteam195 Hey incoming freshman and sophomores at SHS! Come join the CyberKnights for interest night to learn about competitive robotics and more on our team!

August 15, 2023

Preparing for Interest Knight

On the night of, we have all hands on deck. Students stand by the entrance and welcome potential new members. Everyone gets a name tag and is taken on a tour of the shop. We place QR codes linking to the New Student Application throughout the shop

Interest Knight Prep To Do List

- Clean all areas of the shop with a focus on safety
- Collect spare safety glasses (or get some extras) and place in a bin by the entrance to the shop
- Create signs for each department and hang in that departments area
- Create and post QR codes linking to the New Student Application form (or create signs indicating the next steps for interested students to join the team)
- Setup a clipboard with pens and a sheet to collect names & email addresses upon entrance
- Purchase name tags to have at the door with sharpies to write names
- Set up a bowl of candy and/or snacks and drinks
- Set up jobs/responsibilities for students so that the night goes smoothly
- After the event, send an email to all attendees telling them the next steps on how to join the team and making them aware of any deadlines.

Kick-Off Schedule

Our team holds kickoff at our Municipal Center and we invite members of the Board of Education, parents, and alumni. Afterwards, we meet at our shop and have an agenda for the day that includes analyzing the game strategy and mock matches with cardboard game pieces. Below is more info about our process.

FRC KICKOFF - JANUARY 6th

We host ours at the Municipal Center each year, but it can be held anywhere that you can use a projector. Attendance is mandatory for current student team members. In addition, we invite | mentors, parents, alumni, sponsors, and local officials. We provide refreshments, usually asking a couple of mentors or parents to bring water, juice, coffee/tea and some snacks like muffin and bagels. A couple of mentors will talk beforehand and we also invite the Superintendent to speak if they'd like.

Send a press release out the night of kickoff.

Kickoff Schedule (approx)

9 am - arrive & set up tables/chairs/projector & speakers and refreshments

10 am - team & guests arrive

11 - 1 Kickoff broadcast

Leave immediately following broadcast

ALL BREAK FOR LUNCH INDEPENDENTLY

Meet at Mohawk at 2pm

Strategy Review Exercises for the remainder of the day

10 pm - Wrap

BUILD SEASON SHOP PREP

Make a list of items or use signup genius to collect supplies for the pantry from parents (napkins, snacks, condiments, juice, etc)

Create a signup for Weekend Dinners. Parents choose a day to bring in dinner for the team at Mohawk on a Saturday or Sunday.

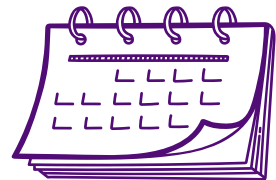
Build Season Schedule

Every team is different and has different meeting times. Figuring out what works best for your team is key. It is important to consider your goals for the season, along with your mentor support, and estimate a realistic timeline from there.

Maintaining a consistent schedule and avoiding procrastination is key. Many materials you need can be backordered and you may even find yourself at the mercy of regular shipping times. For this reason, it's important to try and stay as on top of things as possible.

We are fortunate to have our shop located in a local manufacturing facility. Because of this, we do not have to adhere to schedules put in place by the school. Our schedule during build and competition season is as follows from December through April (World Championship).

Monday through Friday 6:30pm – 9:30 pm
Saturday & Sunday 1:00 pm – 10:30 pm



Feeding Everyone All Season Long

At the start of each season we use SignUpGenius to create a list of every Saturday and Sunday that we will be in the shop. We send this to all parents and ask that they each pick a weekend day to provide lunch for the team. We give them a list of allergies or dietary needs so we can make special accommodations for students if needed.

In addition, we send another SignUpGenius to parents asking that they select a week to restock our snack supply. Parents are always happy to bring in chips, cookies, drinks, and a variety of other items that students and mentors can snack on throughout the season.

SignUpGenius is free and super easy to use:
www.signupgenius.com.



- TRAVEL
 - Departure/Arrival Times & Meeting Spots
 - Hotels
 - Busses
 - Food
- EVENT INFO
 - Before events – the Event Planning Committee will email Lead Mentor 1 & 2 Informational Welcome Packs. This will include a rough daily schedule, information for team lunches (that usually have a deadline), parking info, arrival & departure info, pit setup details, and more. Please be sure to remind Lead Mentors 1 & 2 to be on the lookout for this in their email and to share with the appropriate people. If you cannot get ahold of this document, you can reach out to local FIRST reps and ask for assistance.
- BEHAVIOR AT EVENTS
 - Prior to competition season, we have a mandatory parent and student meeting where we review the expected behavior of our team members. This includes an overview of the spirit of FIRST events, and Gracious Professionalism.
- Team Apparel
 - Local Shirt/Apparel Shops (reach out to them at the very beginning of January to see what kind of lead time they need to get your shirts done before competition. Also check what format they will need any graphics/logos in.
 - Online Ordering (there is no shortage of companies to order your team shirts from online. Just be sure that they have the correct colors, sizes, and that you place your order giving enough time for shipping. If you have a 501c3, check to see if they offer discounts for NPO.
 - Discountmugs.com
 - bonfirefunds.com
 - 4imprint.com
 - You can also make your own shirts by having students bring in shirts all in the same color (purchasing the same brand or from somewhere like Joann's or Michaels where they offer the same variety of colors and sizes regularly, works best).
 - If a parent or mentor has a cricut or vinyl cutter and a heat press – you can handle designing and making shirts in house. This is really only feasible if you have a small team or parents who are willing to handle the task. It gets particularly tricky if you offer logos on teeshirts to your sponsors (which you should). If that is the case, it is really best to have your shirts professionally done – as adding each business logo will be incredibly time consuming.

Each year, all new students, and their parents or guardians, are required to attend a "New Student and Parent Meeting. At this meeting, we review several aspects and important details of being on our team. Participating in fundraising efforts is one of the requirements to being on the team. We explain the importance of fundraising, what the money is spent on, and how they are expected to contribute. We hold several different types of fundraisers each year and there are plenty of opportunities for students to participate. Here are some of our current fundraisers:

- Pail Shaking at local restaurants (2-4 times per year)
- Applebee's Pancake Breakfast (every fall)
- Annual Gala
- Calendar Raffle Sales
- Selling pies/pointsettias
- Annual Dinner Party/Gala
- Donation bins at community events (STEM for All, Apple Harvest Festival)

Our Sponsorship Process

Over the years our team has developed a very successful strategy for finding and retaining team sponsors. We encourage students and their parents to find sponsors by rewarding them with a percentage of the incoming funds that they bring in as travel credits. This helps to alleviate the cost of travel and also incentivizes actively seeking new sponsor companies.

We hold a mandatory Sponsorship Presentation at the start of each year that explains this process to incoming students and their parents.

That presentation is shared in the following pages. This is what parents and students are shown when starting on the team:

[Click here - Link to sponsor presentation/slides](#)

Letter for Parents to Employees

Below is a sample email template for parents to use for assistance in inquiring about volunteer or contribution matching from their employers.

Hello,

I'm reaching out as a parent of a student on Team 195, the [CyberKnights, Southington High School's](#) FIRST Robotics team. Our team has been competing for the past 28 years, earning numerous awards and consistently performing at a high level. We are proud to have qualified for the World Championship for the past 10 years and to be the only team to win Connecticut Robotics Team of the Year for two consecutive years.

Running a program of this caliber takes countless hours from dedicated mentors and significant financial support from sponsors. We are always looking for ways to sustain and grow our program, and I wanted to inquire if [\[Company Name\]](#) offers any form of contribution matching or would consider implementing one to support our team. If there is a formal process to explore this possibility, we would love to learn more.

Additionally, the team offers a multi-tiered sponsorship package that provides unique recognition and engagement opportunities for our sponsors. I'd be happy to share more details if there is interest in supporting the team in any capacity.

Thank you for your time and consideration—I look forward to your response!

Sincerely,

Creating Effective Sponsorship Packages

Creating enticing sponsorship packages for your team involves showcasing the value for potential sponsors. Be sure to include perks like prominent placement of company name/logos on team shirts, robots, and websites which ensures visibility and brand exposure.

Sponsors benefit from aligning with FIRST Robotics teams through increased brand visibility, access to a passionate and engaged community, and the opportunity to support STEM education initiatives, fostering future talent and innovation. Emphasize the mutual benefits of partnership, highlighting the impact on both the sponsor's brand and the advancement of STEM education.

We've included copies of our current sponsorship package in the pages that follow.



SPONSORSHIPS

COMPANY NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

CONTACT NAME: _____

PHONE NUMBER: _____

EMAIL ADDRESS: _____

Please include a company business card with your donation if possible.

Donation Amount: \$ _____ Gift In-Kind Donation _____

How did you hear about our team? _____

Would you like to know about team news and events? Yes No

Company Social Media Handles:

Facebook: _____ TikTok: _____

Instagram: _____ YouTube: _____

Make Checks Payable To:
CyberKnights Robotics Inc
125 Main St #151
Southington, CT 06489

Or Donate Online Here:
<https://cyberknightsrobotics.org/>

SPONSORSHIP LEVELS

PLATINUM

\$5000+

- Company name announced as part of team introduction at competitions
- Robot demo at your company
- All **GOLD** level benefits

GOLD

\$3000-\$4999

- Company logo prominently displayed on robot
- All **SILVER** level benefits



BLUE

Up to \$1000

- Digital yearbook documenting the season in pictures
- Company name and logo on website



SILVER

\$2000-\$2999

- Custom sponsor social media post
- Thank you plaque/picture frame
- All **PURPLE** level benefits

PURPLE

\$1000-\$1999

- Name on team competition shirts
- Two tickets to annual gala
- All **BLUE** level benefits



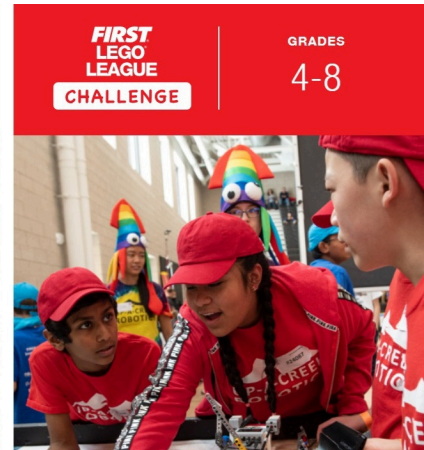
FUNDING *FIRST*

- Sponsorship Presentation – full of tips and strategies to help your team find & retain sponsors year after year. View the presentation here:

https://www.team195.com/_files/ugd/31b07b_7a456c0a99a045538fa2e2ee4f562836.pdf



- Fundraisers
- some samples – recommendations
 - involving parents
- Sponsorships
 - have a lead
 - timeline
 - **tips**
 - **Creating Effective Sponsorship Packages**
- Donations
 - GOFUNDME
 - BONFIRE
 - DONATIONS/CLASS – TEACHERS
- Grant Writing
 - Where to find them
 - general tips
 - couple of ex. of common FIRST grants/givers



These programs serve as valuable feeder programs for FIRST Robotics Competition teams, providing participants with STEM skills and knowledge. Many students go on to join FRC teams, bringing their experience, enthusiasm, and innovative thinking to tackle more complex challenges and make meaningful contributions to their teams' success in the competitive arena.

FRC students can take on mentoring roles, coaching younger students and sharing their expertise, perpetuating a cycle of learning. Additionally, FIRST Robotics team students frequently volunteer at FLL events, providing guidance, encouragement, and technical assistance to aspiring young engineers.

In the following section, we'll go into detail about how FRC teams can support FLL teams.

How to Support FLL

FRC students and teams play a pivotal role in starting and supporting FLL (FIRST Lego League) teams, creating a relationship that benefits both parties and the broader STEM community. Here's how:

- **Identify Partners** – FRC teams can take the initiative to start new FLL teams in their communities by reaching out to elementary schools, community centers, and youth organizations to identify potential participants and coaches. Teams can help the new FLL teams navigate the registration process, recruit members, secure funding, and establish a team structure.
- **Once established**, FRC students and teams can offer ongoing mentorship and guidance to support growth and development. Through regular meetings, workshops, and training sessions, FRC students can share their expertise in robotics design, programming, project management, and competition strategy. Mentoring FLL teams not only enhances the technical skills and knowledge of younger students but also cultivates leadership, teamwork, and communication skills among FRC mentors.
- **Creating a Pipeline**: By engaging with FLL teams, FRC students and teams can establish a talent pipeline that supports future participants for the FRC program. Through mentorship and exposure to advanced robotics concepts, FLL students develop a strong foundation in STEM disciplines and are more likely to pursue further education and involvement in robotics.
- **Raising Awareness for STEM**: Collaborating with FLL teams allows FRC students and teams to raise awareness for STEM (Science, Technology, Engineering, and Mathematics) education and the mission of FIRST.

FLL Training for Coaches

(High school student coaches & adults)

You can view the training that we use to prepare our student coaches to run their teams here:

Our team meets year round, but this wasn't always the case. Some teams opt to starting meeting in September, at the start of the school year. Some meet closet to the start of kickoff. For us, in order to accomplish all of our goals in regards to technical training and outreach, we need to work year round. This allows us the time to focus on different projects, run youth robotics programs, and attend off season events.

In the following pages, we'll show a brief description of what our schedule looks like from month to month. Like most things, this is constantly changing.

The most important thing to do is decide what your season timeframe will look like and then set realistic goals and deadlines.

OUR TIMELINE @ a glance

SEPTEMBER

- New students selected & notified
- First week of Sept, order items needed for parade float
- First meeting with new students & parents takes place
 - Full team safety meeting takes place for all students
- FTC teams start meeting (for now twice a week)
- Students are assigned to FLL teams to coach
- FLL teams finish registering and start meeting (see FLL section for details)
- Event Preferencing & Selection opens on FIRST dashboard (www.firstinspires.org)
- Sponsorship presentation takes place at a weekly meeting before the end of the month. Also post the presentation slides on our website.
- Order metal frame tubes.
- STEM for All takes place at Drive-In a Saturday in Sept. Book for the following year the week after the event.

OCTOBER

- Department classes start.
- Prepare float for Apple Harvest Parade (first or second weekend of Oct) & prepare for booth at AH Festival
- Book the Municipal Center for Kickoff (first Sat of January). Fill out Building Use Form and be prepared to share COI (Cert of Insurance)
- Book flights for World Championship – pay deposit
- Start looking at room prices for World Championship
- Annual Applebee's fundraiser usually takes place – Also, book date for it for next year
- Merchandise shop opens for two weeks

NOVEMBER

- FLL Events start taking place
- Host FLL Qualification event (started in 2023)
- All students registered on FIRST with Consent & Release forms completed.
- All mentors registered w/ YPP & Consent & Release completed.
- Order polycarbonate at the end of Oct or first week of Nov.
- If sheet metal is needed (not always) place order.
- Share invitation to Kickoff with alumni, sponsors, and town/school officials.

DECEMBER

- SRTEA dinner party/fundraiser
- Recruit parents/mentors to manage refreshments at kickoff.
- "Everyone Drives Night" takes place for ALL students on the team
- Create Weekend Dinner Schedule for build season weekends using SignUp Genius
- Share lists of needed snacks and pantry items with parents.
- Send reminder to invited guests for Kickoff.
- Merch comes in.

JANUARY

- FIRST Robotics Competition Kickoff (Game/Challenge Release – first Sat after New Years)
- FRC Build Season begins
- Impact presenter tryouts
- Dean's List nominees selected (mentors collab on essays)
- Select 2 students as "award submitters" on team roster at firstinspires.org.

FEBRUARY

- New competition shirts in
- Impact essay is due. Submitted by students only (check FIRST website).
- Dean's List easy submissions are due (on FIRST website)
- Event expectation meeting for students & parents w/ focus on newcomers

MARCH

- Book venue for End of Year party
- Travel Meeting for World Champs
- Order grad cords for seniors
- Prep senior gifts

April

- World Championship Event

May

- Select & Attend Off-Season events
- Club/Activity Fair at SHS

June

- End of Year Party
- Graduation
- Attend off season events

July

- Start planning meetings for STEM for All
- IRI (Indiana Robotics Invitational)

August

- Check STEM for All inventory & order any items needed.
- Start advertising locally for STEM for All

Local District Events start (we generally participate in 2 district events, avoiding week 1), these are followed by the New England District Championship, and the World Championship. It currently takes place in Houston but changes from time to time.

Prepping for Robot Inspection

Robot Inspection can be nerve wracking, especially for new students. To make sure that they feel prepared, and that our robot is primed to pass, we have our students review the Robot Inspection Checklist by themselves, and then with a mentor to ensure that it meets all the criteria to pass. This does not mean that something won't come up that has to be addressed at your actual inspection but it will help to prepare your students and also might catch some issues before competition.

On the next page is a copy of a Robot Inspection Checklist.

Sample Robot Inspection Checklist (2024)

2024 FRC Inspection Checklist

Rev. 2

TEAM NUMBER: _____ **INSPECTOR(S):** _____
INITIALS (after passing): _____ **DATE (after passing):** ____/____/____
REINSPECTION (initial) _____ **FINAL INSPECTION (initial)** _____

Size and Weight:

- _____ **ROBOT Weight** - Must be ≤ 125 lbs. (~56kg) excluding BUMPERS and battery. <R103> _____ pounds
- _____ **Total Inspected Weight** - ROBOT + swappable mechanisms ≤ 150 lbs. <I103> _____ pounds
- _____ **BUMPER Weight** - Must be ≤ 15 pounds (~6kg). <R407> **Red BUMPER** _____ **Blue BUMPER** _____ pounds
- _____ **FRAME PERIMETER** - Frame must be non-articulated. Minor protrusions $\leq 1/4$ " (6mm) OK. <R101>
- _____ **STARTING CONFIGURATION** - Parts may not extend past the vertical projection of the FRAME PERIMETER. <R102>
- _____ **Starting Volume** - FRAME PERIMETER ≤ 120 in. (~304 cm), height ≤ 48 in. (~121 cm) <R104>
- _____ **Playing Configuration** - ROBOT may not extend beyond the FRAME PERIMETER by more than 12 in. (~30 cm) <R105>

BUMPERS

- _____ **Coverage** - BUMPER segments protect the entire FRAME PERIMETER, any gaps between segments $< 1/2$ " (~1.3cm) <R401>
- _____ **Hard BUMPER parts** - Defined by BUMPER backing, may not extend > 1 " (~25mm) beyond ROBOT frame. <R408-B>
- _____ **Support** - No BUMPER segment may be unsupported by ROBOT structure/frame for a length > 8 " (~20cm), Gaps $\leq 1/4$ " (~6mm) may be wider than 8". BUMPER segments must be supported by at least $1/2$ " (~13mm) of ROBOT frame at each end ($< 1/4$ " (~6mm) gap between segment and frame are OK) <R410 & Fig 8-8>
- _____ **Corners** - Must be filled with pool noodle such that no "hard parts" are exposed. <R409 & Fig 8-7>
- _____ **Wood backing** - Must use $3/4$ " (~19mm) thick x $5 \pm 1/2$ " (~127 mm \pm 12.7 mm) tall plywood, OSB, or solid robust wood backing w/out extraneous holes affecting structural integrity. (shallow clearance pockets and/or access holes are acceptable). <R408-A>
- _____ **Pool Noodles** - Must use a pair of stacked $2 1/2$ " nominal ($2 1/8$ " - $2 3/4$ ") pool noodles. Pool noodles may be any shape cross section, solid or hollow, but both must be identical in shape and density. <R408-C>. Must use a durable cloth cover secured as in Fig 8-6 cross section. <R408-D>
- _____ **Color** - Must be able to display red or blue to reflect alliance color. <R405>
- _____ **Team number** - displayed with Arabic numerals, min. font 4 " (~11 cm) tall x $1/2$ " (~13mm) stroke, in white, and be easily read from approximately $60'$ (1828 cm) when walking around the perimeter of the ROBOT. No logos may be used for numerals. *FIRST* logos comparable to 2024 Virtual KOP may also be applied <R405 & R406>
- _____ **Attachment** - Must be securely mounted when attached and be easily removable for inspection. <R404 & R408-G>
- _____ **Height** - When ROBOT is on a flat floor, all BUMPER segments must reside entirely between the floor and $7 1/2$ " (~19cm) above floor. They may not be articulated. <R402 & R403>

Mechanical

- _____ **No Sharp Edges or Protrusions that are a hazard for participants, ROBOTS, ARENA, or FIELD.** <R202>
- _____ **No Prohibited Materials** - E.g. sound, lasers (other than class 1), flammable gases, or untreated hazardous materials <R203>
- _____ **No Unsafe Energy Storage Devices** - Carefully consider safety of all stored energy or pneumatic systems <R203>
- _____ **No Risk of Damage to Other ROBOTS** - E.g. damaging, entangling, upending or adhering <G419 & R203 >
- _____ **No Risk of Damage to FIELD** - E.g. metal cleats on traction devices or sharp points on frame. <R201 & R202>
- _____ **No Risk of damage to Game Pieces** - areas interacting with game pieces free of sharp or damaging surfaces <R206>
- _____ **Decorations** - Cannot interfere with other ROBOTS' electronics or sensors, be in spirit of "Gracious Professionalism". <R203>
- _____ **End Game** - GAME PIECES can be removed from ROBOT and ROBOT from FIELD without power. <R204>
- _____ **STAGE Chain** - ROBOT not designed to reduce working length of field chain (e.g. create slack or twist chain) <R106>

Electrical

- _____ **Components** - None may be modified, except for motor mounting and output shaft, motor wires may be trimmed, window motor locking pins may be removed, and certain devices may be repaired with parts identical to the originals. PDP/PDH fuses may be replaced with identical fuses only. Servos may be modified per manufacturer's instructions. <R503, R710>
- _____ **Battery** - A single 12 volt, 17-18.2 Ah ROBOT battery, securely fastened inside ROBOT. <R601, R605, R606>
- _____ **Other Batteries** - Integral to COTS computing device or camera or COTS USB < 100 Wh (20,000mAh at 5V) and 5 Amp max output per port used for COTS computing device and accessories only. Small batteries for CMOS/RTC are OK. <R602>
- _____ **PDP/PDH Visibility** - The single PDP/PDH, and PDP/PDH breakers must be easily visible for inspection. <R613 >
- _____ **Main Breaker Accessibility** - The single 120A main breaker must be readily accessible with labeling preferred. <R612>
- _____ **Allowable PD Breakers** - Only VB3-A, MX5-A, MX5-L Series Snap-Action breakers or REV Robotics ATO (40A or lower) may be inserted in the PDP/PDH <R619>
- _____ **ROBOT Radio** - A single OpenMesh OM5P-AN or OM5P-AC radio powered via a VRM +12 volt, 2 amp output or REV RPM. The VRM/RPM must connect to the dedicated +12 volt output on the PDP/PDH. Radio LEDs are easily visible. <R616, R702, R707, R708>
- _____ **CAN BUS** - The roboRIO and PDP/PDH must be connected via CAN wiring even if no other CAN devices are used. <R716>
- _____ **roboRIO Power** - Only the roboRIO must be connected to dedicated power terminals on PDP/PDH. <R615>

BUILD SEASON RESOURCES

Materials

- Metal (Online Metals – in Wallingford, CT)
- West Coast Products
- AndyMark
- RevRobotics
- McMasterCarr

Software

- DS Solidworks (Contact for pricing)

Schedule

Other Resources

- Canva – free licenses for 501C3 orgs
- Adobe – free/discounted licenses for 501C3 and/or education

Project Management

- Monday.com (licensing for FIRST teams)

PACKING FOR COMPETITION

- PIT
 - tools
 - robot cart
 - chairs (optional) – small folding stools
 - safety items
 - first aid kit, spill kit
- Robot / Batteries / Chargers
- **Roster – forms for sign-in**
- Buttons/handouts
- Judge / Presentation Materials
- Snacks

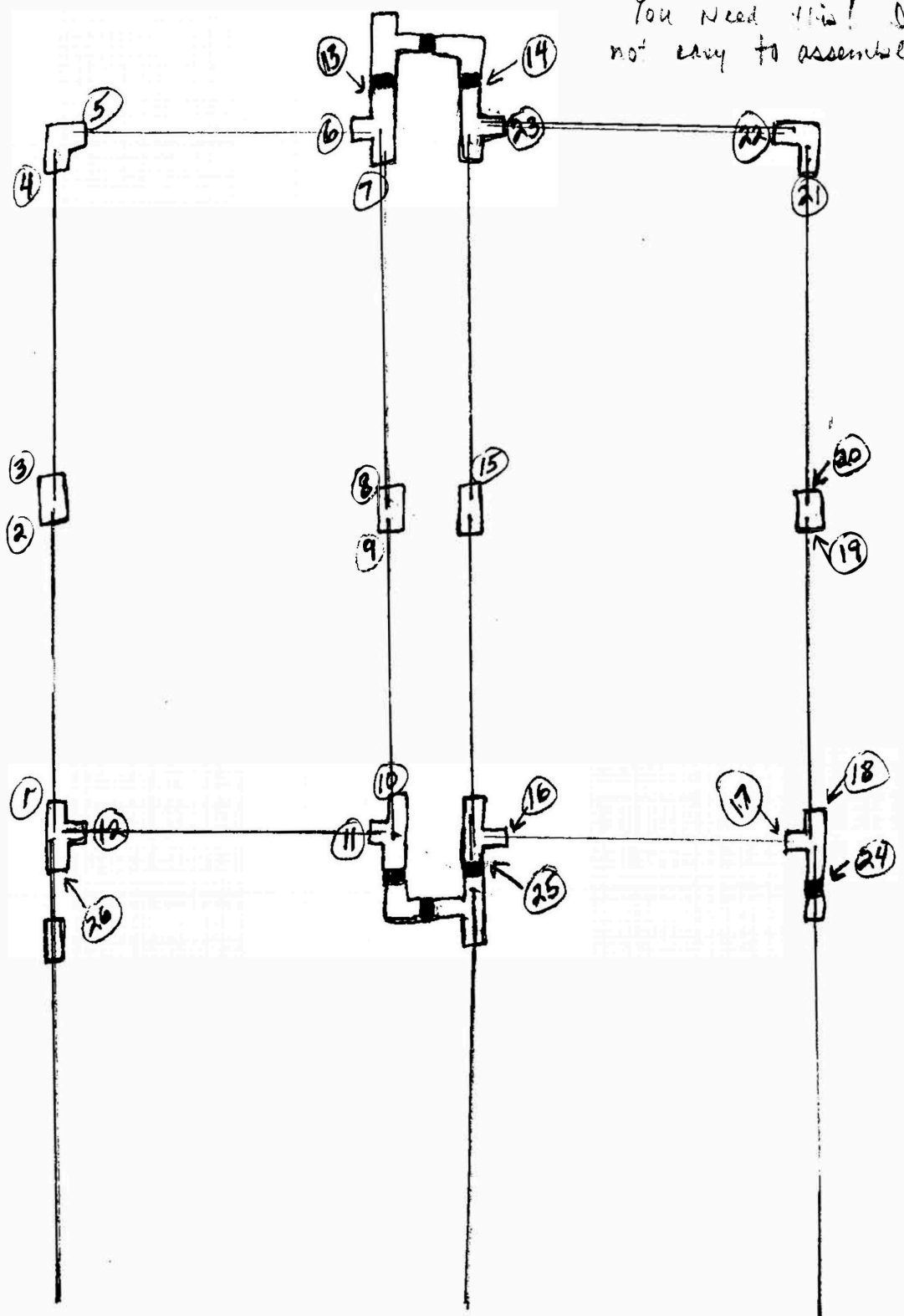
“Must Have” Resources for New FIRST Teams

- FIRST website – www.firstinspires.org
- Chief Delphi – <https://www.chiefdelphi.com/>
- FRC Reddit – <https://www.reddit.com/r/FRC/>
- The Blue Alliance – <https://www.thebluealliance.com/>

Blue Banner Holder

IS BANNER HOLDER:

You need this! It's not easy to assemble w/o it.



* NOT ALL JOINTS ARE NUMBERED - SOME JOINTS ARE GLUED PERMANENTLY

TEAM DUES

Every team is different. What works for one team may not work for another. This is true even in terms of simple processes, like team dues. Some teams choose to require dues, some do not. For teams that do have dues, there is a huge difference in amounts. Many factors may be considered when making this decision such as community economical status, team budget, the teams cost per student (tshirts, travel, etc) , We charge dues and those dues cover team shirts. Our dues are significantly lower than those of other teams/clubs in our school district. In addition, if a student/family has a hardship and cannot make the payment, we offer financial assistance and scholarships to cover them.

Below is a sample of our teams dues form.

Membership Dues - 2023 - 2024 Season	
First Name: _____ Last Name: _____ Grade: _____	
Membership dues are \$250. These dues help cover the cost of students' team shirts and other team expenses.	
Please make checks payable to CyberKnights Robotics Inc.	
Please return dues by October 31, 2023 along with this signed form	
Dues can be handed in at any weekly meeting in the mailbox by the door at Mohawk. If you have any questions please contact info@team195.com	
Student and Parent Signatures	
I, _____ understand that membership dues are non-refundable if I decide to discontinue being a member of Team 195 for any reason.	
_____	_____
Student Signature	Date
_____	_____
Parent/Guardian Signature	Date

TEAM STRUCTURE

Our team consists of 6 Sub-Teams or Departments.

Not every team operates this way, and it can depend on the amount of students, mentors, and other factors.

Here is what our organization looks like:

- Design
- Manufacturing
- Electrical
- Programming
- Business
- Scouting

Each Department has a Mentor Lead and a Student Department Lead.

Our team consists of anywhere from 40–60 students each year.

Students are encouraged to experience different subteams to figure out what interests them most, where their natural talents may lie, and what they would like to learn more about. During the fall, after new students are onboarded at the start of the school year, each department runs classes. For example, Design has weekly CAD classes, programmers learn _____, and the Business Department does training in photoshop, canva, and other editing tools.

At the start of the season, students choose their sub-team. We allow them to participate in more than one, though the majority of students pick only one.

During build season, most technical departments meet every night. Business and Scouting have more flexible schedules but still meet each night. Depending on department size, and work load, sub-teams may have schedules that allow students to have days off and days they are scheduled to be in the shop. This ensures that everyone gets time off, has projects to work on and opportunities to learn, and crowding in the shop.

TEAM COMMUNICATION

- **Facebook Group (parents)**
 - Photos, Events & Season Updates
- **Discord**
 - Inter-department communication
 - Daily communication
 - Regular - most frequently used
- **Remind - Text Message Alerts/Reminders**
 - During Comps - for sending meeting times and places, lunch info, pickup info to parents, eta's
 - Sharing Fundraiser/ Event Info to alumni & alumni parents/families
 - Announcements and Deadline Reminders to current students and parents
- **Weekly Email**
 - During build and competition season we send weekly email newsletters to students, parents, and mentors. These emails provide updates on the progress we're making in the shop, reminders about important dates, scholarship information, and other important updates. We also include photos so parents can see what their kids are up to.
- **Sponsor Emails**
 - During the build and competition season we send bi-weekly or monthly emails to sponsors. We share fundraiser information as well as anything that we are in need of and links to donate online. We share photos, give new sponsor shoutouts, and invite them to our upcoming competitions.

Slack is not intended for students/people under 15. We communicated with them looking for assistance on something once and they informed us that we shouldn't be using it with people that age.

Traveling to competitions with your team is a lot of fun but of course, it can also be a lot of stress. There are pros and cons to traveling with both a large team and a small team, each having their own unique set of concerns.

We are fortunate to have a mentor who specializes just in travel arrangements for our team. If you have any questions or would like to ask for some advice, please feel free to reach out to Cheryl at _____.

You can also view her Travel Workshop using the link below or scanning the QR code.

<https://www.youtube.com/watch?v=0EJqFkwulX8&t=6s>



Sample Travel Forms

Travel Reservation Form 2024 Season

Student Name: _____
(Full legal name needed for flight - first and last) please print or type

Date of Birth _____

2024 FIRST CHAMPIONSHIP: Houston, TX - George Brown Convention Center

(██████████)
Departing Tuesday morning, April 16 returning Sunday, April 21

___ **I do NOT plan to travel to Houston this season**

___ **I intend to travel to Houston**
(██████████ deposit required with this form, due by December 13th, 2023)

Second payment will be due February 1 - (██████████)
Last Payment will be due by March 1 - (██████████)

Please list any dietary concerns:

By signing I realize:

- My deposit is being used to make travel arrangements that are non-refundable. Should I cancel my decision to go on this trip my deposit **will not be returned.**
- I understand that this form is NOT a permission slip and that one will be required and will be provided later

Student Name printed: _____

Student Signature: _____ Date: _____

Parent Signature: _____ phone # _____

Deposit for Houston \$_____ included
Make checks payable to **CyberKnights Robotics Inc.**

Forms should be returned by December 13th, 2023 (all late deposits are subject to availability.)

A second payment of (██████████) **due on February 1**
Final payment due (██████████) **on March 1.**
Students will be responsible for getting permission slips signed and returned

Sample Travel Forms



FIRST Travel Competitions for 2024 - Intent To Travel Form

This is not a permission slip

Team 195 will be attending multiple competitions this season. One of which requires travel arrangements to be made. This document is to provide you with early information and to obtain your intent to travel to the travel events only. Local competitions (those not requiring hotel stays) are mandatory for all CyberKnights. Travel competitions are optional.

• Houston, TX for the FIRST World Championship

For those who have traveled previously on FIRST Trips, you will remember it was a week of learning, competition and fun. We would encourage everyone to consider this trip. It is an amazing experience.

A [REDACTED] deposit (non-refundable upon your cancellation) will be due from each student planning on attending either event.

FIRST World Championship Houston, TX

Details and Costs:

- This competition is being held April 17 through the 20th, (traveling from the 16th to the 21st)
- We will be flying to Houston, leaving on April 16th, with times TBA
- We will leave on the morning of Sunday, the 21st, and arrive home that evening
- Additional details and permission slips will be provided as we get closer to the trip date (this event happens during a school week)
- The trip cost will be \$ [REDACTED] **per student**
- **Trip Includes:**
 - Travel to and from Houston
 - 5 nights hotel accommodations (4 students to a room)
 - 1 excursion on Wednesday
 - 5 nights/days Breakfast and Dinner – Lunches on own all days including travel days

(On arena days since the team cannot all be in the same place at the same time, you will need to bring some money for concession lunches at the arena)

First Payment \$ [REDACTED] deposit required with this form - due by December 13th, 2023

Second payment will be due February 1 - \$ [REDACTED]

Last Payment will be due by March 1 - \$ [REDACTED]

Registering for a team on FIRST website

Go to <https://my.firstinspires.org/>

- Go to "My Dashboard" and "Parent/Guardian – Youth"
- For new: Click on "Add a Youth" and answer questions
- For existing: Click on student's name. Under "Youth Options", click "Apply to a Team". Verify information.
- Follow prompts and answer questions.
- Under "Youth Options", click "Youth's Consent and Release"
- Click "Youth's Consent & Release Form"
- Click "Accept"

After membership is approved to the team, if consent form not complete then you will receive an email to go back into the FIRST Inspires Site to complete the form.

Anodizing/Powder Coating

- Search on Google for local businesses specializing in metal finishing. Send them your sponsorship package and a letter explaining FIRST robotics, telling them about your team, and expressing your desire to have your robot be xyz colored. Make sure to offer to showcase their logo on your robot and count them as a sponsor.

General Safety Rules

Robotics Team 195 GENERAL SAFETY RULES



1. BE RESPONSIBLE – THINK BEFORE YOU ACT – ASK QUESTIONS IF UNSURE
2. No student shall at any time operate a machine or robot if the mentor or authorized and qualified adult is not in the room.
3. Never use any equipment (machine, hand, or power tool) unless you have been instructed in its proper use and care and there is an authorized/qualified adult present.
4. Always use the proper tool for the job. If unsure of proper tooling, ask an authorized/qualified adult.
5. Report ALL accidents no matter how minor to the instructor or adult supervisor.
6. Students must wear the proper safety protective equipment at all times which include safety glasses, face shields (when applicable), gloves, and lab coats or aprons (when applicable) while working with any machine (including the robot).
7. Safety glasses must be worn at all times using any equipment/robot, and working or walking near any equipment/robot.
8. Always walk and work in a controlled and thoughtful manner. Be aware of your surroundings and any machinery in use.
9. When operating any type of machine (including the robot), all loose clothing, jewelry (bracelets, rings, etc.), and other objects that could potentially be caught in a machine shall be removed. Long hair should be tied back.
10. Avoid wearing synthetic clothing/fabrics (such as fleece) when working with flammable material (such as steel or titanium).
11. Shoes must cover the entire foot: No sandals, open toed shoes, mules or crocs are allowed while working on the robot or any equipment.
12. Perform only the activity as directed. Do not do anything which is not part of an approved procedure. Follow all instructions given by your instructor or adult supervisor.
13. Observe all special safety considerations for the particular machine that you are using, and if you don't remember them take time to review them or ask an authorized adult before using equipment.
14. There is to be no fooling around or inappropriate behavior near machines or robot(s) at ANY TIME.
15. Never use any dull or damaged equipment. Report any damaged or dull equipment to an authorized individual.
16. Make sure all machine guards and eye shields are in place before using a machine.
17. Do not distract a student when he / she is operating a machine.
18. Only one person on a machine at a time, however when working with heavy objects (chucks), secure the assistance of a helper. The helper should be made known of his / her work before work starts.
19. Clean the machine and or remove chips (never with fingers) only when the machine IS NOT RUNNING. Any adjustments to a machine should also be made with the machine OFF.
20. Make sure that spectators do not stand in direct line with revolving cutters or with the workpiece.
21. Know the machine you are using. Make certain that all clamps holding the work are tight and that all keys and wrenches are removed before starting. Know how to stop the machine.
22. Never leave a machine running when you are not there to operate it. Never try to stop a machine with your hands. Do not touch moving stock or any cutting tool that is in motion.
23. When operating machinery, always use proper lubricants and coolants to avoid breaking tools or causing burns. Always check the temperature of a tool before replacing it or handling it.
24. Check all adjustments to make sure the machine is in proper operating condition.
25. Never leave the work area without adult permission.
26. Never cut toward yourself with sharp edge tools. ALWAYS CUT AWAY.
27. Don't try to lift heavy objects alone. The proper procedure is to keep the back straight, bend with the knees, and lift with the legs.
28. When handling sheet metal, assume all edges are sharp. Use cut-resistant gloves.
29. Handle blades and other sharp tooling with extreme care, and store them in proper and safe conditions.
30. Never use a file or tool without the proper handle. When carrying any sharp object in the shop, it should be POINTED TO THE GROUND. Never run with any tool or sharp object.
31. Store equipment in the appropriate location and where it will not create a safety hazard or get damaged or lost.
32. Follow all first aid procedures and directions given by your instructor or adult supervisor immediately. The first

aid kit is located in the yellow cabinet by the bathrooms.

33. Treat all chemicals with the respect they deserve. Know the hazards before you handle the material. Handle chemicals carefully.
34. Never take chemicals, supplies or equipment out of the work area or use them inappropriately.
35. Keep full control of the robot at all times with no one in its path when operating.
36. Ensure that no one is working on the robot when powered on or in its enabled state.
37. Always de-energize the robot before working on it by unplugging the batteries.
38. Always vent any compressed air to the atmosphere. Open the main vent valve and verify that all pressure gauges on the robot indicate zero pressure before working on the robot. When releasing compressed air, keep the face and body away from the valve.
39. Relieve any compressed or stretched strings when working on the robot.
40. Know the proper way to handle and use batteries, do not use damaged batteries and use appropriate protection and first aid if exposed to battery acid.
41. Understand stored energy hazards and practice appropriate safety with electrical, mechanical, and pneumatic energy sources: Springs, chains, and gears; batteries; pneumatic cylinders and lines, extended "arms," bound joints, and lifted weights. Release stored energy before you power down; return it to its "home" position, and power off the equipment.
42. Report any problems with any equipment, machinery, including the robot immediately to an adult supervisor.
43. Eating, drinking or applying cosmetics in the work area is not allowed.
44. Clean your work area, put away ALL equipment in the appropriate location and wash your hands at the end of each work session.
45. Respect ALL machines, tools, pneumatic systems, and other equipment. THESE ARE NOT TOYS. Improper use can cause bodily harm.

Failure to abide by these rules will be grounds for immediate disciplinary action and possible removal from the Robotics Team. IT IS YOUR RESPONSIBILITY TO PROVIDE A SAFE ENVIRONMENT FOR YOURSELF AS WELL AS YOUR TEAM.

Student and Parent/Guardian: Please sign and date below:

I, the undersigned, hereby declare, that I have read the following safety rules, reviewed them with my instructor and other qualified adults, and understand them to their fullest extent.

Student: I have read all of the rules and agree to follow them accordingly.

Student Printed Name & Signature: _____

Date: _____

PARENT/GUARDIAN: By signing, you give permission to allow your child to participate in all activities using tools and equipment for and with the robot or related robot equipment and confirm that your child has read, reviewed, and understood the safety rules. Your signature is required to allow your child to participate in all activities using tools and equipment for and with the robot or related robot equipment.

Parent/Guardian Printed Name & Signature: _____

Date: _____

Getting Parents Involved

To create a thriving community within your FRC team, engaging parents is key. At Team 195, we believe in creating opportunities for parents (families) to connect and contribute meaningfully. We organize informal gatherings, whether at restaurants or homes, allowing parents to mingle and build relationships.

Fundraising is another avenue where parents play a crucial role. From managing concessions stands at events to spearheading fundraisers like our calendar raffle or dinner events, parents take charge and form small subcommittees, fostering camaraderie and investment in the team. Additionally, our "CyberKnights mom" shirts on bonfirefunds.com not only raise funds but also instill a sense of pride.

Simple gestures like donating snacks weekly via platforms like SignUp Genius further involve parents in the day-to-day operations.

We understand that parents are vital to our outreach efforts as well, assisting in events such as our Annual Veterans' Dinner or Christmas Toy Drive. Fostering parent engagement in high school activities involves clear communication, recognizing their skills and availability, and providing opportunities for meaningful involvement. By finding these connections, we not only enhance our team's capabilities but also strengthen our bonds.

Here are some other examples of the ways that we involve parents:

- Each year we have at least 2-3 Team Meetings where parent attendance is required. These are generally our New Student Onboarding Meeting and our Travel Meeting (which takes place before we travel for competitions and we review our students expectations while traveling and go over all other travel information), and our Sponsorship Meeting (where we explain our Sponsorship Recruitment & Travel Credit Plan)
- During the Sponsorship Presentation we remind parents to find out if their employers will donate to the team and/or offer donation matching.
- We use TimeTree and Remind to keep parents informed about upcoming events, dates, times, locations and more. We also use Remind to provide ETAs on our teams arrival back from competitions for pickup.
- We have a "Parents Only" channel on our teams Discord Server and parents also have access to our General channel on Discord.

At the start of each year, we enlist the help of our most involved parents to connect with the new students parents. We ask them to make them feel welcome, invite them to things, make sure that they understand what a fantastic spectator sport FIRST is and how much fun they will have in the stands, and just generally get them interested in the program.

We also make sure that parents know that they are welcome to come in to the shop and check out what is going on when picking up or dropping off their child.

We send weekly emails to all parents and students summarizing what we've been working on and anything that we need help with during build season. In the summer months, these are bi-weekly.

Throughout the year we will make announcements via our email, at team meetings, or on Discord if we are in need of something that a parent might be able to help with. Some of the things we've gotten help from parents with are:

- Helping to fix an old oven that we bought off of facebook marketplace. We posted that we were looking for someone that might be able to assist and found that a parent was an electrician.
- Finding someone to assist in towing our trailer home from an event.
- Looking for someone to help our students with Public Speaking, we found that a parent made a career out of developing leadership skills and public speaking was a part of that.
- Looking for adults to simply supervise our students as they coach FLL teams at the local library. Parents were willing to take turns spending two hours for one day a week at the library while their kids ran these programs.

Having a mentor be responsible for communication with parents is also helpful in all of this. We have a Parent Liaison who answers all incoming parent questions, works on recruiting parents to all of the above efforts, and focuses on keeping parents involved.

Many teams have parents that form a sort of Booster Club who focuses on raising funds for the team year round. This works for most school athletic teams and the same applies for robotics. This is a strategy we highly recommend.