



Table of Contents

Section	Page Number
The Importance of Safety In Our Team	3
Safety Training	4
Shop and Tool Safety <ul style="list-style-type: none">- First Aid- CNC Safety- Laser Cutter Safety- 3D Printer Safety- Battery Storage and Safety	5
COVID Safety	14
Competition Safety <ul style="list-style-type: none">- Map of Registered FRC Events	15
Extra Resources	20

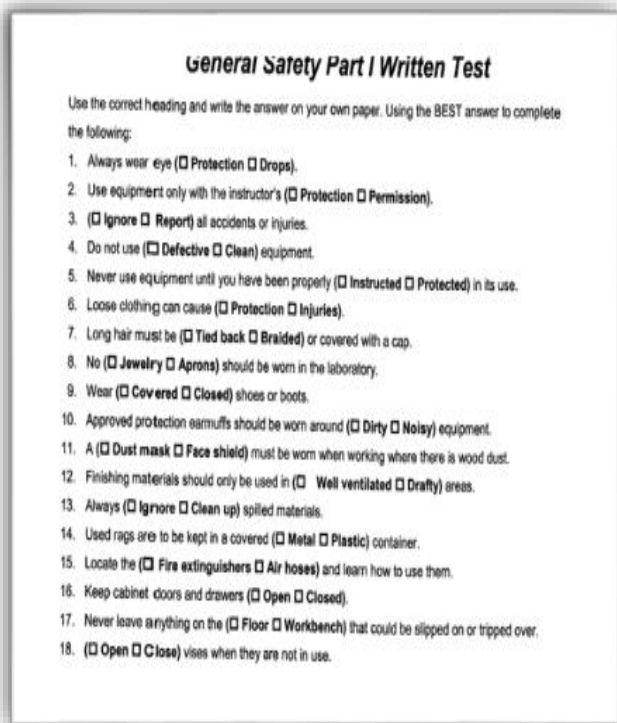
The Importance of Safety In Our Team

Safety is an important aspect of FIRST as constructing a hundred-pound robot using various industry grade tools and parts can be extremely dangerous. Safety measures are kept in place to minimize injuries, ensure that people know what to do when something goes wrong and to create a good working environment. Our team strongly believes that safety is one of the most important aspects of FIRST. To encourage safety in our team, we have lots of resources that are made known to our team members to make it clear that safety is our number one priority. During competition, our safety captain and our mentors make sure that everyone is following the correct safety procedures established by FIRST. Safety plays an extremely important role in our team's path to success.



Safety Training

- Before our build season starts, our project management board and our executive board are safety trained by our mentors.
- The rest of our team is safety trained during preseason (September – November).
- Every member is required to take and pass a hands-on safety test and a 12-page written safety test administered by our school district.
- We document the safety training status of each member on our team. Passing and doing safety training is a requirement to be a part of our team.



Shop and Tool Safety

Proper care when using tools in the shop is essential in order to minimize the risk of injury to yourself and other people in the shop. The following rules listed are some of the most important steps to ensure safety in our shop:



- Always wear safety glasses when you are in the shop.
- Make sure to wear ear protection when operating loud machinery.
- If your hair is long, make sure to tie it back.
- Make sure that your hands are dry when operating electrical devices.
- Always use the proper tool for the job.
- Make sure that your tool is in good condition before using it.
- Make sure to know how to use a tool before using it.
- Make sure to use a clamp to secure the material that you are using before cutting.
- Don't get distracted when operating power equipment.
- Hold tools power tools firmly when you operate them.
- Be careful when using knives or blades. Direct cutting strokes away from your body and be aware of your surroundings.
- Store sharp-edged tools in a safe place.
- Report all injuries or accidents to a mentor.



- Never leave a machine unattended while it is running.
- Only leave the machine when it is turned off and all motion has stopped.
- Make sure that the cutting tool is properly installed on the machine before operating it.
- If a machine isn't working properly or doesn't sound right, turn it off and tell a mentor.
- Use a piece of scrap wood to move scraps around the cutting tool; never use your hands to clear away scraps or dust.
- Never use your hands or fingers to test if a tool is sharp.
- Make sure to use wood blades to cut wood and metal blades to cut metal.
- Make sure to disconnect the power tool if it's not in use.
- Never use your hands or fingers to test if a tool is sharp.
- Horseplay is never allowed inside the shop.
- If you have long hair, make sure to tie it back and keep it away from machinery.



First Aid

- Our team has a dedicated First Aid drawer to store First Aid supplies located next to the sink.
- During preseason, familiarize yourselves with all the safety supplies that we have.
- Familiarize yourself with the FRC 2023 Safety Manual to learn the basics of First Aid.
- If you get an injury at any time, be sure to let a mentor know so that they can assist you.



CNC Safety

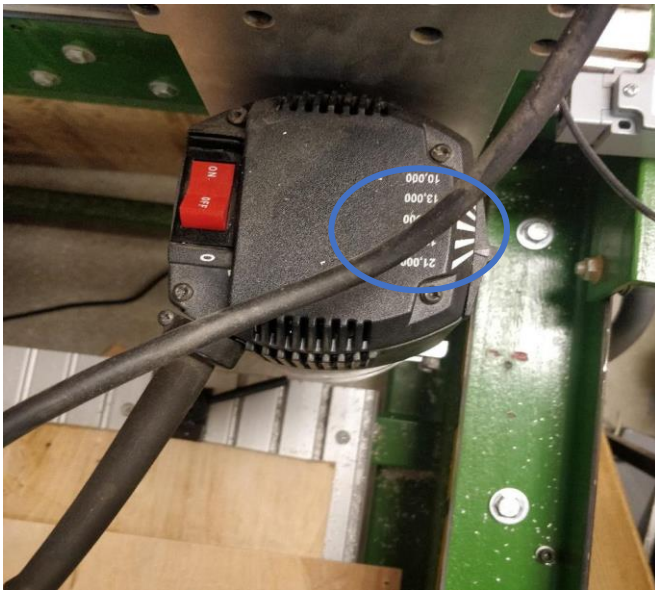
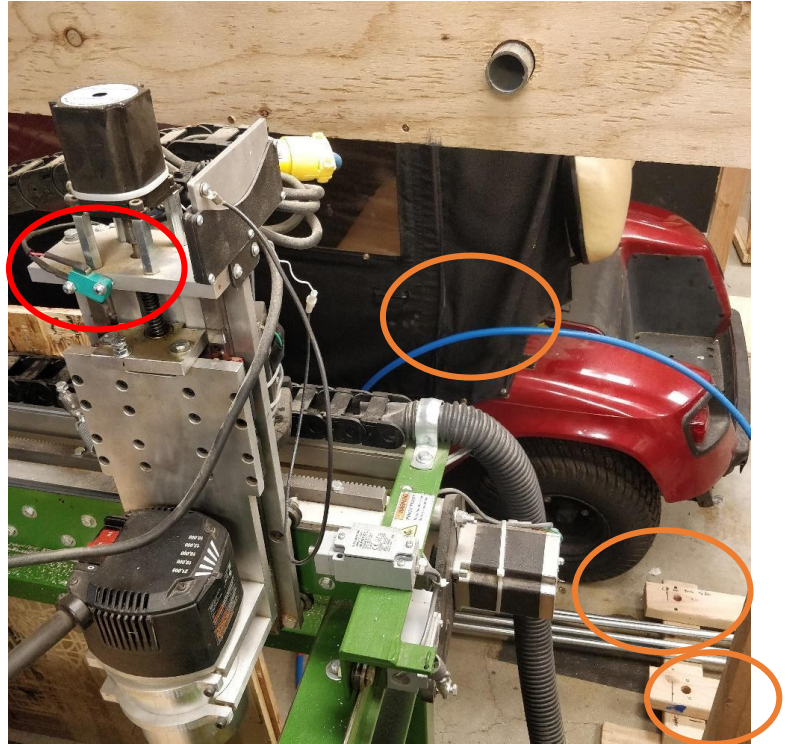
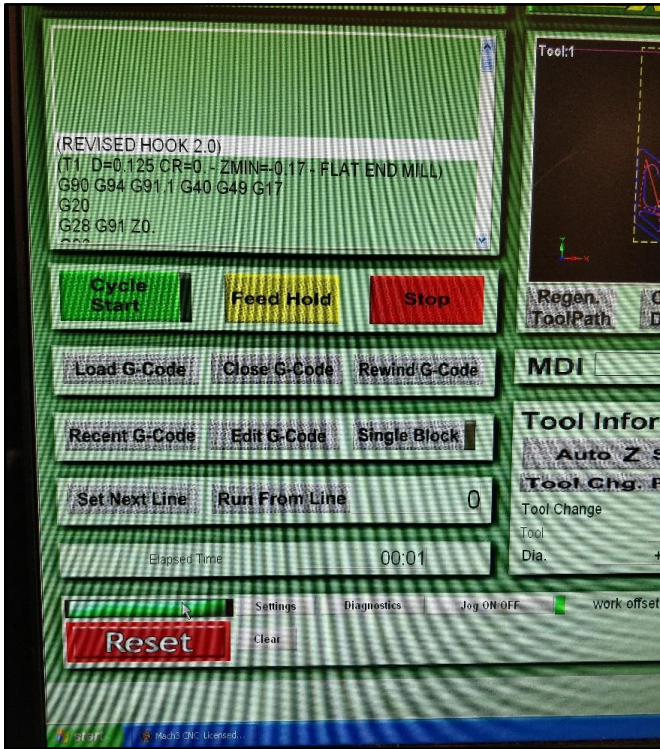
- Always wear safety goggles while operating the CNC.
- Wear ear protection to protect your hearing as the CNC is very loud.
- Make sure that you know where the E-Stops are and when to use them. If you do not know where they are located or what they are, do not operate the CNC and request someone else to operate it.
- If you have not used the CNC before, study the CNC user guide found on the OneNote, and then ask someone experienced with the CNC to show you the process. DO NOT “wing it” or proceed without proper instruction or knowledge of the CNC as you will hurt yourself and those around you while damaging the CNC.
- Team members have access to a complete CNC user guide via the team documentation hub, OneNote.
- Make sure everyone near the CNC is wearing safety goggles and ear protection and inform someone before you start operating it.
- Ensure that the CAD/CAM model has tabs inserted into it to ensure that the piece getting cut does not fly out and harm others or yourself.

- Know when to hit the E-Stops and do not hit one unnecessarily as it can waste stock.
- Make sure that the correct bit is in place as the incorrect one can break either the stock or the bit itself and can harm people.
- Ensure that the feeds and speeds withing the CAD/CAM are appropriate for the stock and bit you are using (you will have to adjust the slider on top of the spindle to adjust speed of the bit).
- Always have a spotter with you to help keep you safe (you have to ensure their safety as well).

What If Something Goes Wrong?

- If something has gone wrong or the CNC does not work, do not attempt to fix the problem yourself. Call a mentor or someone who has more experience on the CNC than you. Discuss what went wrong with them (more than 1 person) and fix the problem.
- Do not simply restart the process, go back to CAD/CAM and check over everything such as max stepdown and heights. Also check if it was your setting of the zeroes that caused the error.
- Every time an error occurs, and you fix it, update the CNC log found on the desktop next to the CNC so that people who use it later on know how to fix the problem. Also inform any frequent CNC users why the problem occurred so that they can prevent it in the future.

CNC Diagrams



Key:

E-Stops

Spindle speed slider

Limit Switches



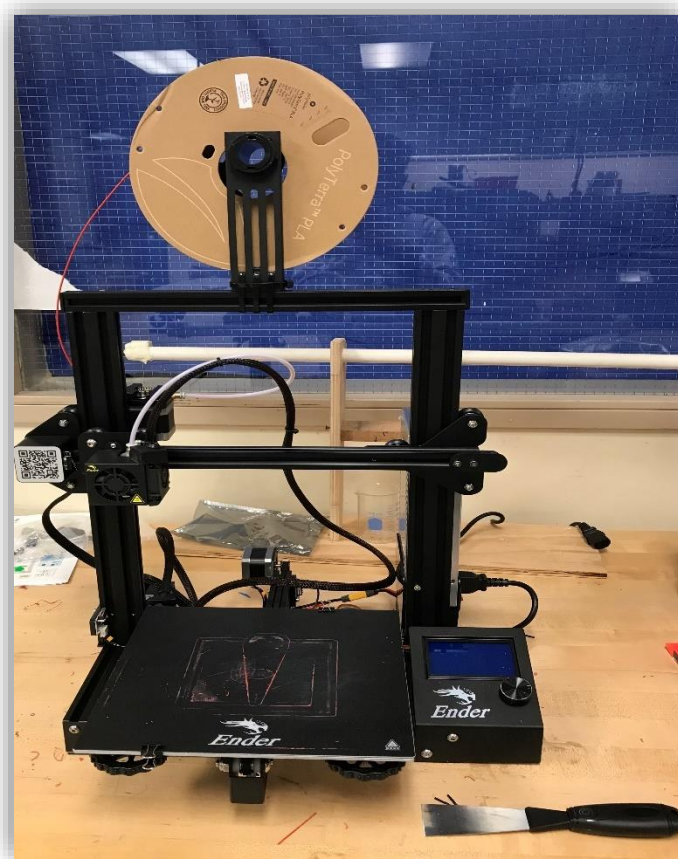
Laser Cutter Safety

- Keep a Fire Extinguisher nearby as a precaution when using the laser cutter.
- Don't look directly at the laser, as it can potentially cause damage to your eye.
- Always stay attentive and make sure that the laser cutter is performing it's task correctly.
- If something major goes wrong, press "Stop" or disconnect the laser cutter from power.
- Keep the surrounding area clean.
- Ensure that the vents are removing the smoke that is released.
- Safety glasses while using the laser cutter is not necessary as our laser cutter is covered.



3D Printer Safety

- Be aware of toxic fumes from the PLA. Do your best to not stay around the 3D Printers while they're printing for long periods of time.
- Don't touch the surface of the 3D printer while it's printing, heating up, or cooling. Temperatures can be between 200 and 300 degrees Celsius and can cause severe burns.
- Some scraper blades are laced with contaminants. To avoid exposure, scrape away from your fingers and wear safety gloves.



Battery Storage and Safety

- Be cautious when handling the robot batteries as they contain acid.
- Don't use robot batteries that are visually damaged in any way.
- Keep the battery charging area nice and clean.
- Battery spillage kit is located next to the battery storage area in our shop. Familiar yourselves with the official FRC 2023 safety manual to know how to use it.
- If there is a battery leak at a FRC Competition, go and ask pit administration for help.
- Follow the corresponding procedure to handle a leaking battery (located in the official FRC 2023 safety manual).
- Be careful when lifting the battery as they can be heavy. Hold it straight up to avoid any leaks.
 - This year, our team has developed a 3D printed handle design to go on top of the robot battery. This makes the battery much easier to carry around.



COVID-19 Safety

Since the 2020 global COVID-19 pandemic, there has been an emphasized caution on safety procedures to minimize potential spread of the coronavirus. As the world has begun a return to normalcy, the caution has been minimized but it's still important that we do not have a breakout within the team. Below are some of the precautions that we encourage all team members to follow:

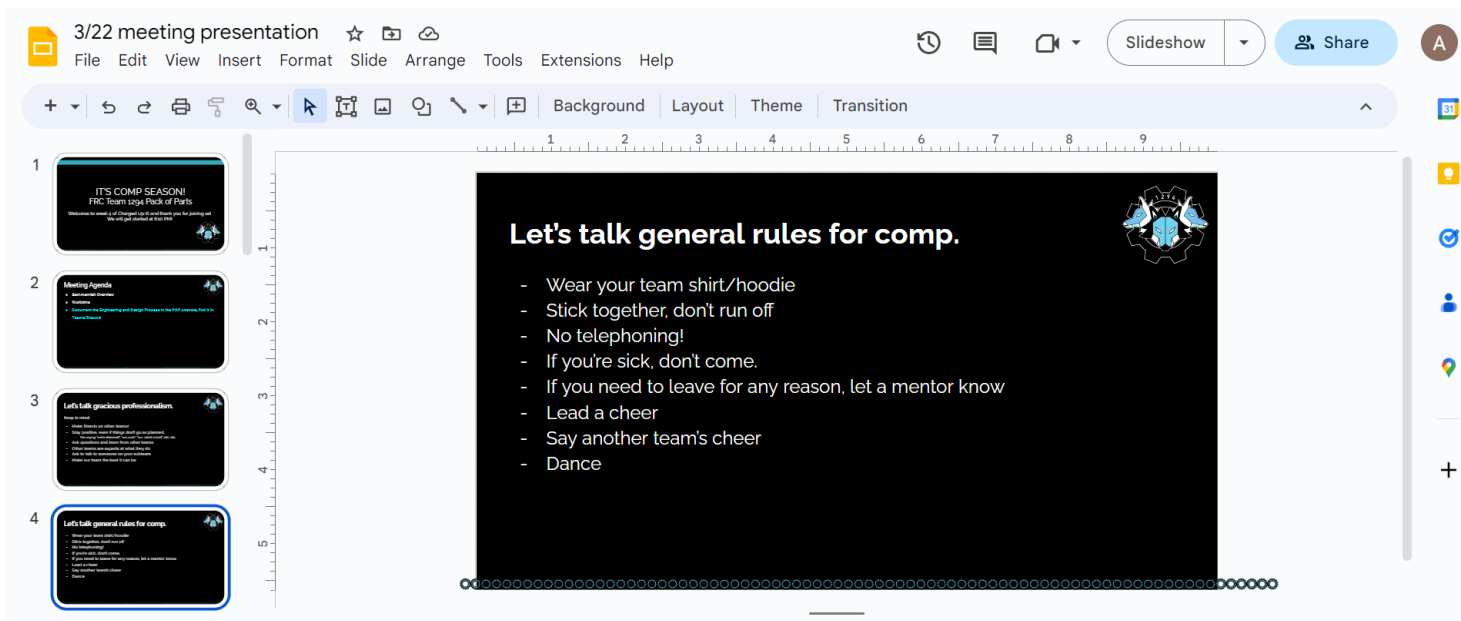
- Stay home if you are feeling sick or unwell.
- If you are in the shop and have just recovered from being sick, we encourage you to wear a mask.
- Wipe down tools and frequently used surfaces.
- Frequently wash your hands. Especially before eating or drinking.
- Tell others if you have COVID or have been exposed to COVID so that others can follow the correct safety procedures.
- Masks are encouraged, but not required.
- Before competition, be sure to check COVID-19 rules and regulations.



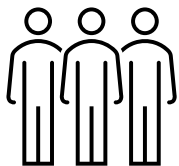


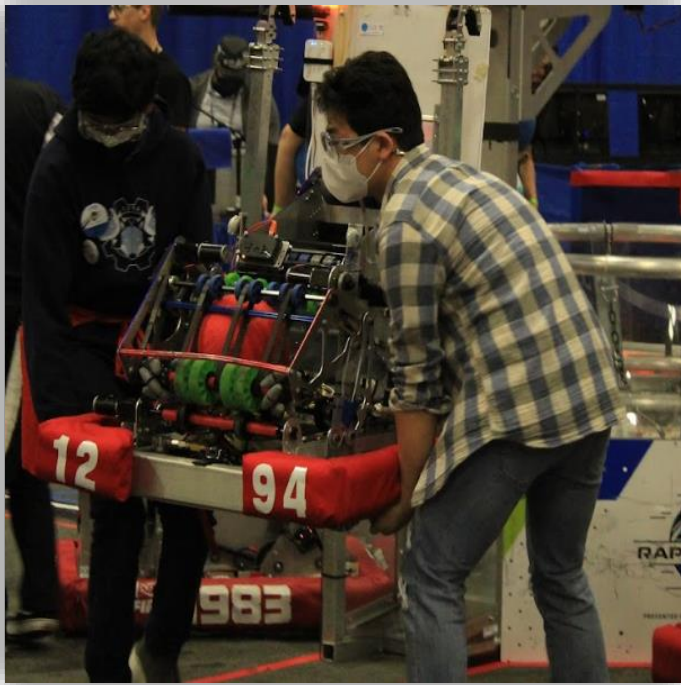
Competition Safety

Before our first competition, our team always holds a meeting to talk about proper competition safety and behavior. Below are some of the rules and procedures that our members are required to follow:



- Make sure to wear safety glasses when you are in the pits.
- Make sure the robot is on a safe surface when you're working on the robots in the pits.
- Use the buddy system when at comp. Don't wander around by yourself.
- Lift the robot safely in the pits and on the playing field.





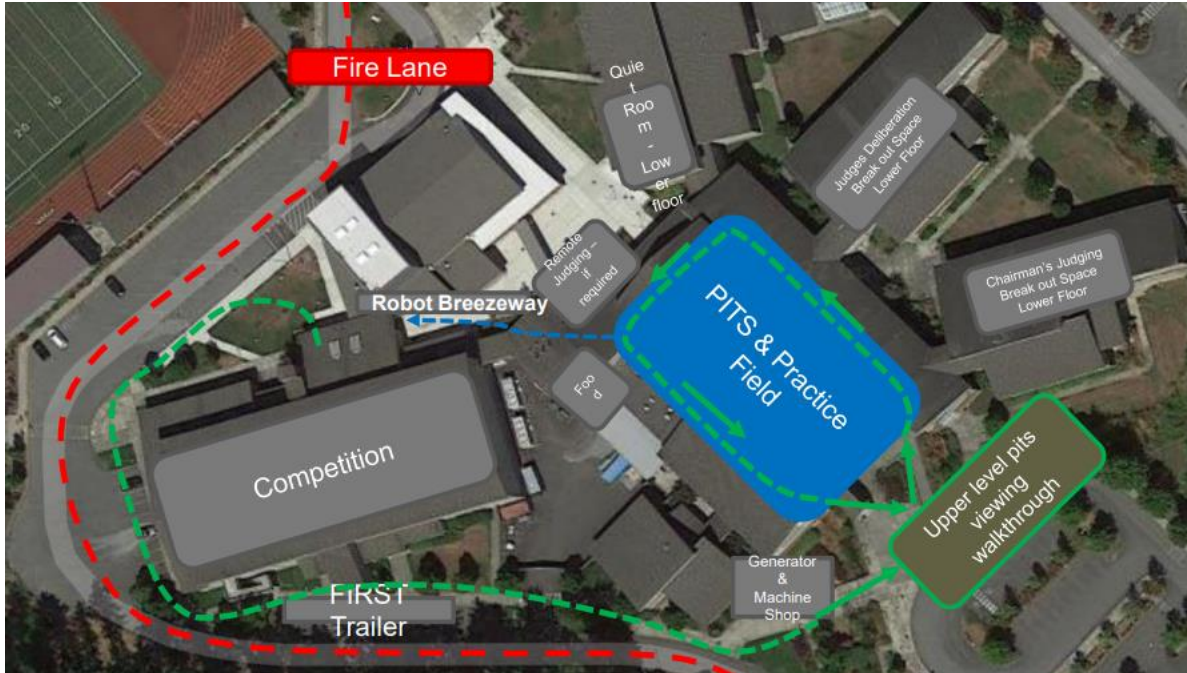
- Always keep the pits nice and clean and make sure pedestrians around you are aware of where the robot is at all times.
- Always demonstrate Gracious Professionalism when you are at competition. Offer help to teams who need it and make sure that other teams are following proper safety precautions.
- Make sure that the pit and any other things hung in the pit are secure (cannot be 10ft above the floor).
- Make sure to properly clean up the pits when things have to be taken down.
- Keep a clear path when transporting the robot.
- Make sure to keep track of your belongings.
- Don't throw objects from the stands.

- Assist other teams with safety issues.
- Control access to the pits. Make sure that too many people from your team are not at the pits at any time.
- Have proper storage for batteries and tools in the pits.
- Always cooperate with volunteers and judges. If they tell you to do something, do it!
- Report injuries to the EMT (located near the Pit Administration Desk).
- If you have any questions or concerns at safety during competition, talk with the Safety Managers.
- Be aware of other teams/people in the pits.



Bonney Lake High School FRC Event

Map:



Pits:

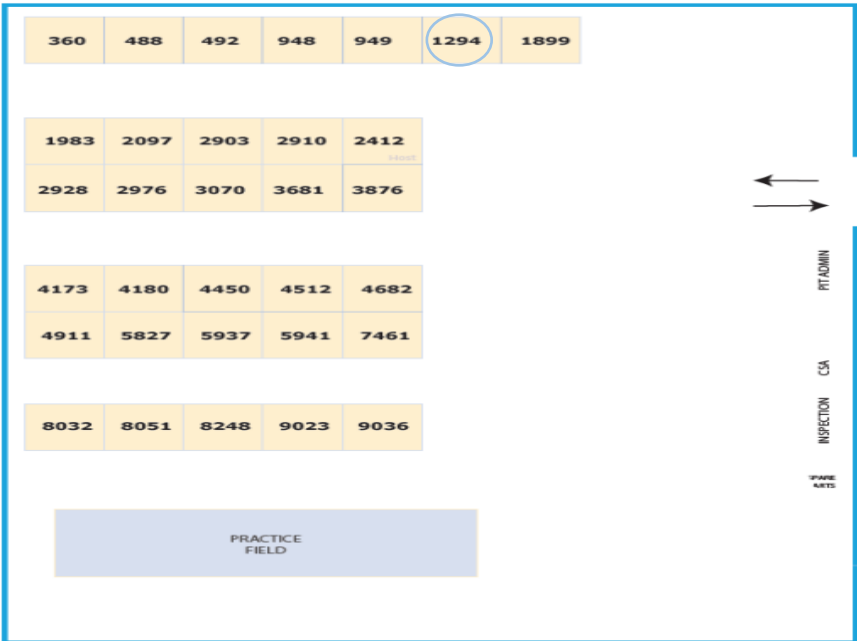


Sammamish High School FRC Event

Map:



Pits:



Extra Resources

- The Official 2023 FIRST Robotics Competition Safety Manual
https://www.firstinspires.org/sites/default/files/uploads/resource_library/frc/team-resources/safety/2023/2023-Safety-Manual.pdf
- Tips protect yourself and others from COVID-19
<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>
- The World Health Organization's Q&A page for different topics related to COVID-19
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub>
- Our Team's Safety Captain: Aditya Manivel.
 - Contact: aditya.manivel@team1294.org