FIRST Team 6865

SAFETY MANUAL

Revised February 2025

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References

This document is modeled from the following and customized to the needs of the FIRST Team 6865:

Canadian Centre Occupational Health and Safety
https://www.ccohs.ca/oshanswers/chemicals/whmis_ghs/sds.html

FIRST Safety Manual; Sponsored by UL

Safety Manual for Technological Studies Courses
Rainbow District School Board, June 2003

UCSB College of Engineering Machine Shop Safety Handout
Prepared by the Staff of the Machine Shop and
Mechanical and Environmental Engineering Department
3 December 2003

Safety Manual for FIRST Team 1305

Adherence to Safety Manual

All members of FIRST Team 6865, including students; mentors; parents and visitors; are expected to comply with all items within the FIRST Team 6865 Safety Manual, FIRST Robotics Competition Safety Manual, and other regulations input by the Rainbow District School Board.

Failure to comply with the manuals and regulations may result in documented formal discussion(s) with a mentor, up to and including removal as a FIRST Team 6865 member, as determined by the Management Mentors.

Communication

Safety is a daily issue and should be kept in mind every day. Exchanging knowledge, skills and information in order to maintain a safe work environment must be a priority of the department and the school.

Some of the basics of communication include:

- safety vigilance and reminders of safety procedures among teachers, students, and the joint health and safety committee
- a safety notice board, containing posted minutes from a joint health and safety committee within the school and school board and the Occupational Health and Safety Act (must be posted by law)
- visible WHMIS binders, symbols and MSDS sheets
- purposeful instructions for students new to Technology classes
- readily available manuals for the operation of various types of machinery, tools or equipment
- safety posters around major equipment and work areas
- clear and precise instructions
- clear and marked areas that contain safety items such as fire extinguishers, eye wash stations, first aid kits

All accidents must be reported to the administration, (even minor accidents). Teachers and Mentors should ensure they have readily available accident report forms, and conduct follow-up meetings as soon as possible after the incident.

Documentation

All FIRST Team 6865 members will be expected to adhere to Safety Manual as part of the Training Document annually. The signatures will be placed in the Training Records Binder. The binder will be kept in the team room and brought to events.

Students will be trained, and reviewed annually, on the safe operating procedures of all shop machinery prior to use. The training will be done utilizing the safe operating procedures within this manual. Students and mentors are both responsible for ensuring that everyone is properly trained on the equipment. No individual is to utilize equipment unless they are properly trained. Records are retained at the team office.

Sign In & Sign Out

At the start of all team meetings and after school work time, an attendance sheet will be taken to each room and have someone take attendance of each room. The sheet is then left in the buildroom for people to sign out at the end of the night by indicating the time they left.

This attendance on the sign in sheet may be used in selection of various tasks including chairman's presenters, student managers, competition participants, and drive team.

We encourage people to sign up for build and business meetings online using google docs. This is then used to keep track of attendance.

People are to check in with a mentor upon arrival and to indictact when they are leaving.

REVISION LOG

DATE	REVISION	NAME
March 31, 2019	New	Y. Bauer
February 23, 2020	Add "Records are retained at the team office."	C. Kuntsi
Feb 9, 2022	Grammatical fixes	A. Wilson
Feb 23, 2024	Aligned procedures with current practices	A. Wilson-Zegil
Dec 14, 2024	Aligned procedures with current practices	A. Wilson-Zegil

Evacuation Plan

Upon noticing fire or smoke

1. Inform others around you of the situation.
2. If trained and the fire is small, utilize the fire extinguisher.
3. If the fire is too big, proceed to the nearest exit and pull the fire alarm on the way.

Upon hearing a fire alarm

1. Safely stop what you are doing, and proceed to the nearest exit. Be sure to check doors for heat prior to opening them.
2. Go to the designated meeting location. For FIRST Team 6865, while at Manitoulin Secondary School, the meeting location is the track on the other side of the road at the back of the school.
3. A mentor is to grab the sign in sheet. Attendance will be taken by a mentor ensuring all members are present.
4. The mentor will inform the Fire Department of any missing individuals. No one is to re-enter the building.
5. Be sure to allow room for the fire department to work safely. Additional fire trucks may arrive at any time.
6. Wait for the all clear from the Fire Department before entering the building.

At competition

1. The Safety Captain and a Mentor will determine the meeting location at the event and at the hotel, in the case of an emergency. Team members will be informed of the location at the full team meeting
2. When hearing an alarm proceed to the meeting location.
3. Follow all instructions from event or hotel personnel.
4. Attendance is to be taken using the trip number count provided at the beginning of the trip.
5. A mentor will inform the event or hotel staff, or the fire department of any missing individuals.
6. Wait for the all clear before returning.

If other messages are provided through the PA system, or at events, please be sure to follow the instructions provided.

FIRST Team 6865 will hold a fire drill annually to practice, and seek ways to improve.

REVISION LOG

DATE	REVISION	NAME
March 31, 2019	New	Y. Bauer
February 23, 2020	Change- “it comfortable…” to “if trained…”	C. Kuntsi
Feb 9, 2022	Revised	A. Wilson
Feb 23, 2024	Aligned procedures with current practices	A. Wilson-Zegil

Mentor Supervision

1. A mentor will be present at all meetings held at Manitoulin Secondary School and all outreach events. In the event a mentor is not available for a meeting, students and parents will be informed.
2. All mentors must be invited to be an official FIRST Team 6865 mentor from the Management Mentors.
3. **Mentors must be registered within the FIRST system and pass the Background check through the FIRST system.**
4. Individuals who are interested in potentially mentoring or volunteering with 6865 are welcome to attend team events before being registered. These individuals must follow all 6865 practices, and will be accompanied by another mentor at all times. These unregistered individuals are not to be alone with a student.
5. If a mentor is bringing a guest with them, they are to inform the other mentors in advance of the individual attending a meeting, and will be responsible for monitoring the individual. The guest is not to be alone with a student under any circumstances.

Wellness Breaks/Activities

1. If you need to take a break, head to a safe space (i.e. the quiet room) or other approved spot. Make sure you tell a mentor before you leave , go with a buddy (make sure one of you has a phone) and check in with a mentor to keep people updated.
2. If you aren't able to leave, try some paced breathing and visualization. Focus on something small and use grounding exercises (i.e. listening to music, talking with someone, reading something)
3. Remember to eat and drink. Take a break in the stands, or in a approved spot to eat.
4. If there's a lot going on, focus on the task at hand, focus on the job you have been given.
5. If you're lost and don't know what to do, take pictures.

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DATE	REVISION	NAME
March 31, 2019	New	Y. Bauer
February 23, 2020	Change- "it comfortable…" to "if trained…"	C. Kuntsi
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Mar 1st 2024	Section added	A Wilson-Zegil
Dec 14, 2024	Updated to align with current practices	A. Wilson-Zegil

Basic Safety Rules

Follow the rules.
Disregarding safety rules, working unsafely or leaving a mess will result in injury. Failure to comply will result in suspension of privileges. Safety Rules apply regardless of location

Never work alone.
A mentor authorized by Manitoulin Secondary School to supervise in the shop must be in the shop when power tools are being used.

Refuse to operate equipment without instructions.
Have yourself checked out on an unfamiliar tool the first time you use it.

Never work when you are impaired.
This includes when you are too tired, stressed or hurried to work carefully.

Horseplay is NOT allowed.
Shop equipment is dangerous and demands respect. Never indulge in horseplay in the shop areas.

Plan your work.
If you cannot do a job safely, don't do it. There are limits to what we can build here. Think through the entire job before starting.

Always wear closed-toe shoes in the shop.
Tools, chips and fixtures are sharp, and often hot. Shoes will help protect your feet from injury. Leather shoes are preferred when welding. See PPE section below.

Eye protection is essential.
Always wear safety glasses when working or cleaning tools. See PPE section below.

Loose clothing, hair and jewelry.
Remove or secure anything that might get caught in moving machinery.
Rings, necklaces, long hair and loose clothes will get caught in tools and can drag you along. Do not wear a tie or scarf. Long hair must be tied back or covered to keep it away from moving machinery.

Keep your hands away from sharp tools
Make sure that nothing that you do will cause you to be cut.

Dust, chemicals and smoke can be dangerous
Heavy sanding, painting and grinding should only be done in well-ventilated areas, preferably outside. Use appropriate protective equipment including respiration protection.

If you are unsure – ask!
Inattention, hurried work, horseplay, bad judgment, fatigue, improper clothing, defective tools, and poorly secured work pieces cause most accidents. Avoid accidents by following all of the rules in this handout.
If you're unsure about the safe operation of a tool or any aspect of a job, ask for help

Compressed Air
Avoid excessive use of compressed air to blow dirt or chips from machinery to avoid scattering chips. Never use compressed air guns to clean yourself. Never aim compressed air at clothing, hair, or another person.

Cleaning.
Machines must be **shut off** when cleaning, repairing, or oiling a brush, hook, or special tool is preferred for removal of chips, shavings, etc. from the work area. Never use your hands to clean cuttings – they are sharp!
Hand protection in the form of suitable gloves should be used for handling hot objects, glass or sharp-edged items
Keep your fingers clear of the point of operation of machines by using special tools or devices, such as: push sticks, hooks, pliers, etc. Never use a rag near moving machinery.
Keep the floor around machines clean, dry and free from trip hazards. Do not allow chips to accumulate.

Machine guards and shields.
Machines must be operated with all required guards and shields in place (pinch points / articulating or rotating forces.

Properly use power strips.
Do not 'daisy chain' (plugging power strips into one another) or overload the rated capacity of the power strip

Toxic and Flammable Materials
Check the hazardous materials SDS Safety Data Sheets book for any specific precautions to be taken while working with the material. An empty container, which previously contained a flammable substance is particularly hazardous as it may now be explosive. Exercise extreme caution. Ensure a workplace label is on the empty container.

Clean up after yourself.
Before you leave the shop each day all tools must be returned to the toolbox, the machine cleaned and the floor swept. Allow 10-15 minutes for cleanup before leaving.

Right to refuse
If you feel you are not comfortable performing a task for a safety reason, whether it is training, dangers, skill, or other; you have the right to refuse the task until the reason has been remedied.

In an Emergency, use the EMERGENCY STOP pushbutton.
Know the location of the Emergency STOP pushbuttons. How many are there?

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DATE	REVISION	NAME
March 31, 2019	New	Y. Bauer
February 23, 2020	Changes- SDS Safety Data Sheets, workplace labels	C. Kuntsi
Feb 9, 2022	Grammatical fixes	A.Wilson
Feb 23, 2024	Checked procedures align with current practices	A. Wilson-Zegil
Dec 14, 2024	Updated practices	A. Wilson-Zegil

Personal Protective Equipment

All personnel working within a shop environment or at competition must be made aware of, and use, personal protective equipment.

Eye Protection

Students and mentors must wear CSA approved safety glasses at all times, in all shop areas.
Students must wear safety glasses/goggles and shields anytime they use equipment and tools that create hazards for their eyes (impact tools, grinders, drills, lathes, mills and planes, etc.)

Hearing Protection

All personnel working in noisy areas or with equipment which causes noise for prolonged periods should wear hearing protection.
In areas with a rating of 85 decibels or greater, personnel must wear hearing protection.

Students must wear hearing protection anytime the mentor deems it necessary.
Approved hearing protection devices are:

- permanent earplugs (must be fitted with a good seat and can be washed and reused)
- Disposable earplugs (made of a pliable material, one size fits all and disposed of after one use)
- Ear muffs (when worn properly provide the greatest protection, usually made of plastic or foam)

Head Protection
Students working in construction areas must wear CSA approved hard hats (class B)
Hard hats must not be painted and must be in good repair.
Shell liners must be installed properly and be in good repair.

Foot Protection
Students and mentors working with-in school shops or at events must wear good quality footwear (steel toe boots or appropriate shoes); no open footwear or sandals allowed.

Respiratory Protection

Anyone exposed to respiratory hazards generated by equipment, procedures, or materials must wear appropriate personal protective equipment.
Proper equipment includes dust masks or gas masks as appropriate to the type of particulate or gas emitted.
Various respiratory hazards are:

- Gases (such as carbon monoxide)
- Vapours (produced by solvents, paints and degreasers)
- Fumes (welding fumes or fumes from diesel engines)
- Mists (spray paint or cutting oils)
- Dusts (generated by grinding, sanding or cutting)

Appropriate clothing

Students should wear clothing which will not impede the work being done.

Students should not wear dangling jewellery, ties, wallet chains, belts or other dangling items.

Students should not wear loose clothing or clothing such as skirts or shorts, which do not protect the legs in the event of an accident. Long hair should be confined.

Protective gloves should be used when handling finishing materials or when there is risk of cuts or scratches.

WHMIS Training

The Workplace Hazardous Materials Information System gives everyone in Canada the right to know about hazardous materials in the workplace and a means to find out information on such materials. This happens through: labels, materials safety data sheets (SDS), and worker training and education. WHMIS training is available through the Ministry of Labour. All mentors working in shops should be trained in WHMIS to ensure the safe operations of their shops.

Symbols

Six classes of controlled products are:

1. class A (compressed gas)
2. class B (flammable and combustible material)
3. class C (oxidizing material)
4. class D (poisonous and infectious material)

a. materials causing immediate and serious toxic effects
b. materials causing other toxic effects
c. bio hazardous infectious material

5. class E (corrosive material)
6. class F (dangerously reactive material)

Supplier Labels

WHMIS labels are required on all controlled products and are obtained from the supplier. Labels must include:

1. product identifier
2. appropriate hazard symbol
3. risks statement
4. precautionary measures
5. first aid measures
6. supplier
7. statement of availability of MSDS (material safety data sheet)

Fire Protection

At the beginning of the semester, and periodically thereafter, review fire safety procedures. Make sure everyone is aware of the fire alarm, fire extinguisher and fire exit locations. Practice evacuation procedures, review steps in shutting down equipment, closing doors and leaving the area.

In the case of a fire within the shops, the alarm must be sounded.

All shops must be provided with properly rated and maintained fire extinguishers. These extinguishers must be maintained during monthly health and safety committee inspections.

Anyone using a fire extinguisher must report its use and the necessity for it to be refilled.

Fire extinguishers must be provided in these areas:

- all shops
- anywhere flammable material is stored or handled
- anywhere gas or oil is used
- where welding, or open flame cutting is required
- when students are working off school property and there is any chance of fire

Four classes of fire extinguishers are:

- class A (used for combustible material such as paper, wood and textiles)
- class B (used for paint, gas or oil fires)
- class C (used for electrical fires)
- class D (used for flammable metal materials)
- class ABCD (used in any of the above 4 fire situations)

Storage Areas

All storage areas for flammable materials or gases must comply with Rainbow District School Board policy.

First Aid Expectations

Technical teachers should be aware of and be able to perform basic first aid procedures for breathing, bleeding and burns.
Training in First Aid and Emergency Response procedures is required.

Breathing

If the casualty is unconscious; check for breathing for 3 seconds. Listen at the mouth and nose. Watch and feel for chest movement. Call 911 immediately.

If the casualty is not breathing, start artificial respiration immediately. The most effective method is CPR compressions and breath replacement.

Bleeding

Control external bleeding immediately:
- Apply direct pressure to stop blood flow.
- Place the casualty in a comfortable position and elevate the injured part.
- Let casualty rest to slow circulation.
- Apply direct pressure with hand over dressing.
    - Do not remove blood soaked dressing. Add another dressing and continue pressing.
- When bleeding is controlled, secure bandage and maintain elevation.

The simple formula for the control of bleeding is RED, Rest, Elevate and Direct pressure.

Burns

Immediately immerse the burn in ice water or immediately apply ice or clean cloths soaked in cold water. Cold will;
- reduce the temperature of the burned area and prevent further damage
- reduce swelling and blistering
- relieve pain

First Aid Kits

First aid kits for technical shops should include these minimum requirements. REPORT ALL INJURIES TO MENTOR, MAIN OFFICE, AND PIT ADMIN.

The following items should be included in a kit available in all technical shops.

1 Standard first aid manual
1 One way air mask
Disposable gloves
1 Pair of scissors
1 Foil rescue blanket

Adhesive strip bandages
Individually wrapped sterile gauze pads (8cm X 8cm) (3" X 3")
Clinx conforming bandage
10 cm (4") Tensor bandages
15 cm (6") Tensor bandages
3 Triangular bandages
Safety pins
Sterile gauze compress bandages
Sterile gauze compress field dressing
Adhesive tape
Antiseptic

A kit should be posted in a visible area of the shop and the materials should be replenished on a regular basis by team Safety Captain

Emergency Procedures

The following procedures should be followed if an incident occurs in your immediate area:

1. Take command of the situation.
2. Provide immediate first aid and support.
3. Call the office to inform the emergency response team.
4. Keep your students calm.
5. Isolate the incident area, shut off power and control systems.
6. In case of fire, pull the alarm and evacuate all students.

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March 31, 2019	New	Y. Bauer
February 23, 2020	Add First Aid information	C. Kuntsi
Feb 14, 2022	Grammatical fixes	A. Wilson
Feb 23, 2024	Checked procedures align with current practices	A. Wilson-Zegil
Dec 14, 2024	Updated Contents in first aid kits	A. Wilson-Zegil

Safety Data Sheets (SDS)

Safety Data Sheets (SDS) are summary documents that provide information about the hazards of a product and advice about safety precautions. SDSs are usually written by the manufacturer or supplier of the product.

1. The Safety Captain will ensure that the binder of SDS is available.
2. Mentors will be responsible for acquiring the SDS sheets for the materials they purchase.
3. A mentor will be assigned to train students on how to read SDS sheets for the materials they work with.

Workplace Labels

Required when products are produced on-site, or when goods are transferred from one container to another. They must include:

1. product identifier
2. safe handling instructions
3. statement of availability of SDS (safety data sheet)

Safety Data Sheets (SDS)

SDS must provide:

1. identification
2. hazard(s) identification
3. composition/information on ingredients
4. first aid measures
5. fire-fighting measures
6. accidental release measures
7.. handling and storage
8. exposure controls/Personal protection
9. physical and chemical properties
10. stability and reactivity
11. toxicological information
12. ecological information
13. disposal considerations
14. transportation information
15. regulatory information
16. Other (date of preparation or last revision).

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February 23, 2020	Add SDS subsections	C. Kuntsi
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Feb 23, 2024	Checked procedures align with current practices	A. Wilson-Zegil

Battery Safety

1. Batteries should be safely carried by the base. Never carry batteries by the cables.
2. Batteries are to be periodically checked for damage, and are to be checked before and after every time they are placed in a robot.
3. Batteries are to be charged utilizing proper battery chargers.
4. A Battery Spill Kit will be available in the team room, and should be brought to all events.

When an electrolyte leak occurs:

1. Neutralize it by pouring the sodium bicarbonate on all wetted surfaces. The bicarbonate of soda itself is not dangerous, and will react with the acid in the electrolyte leaving a safe residue that can be disposed of in a conventional manner such as rinsing with water.
2. Follow emergency handling instructions of the SDS and notify a mentor.
3. Put on gloves before handling the battery.
4. Place the battery in a leak-proof container for removal.
5. Be sure to neutralize any acid on the gloves before removing and storing them.
6. Seek medical attention if skin comes into contact with any chemicals.
7. Place the battery in the non-metal container in a safe location. A mentor will dispose of the battery at the Hazardous Waste Depot.

At a FIRST event:

1. Provide the battery in the non-metal bucket to Pit Admin for disposal.
2. Immediately send the person in contact with acid to the First Aid Station/EMTs.
3. Report incident to the pit administration supervisor so that the individual can fill out a Medical Incident Report form. Provide team number and available information.

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March 31, 2019	New	Y. Bauer
Feb 14, 2022	Clarity procedures	A.Wilson
Feb 23, 2024	Checked procedures align with current practices	A. Wilson-Zegil

Face Painting

1. **Use non-toxic paints specifically designed to be used on body skin.**
   Never use permanent markers or any other products not designed for safe use on skin.
2. **Endeavour to obtain an SDS for the products you are using.**
   This could be a challenge but there should be an effort.
3. **Do not apply paint in the proximity of your eyes or mouth.**
   Face painting can transmit pathogens and avoidance of mucous tissues will reduce the risk of transmitting infections.
4. **Have clean bottled water available for rinse rinsing if needed.**
   If body paint gets applied accidentally where not intended, rinse water may be needed.
5. **Have on hand wet wipe towelettes such as "The Wet Ones".**
   These will be very useful for clean up
6. **Be mindful of open sores and skin infections.**
   Do not re-use brushes or tissues that come into contact with lesions or sores
7. **Clean brushes with alcohol wipes before each new person.**
   This will help prevent any spread of infection
8. **Do not spray hair sprays in the face.**
   Whenever hair spray is used, have the subject hold their breath and close their eyes.

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March 31, 2019	New	Y. Bauer
February 14 2022	Grammatical fixes	A.Wilson
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Hand Power Tools Guidelines

1. Keep hands away from the cutting area at all times.
2. Don't wear ties, gloves, and or dangling jewellery when operating power tools. Wear short sleeves and tie up long hair.
3. Always use two hands on the tool when operating it. Clamp the workpiece to a solid surface.
4. Never remove guards from power tools.
5. Never use power tools to do work not specifically recommended for that tool.
6. All power tools must be effectively grounded or be of the double insulated type.
7. Electrical cords must be in good condition.
8. Before connecting portable power saws to a power source inspect the swing guard to make sure it is operating properly.
9. Immediately report any broken, dull or damaged bits or blades to the teacher.
10. Do not operate electrical power tools in wet conditions.
11. Operating a power tool while in a precarious position such as on a ladder or overhead beam is an additional hazard. Make sure you are secure from falling, should the tool stall or kick back.
12. Always wear safety glasses or a face shield when operating a power tool.
13. When you have completed an operation with a power tool, switch it off and lay the tool down in a safe manner after it stops. Keep the rotating blade or bit away from your legs and body. Unplug it and store in a designated area.

★ PAY CLOSE ATTENTION TO THE OPERATION BEING CARRIED OUT AND DO NOT BE DISTRACTED.

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DATE	REVISION	NAME
March 31, 2019	New	Y. Bauer
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Hand Tools- General

Tool	Uses	Safety
File	- Useful for removing surplus metal, producing finished surfaces and to remove sharp edges.	- Never use a file without a handle. - Ensure that the handle is tight before use. - Use the appropriate file for the job. - Never use a file as a pry or a hammer. - Do not knock a file on a vise or other hard object to clean it. Use a file card.
Hacksaw	- Mount work so that you are sawing as close to the vice jaws as possible.	- Check that the blade is the proper pitch for the job and that the teeth point away from the handle. - Don't twist the blade and use the full length of the blade when sawing. - Use light forward pressure only when sawing.
Hammer	- When using a hammer, always grasp it at the end of the handle to provide better balance and greater striking force. - Select the proper hammer and weight for the job.	- Be sure the handle is solid, not cracked and tight. - Never use a handle with a greasy handle or when hands are greasy. - Never strike two hammer faces together or a hammer face on any other hard surface. (anvil, vise,etc…)
Load tester	- Used to test battery condition.	- Never leave the tester connected for an extended period of time.
Multimeter	- Multi-purpose tool used to measure voltage, amperage and resistance.	- Refer to manual or teacher's instructions before proceeding with the use of this tester.

Paper cutter	- Used for cutting thin materials.	- Never place your fingers under the cutting blade. - Always make sure that the arm is locked down when not in use. - CAUTION: Sharp!
Planes (hand)	- Used for planing rough surfaces. - Used to obtain a smooth flat surface.	- Always handle plane blades with care as their edges are razor sharp. - Always take small cuts when planning a piece of stock. - Always retract the blade after use. - Keep the blade sharp at all times. - CAUTION: Sharp!
Pliers	- Useful for gripping and holding small parts for certain operations, or when assembling parts. - They should not be used to replace a wrench on nuts or bolts.	- Never use the pliers instead of a wrench. - Always keep the pliers clean and lubricated. - Never attempt to cut large diameter or hard material with pliers.
Punches/ Chisels	- Useful for cutting, layout work, driving straight pins and tapered pins and also for aligning holes in mating parts.	- Wear protective gloves and eyewear when using. - Keep tools properly sharpened and dressed. - Use care when holding. - CAUTION: Sharp!
Pullers	- Useful for separating two parts. - Always use the appropriate puller for the job.	- Do not use excessive force. - Use the appropriate puller for the job. - Ensure the puller is aligned and positioned properly. - Wear gloves. - Watch for falling or flying parts.

Saws (hand)	- Used to make cuts across the grain and with the grain. - Make fine cuts for joinery and cut small openings on fine work.	- Make sure the blade is sharp before use. - Keep hands away from the cutting action of the saw. - Never cut into nails or screws. - Always store the saw with the blade down and a secure cover. - Apply slow steady pressure when using. - CAUTION: Sharp!
Screwdrivers	- Select the screwdriver with the appropriate head for the job. - The length chosen should be sufficient to enable the screwdriver to be turned conveniently on the centerline of the screw.	- Never use the blade for prying or chiseling.
Scribers / Scratch all	- Useful for laying out lines.	- Keep the tool sharp at all times. - Always use common sense and care when using the scriber. - CAUTION: Sharp!
Sockets	- Used tightening and loosening nuts and bolts.	- Make sure the socket fits the bolt head or nut exactly.
Socket Handles	- Used to apply pressure to the socket.	- Make sure to use the proper handle for the job.

Soldering Iron	- Used to melt solder so that it can flow into the joint between two workpieces.	- Students will be instructed on the safe use of the soldering iron before using it. - Wear proper eye protection and appropriate clothing and confine long hair. - Make sure all guards are in place and operating correctly. - Avoid serious burns by treating all soldering equipment as though it was hot. - Handle all soldering equipment with caution. - Solder over the bench top to prevent hot solder from dropping on the operator's legs. - Always place equipment back in the holder after use. Never lay it on the bench.
Staplers	- Useful for attaching thin materials to surfaces.	- Never point and fire staples unnecessarily. - Keep hands away from the contact area.
Test light	- Used to determine if power is present.	- Never use a test light to test voltage that is alternating or higher than 12 volts. - Caution: Sharp point
Tin snips	- Useful for cutting and shearing thin materials.	- Use thin materials only. Never force the tool. - Keep hands clear of the cutting jaws. - Always keep the tool sharp. - CAUTION: Sharp!

Utility knife	- Useful for cutting and trimming thin material and to make accurate layouts.	- Use caution when cutting. - Always ensure the blade is retracted after use. - Never hand the knife to someone blade first. - Adjust the blade to the thickness of the material being cut. - Exert steady pressure when using the instrument. - Make sure the tool is kept in a vertical position when cutting. - Keep your hand behind the cutting edge.
Vises, clamps (Holding devices)	- Used to hold small work securely during various operations.	- Never overtighten work in vise. - Use caution when releasing the handle. (handle may drop and pinch fingers)
Wire stripper	- Used to remove outer plastic covering of electrical wire, cutting wires as well as crimping wires.	- Make sure the wires that are being serviced are not LIVE!
Wrenches	- Used for tightening and loosening operations. - Always select the proper size and type of wrench for the job.	- Always pull toward yourself. - Always be sure that the nut is fully seated in the wrench jaw.
Adjustable wrenches	- Used for tightening and loosening operations. - Adjust the wrench to fit the job.	- Always pull toward yourself. - Always be sure that the nut is fully seated in the wrench jaw.

Hand Drill Safety Guidelines

1. Students will be instructed on safe use of the hand drill before using it.
2. Wear proper eye protection and appropriate clothing.
3. Review manufacturer's manual for any special safety instructions.
4. Review any safety rules pertaining to use of portable electric tools.
5. Always disconnect the power before installing or removing drill bits.
6. Make sure the drill bit is clamped securely in the chuck.
7. Make sure to remove the chuck key before using the drill.
8. Secure or clamp your work before drilling.
9. Always allow the drill to stop before laying it down on the work surface.
10. Keep loose clothing away from rotating drill bits.
11. Never force the drill, apply steady pressure.
12. Use caution when drilling in walls or partitions, they may conceal electrical wires.

★ **Pay close attention to the operation being carried out and do not be distracted**
★ **Wear appropriate eye protection**

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March 31, 2019	New	Y. Bauer
Feb 15, 2022	Grammatical Fixes	A.Wilson
Feb 23, 2024	Checked procedures align with current practices	A. Wilson-Zegil

Drill Press Safety Guidelines

1. Wear safety eye protection while drilling.
2. Run drill at correct RPM for diameter of drill bit and material. Ask shop personnel for the correct RPM.
3. **Always** hold work in a vise or clamp to the drill table.
4. Use a correctly ground drill bit for the material being drilled. Shop personnel can help select the correct bit.
5. Use the proper cutting fluid for the material being drilled. Ask the shop staff about the appropriate fluid for the material you are machining.
6. Remove chips with a brush, **never** by hand.
7. Ease up on drilling pressure as the drill starts to break through the bottom of the material.
8. Don't use a dull or cracked drill. Inspect the drill before using.
9. Always try to support part on parallels or a backing board when drilling through material.
10. Always clean drill shank and/or drill sleeve, and spindle hole before mounting.
11. **Never** try to loosen the drill chuck while the power is on.
12. Lower the drill spindle close to the table when releasing the drill chuck or taper shank drill to reduce the chance of damage should they fall onto the table.
13. **Never clean a machine while it is in motion!**
14. If the drill binds in a hole, stop the machine and turn the spindle backwards by hand to release the bit.
15. **When drilling a deep hole, withdraw the drill bit frequently to clear chips and lubricate the bit**.
16. **Always remove** the drill chuck key, or, the drill drift from the spindle **immediately after using it.**
17. Let the spindle stop of its own accord after turning the power off. Never try to stop **the spindle with your hand.**
18. Plexiglass and other brittle plastics can be difficult to drill. Ask the shop supervisor for advice on drill and coolant selection when drilling these materials.

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Lathe Safety Guidelines

1. Students are not permitted to use the Lather without training and a mentor present.
2. Students will be instructed on safe use of the Metal Engine Lathe before operating it.
3. Wear proper eye protection and appropriate clothing.
4. Special attention should be given to long hair, rings, watches and any loose apparel.
5. Before turning on the power, check to see that the tailstock, tool holder, and job are properly clamped.
6. Do not leave a chuck wrench or any other tool in the chuck.
7. Never try to measure work or adjust a cutting tool when the lathe is running.
8. Always file left-handed and away from the chuck. Use a file with a properly approved handle.
9. Do not try to change gears when the lathe is running.
10. Do not remove cuttings with your hands. Use a brush.
11. Never make contact with moving parts.
12. Never leave the machine running while unattended.
13. Never stop the chuck with your hands: allow it to stop normally.

★ Pay close attention to the operation being carried out and do not be distracted.
★ Before starting a machine, always check it for the correct setup and always check to see if the machine is clear by operating it manually, if possible.

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Milling Machine Safety Guidelines

1. Students are not permitted to use the Mill without training and a mentor present

2. Students will be instructed on the safe use of the milling machine before operating it.

3. Wear proper eye protection and appropriate clothing.

4. Avoid ties, dangling jewelry and protect long hair.

5. Learn all the controls before turning on the machine to operate.

6. Fasten the work SECURELY in a vise or to the table.

7. If you are authorized to change the cutter, always make sure that your hands are well protected. CUTTERS ARE EXTREMELY SHARP and can inflict painful cuts to exposed flesh.

8. Make sure that the cutter is clear of the work before starting the machine.

9. Keep hands away from revolving cutters. NEVER reach over or around a revolving arbour to make an adjustment.

10. Do not check or measure work while the cutter is revolving.

11. Stop the machine and use a suitable brush to clean chips from the cutter or vise. Rags must NEVER be used near rotating cutters.

12. Do not walk away from the machine until it has come to a complete stop.

★ Pay close attention to the operation being carried out and do not be distracted.
★ Wear appropriate eye protection

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Band Saw Safety Guidelines

Read, understand and sign-off on the Basic Shop Rules.

1. Students are not permitted to use the Band saw without training and a mentor present
2. Students will be instructed on the safe use of the band saw before operating it.
3. Wear proper eye protection.
4. Avoid ties, dangling jewellery, loose clothing and protect your long hair.
5. Making sure the power is off, adjust the upper guide to clear the work piece. (1/8 “ max)
6. Allow the machine to reach full speed before beginning to cut.
7. Maintain and use push sticks whenever possible.
8. Avoid cutting sharper curves than the blade width allows. Use relief cuts.
9. Stop the machine before backing out of a cut.
10. Your hands must be to the side(s) rather than in front of the blade, and at least 2 inches from the blade.
11. The material must lie flat on the table.

★ Pay Close Attention to the Operation Being Carried Out and Do Not Be Distracted.
★ Never Leave the Saw Running and Unattended.
★ Wear Appropriate Eye Protection

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Grinding Safety Guidelines

1. Students will be instructed on safe use of the grinder before operating.
2. Wear proper eye protection and appropriate clothing.
3. Never bring hands or fingers near the revolving stone.
4. When stopping, stay with the machine until the wheel stops.
5. Before starting, check all wheels for visible cracks and listen for hidden cracks by tapping the wheel with a small steel rod.
6. Tool rest should be positioned securely, 1 to 3 mm from the stone.
7. When starting, always stand to one side.
8. Hold the work firmly on the tool rest and feed the work gradually against the wheel. Slide from side to side to prevent grooves.
9. Too much pressure or striking the wheel suddenly may cause it to fracture.
10. Never grind on the side of the wheel.
11. Clamp small pieces into a holder in order to grind.
12. Avoid burns and heat damage by placing work in the water pot frequently.
13. Avoid the use of gloves.

★ Pay Close Attention to the Operation Being Carried Out and Do Not Be Distracted.
★ Wear Appropriate Eye Protection

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Table Saw Safety Guidelines

Special training is required before using the table saw. You may not operate it without permission from the shop supervisor.

1. Students are not permitted to use the Table Saw without training and a mentor present
2. Students will be instructed on the safe use of the table saw before operating it.
3. Wear proper eye protection and appropriate clothing.
4. Avoid ties, dangling jewellery and any loose fitting clothing. Protect long hair.
5. Make sure all guards and safety devices are in place before proceeding.
6. Set the blade to project no more than 1/4 inch (6 mm) above the stock.
7. Never make any adjustments to the machine while it is running.
8. To avoid a kick-back, hold the board firmly against the guide fence through the entire rip sawing operation.
9. Stand to one side of the saw blade. If kickback occurs, you won't get hit by debris.
10. Always use a push stick when ripping stock. Hands must be at least 12 inches away from the blade at all times.
11. Do not make free hand cuts. The wood should be guided through the blade by either a rip fence or a mitre gauge.
12. Make sure the wood is guided completely through the blade before stopping the procedure.
13. When using long stock, make sure that someone is assisting you during the procedure.
14. Keep scrap clean from the saw table, and around the work area, but do so only when the blade is not in motion.
15. Never leave the table saw unattended while the blade is running. Wait until the blade has come to a full stop before you leave the area.

- ★ Pay close attention to the operation being carried out and do not be distracted.
- ★ Any procedures requiring that the guard be removed should be done by the teacher.
- ★ Blade changes and adjustments should be made by the teacher and with the machine power locked out.

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Power Hand (Skill) Saw Safety Guidelines

1. Students will be instructed on the safe use of the circular saw before using it.
2. Wear proper **eye protection and appropriate clothing**.
3. Check with the manufacturer's safety manual for any special safety instructions.
4. Make sure the **teeth of the blade are sharp and set correctly** and that the arbour nut is tightened properly.
5. **Always disconnect the power** before changing the blade or making any adjustments to it.
6. Use the correct blade for the work to be done.
7. Always allow **the blade to reach proper speed** before beginning your cut.
8. **Never stand in direct line** with the saw blade, the saw could bind and may kick back from the cut. Always keep your hands clear of the cutting line.
9. Always keep the guard in place and the blade adjusted to the correct depth of cut.
10. When your cut is finished, release the switch and make sure the blade has stopped completely before laying down the saw.

- ★ Pay close attention to the operation being carried out and do not be distracted.
- ★ Wear proper eye protection

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Disc and Belt Sander Safety Guidelines

1. Students are not permitted to use the Disc and Belt without training and a mentor present
2. Students will be instructed on safe use of the belt and disc sander before operating it.
3. Wear proper **eye protection and tie back hair.**
4. Avoid ties, dangling jewellery and loose clothing.
5. **Make sure that the sanding belt tracks properly**.
6. Avoid sanding over nails and screws.
7. Hold the work securely. Use the table for support.
8. Have the dust extractor system turned on and connected to the sander.
9. When replacing a belt make sure it is put on in the right direction (arrows inside the belt indicate rotation).
10. **Check** that the **sander does not have a torn belt or ripped sandpaper disk.**
11. Whenever possible, use a jig or fixture to hold the workpiece.
12. The space between the belt and the table should be at a maximum width of 1/16 of an inch.
13. **Do not sand any material that will give off dangerous dust. Such materials as beryllium or copper beryllium alloys must not be sanded or filed. Asbestos must not be sanded. Asbestos is an ingredient of brake shoes and pads**.
14. **Special precautions must be taken with FRP materials (Fiberglass Reinforced Plastics).** The glass fibers are irritants to the lungs. Dust respirator is mandatory and cleanup immediately. Consult with your mentor.

- ★ Pay close attention to the operation being carried out and do not be distracted.
- ★ Wear appropriate eye protection

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Welding Safety Guidelines

Spot Welding

1. Students will be instructed on the safe use of the spot welder before operating it.
2. Protect your head and eyes by wearing a welding helmet equipped with approved lens and cover glass. Observers must wear suitable eye protection.
3. Protect your skin by wearing leather or flame resistant canvas coats and gloves.
4. Remove combustible material and sweep the area before welding. Any immovable combustibles must be covered with metal or fire resistant guards.
5. Always place a suitable barrier around the work area to protect others from arc radiation.
6. Never strike an arc unless you and the onlookers have protective lenses in place.
7. The tips should be maintained in good order.
8. Ensure that ventilation will remove smoke and fumes.
9. Keep operable fire extinguishers close at hand and ready for an emergency.
10. When the job is complete, check the area for any hot or smoldering material. Ensure that it is extinguished.
11. When spot welding, always keep work areas, work pieces, equipment and clothing dry to avoid electric shocks.

    ★ Pay close attention to the operation being carried out and do not be distracted.
    ★ Wear appropriate eye protection

Arc/MIG/TIG Welding

Caution: Arc welding equipment uses high amperage and electric shock may occur. In some processes inert gases are also used and caution must be observed when changing tanks.

1. Students will be instructed on the safe use of the welders before operating them.
2. Use a proper welding shield (shade 10 minimum).
3. Notify others that you are about to weld if you are not in a protected welding booth.
4. When welding, the area should be free of water and your footwear dry.
5. When welding, the area should be free of combustible materials.
6. Ensure the ventilation system is turned on and working.
7. Always pick up hot pieces using tongs or pliers.
8. All welding equipment must be in proper operating condition, never use damaged equipment.
9. When chipping slag, keep the helmet on with clear glass in place.

★ Pay close attention to the operation being carried out and do not be distracted.

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Working with Solvents, Resins and other Chemicals

1. Learn about the chemicals that you are planning to use before opening them. Read the instructions and SDS sheet.
2. Use water-based cleaners instead of solvents where possible.
3. Avoid skin contact. Wear latex gloves.
4. Never smell, touch, taste unknown chemicals.
5. Work in a fume hood if possible. Respirators are available when necessary.
6. Do not use solvents around hot metal surfaces and flames.
7. Do not smoke or light flames in areas where solvents are used and stored.
8. Report and clean up any spills immediately.
9. Do not pour any chemicals down the drain. Waste containers are available in the solvent cabinet.
10. Only use solvents in well ventilated areas - do not work with them in confined, unventilated areas.
11. Do not drink alcoholic beverages or take medications containing alcohol before or during working with solvents. Alcohol in the bloodstream sometimes causes synergistic reactions with various solvents that can lead to loss of consciousness, and even possibly, death.
12. Report any ill effects and skin disorders to the area supervisor.
13. Develop and maintain good personal hygiene habits. Remove protective equipment and wash thoroughly after contact with solvents.
14. Fumes from paints, solvents, adhesives, and the abrasive cut-off saw used on the patio can drift into the shop. Work with staff to minimize these problems.
15. Mix resins in small batches.

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Safety Guidelines for Heavy Sanding of Wood and Foam

1. Sand in a well ventilated area away from other machines, only on the patio with the doors to the shop closed.
2. Use a vacuum or a dust collector to collect dust **while** sanding to prevent the dispersal over a large area.
3. A dust mask may be worn if desired. They are stored in the safety cabinet.
4. Safety glasses must be worn when sanding

Guidelines for Cleaning

1. Turn off the power to the machine before cleaning. This will avoid accidentally starting the machine and injuring yourself.
2. Remove cutting tools. Take out drill bits, mills and remove lathe tools to reduce the chances of getting cut. On the table saw lower the blade completely.
3. Put away all hand tools and other items around the tool so that you don't make them dirtier. Clean chips from the tool, the chip pans. Recycle clean chips where possible.
4. Put a light coat of way oil on the machine ways. Ask staff to show you where this oil is kept.
5. Sweep the floor in the area where you have been working.
6. Do not over use compressed air. Do not blow air into the bearing surfaces, and do not scatter chips all over the shop. Sometimes a shop vacuum works better than the air gun.
7. Report missing, broken or damaged tools to shop staff.
8. Spend five minutes on general cleaning around the shop. We're all in this together.

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How To Be Safe In Your Pit

Creating/Setting Up/Taking Down the Pit

- No more than five people, including mentors in the pit.
- Be careful of hands and fingers; they could get pinched
- Coordinate with your teammates, so that everyone is aware of what is happening
- Use ladders properly with at least two spotters
- Wear safety equipment
- Be careful with sharp objects; if you need to use cutting tools never point them at people

During Competition

- Sweep the floor after the robot leaves
- Keep all tools in their proper places
- Use any tool with the proper care and handling
- Wear safety glasses at all times in the pit area
- If you are using machinery, make sure everyone is aware
- No loose clothing
- Tie back long hair
- Be Aware of Emergency Procedures
- Handle Batteries Safety and Carefully
- Seek out and correct potential Safety Violations
- Use the proper Personal Protective Equipment
- Do everything carefully, don’t rush through things
- Make sure all team members have enough rest, water, and food
- Don’t be afraid to ask for help
- Report and Treat all Injuries

Appendix 1 - Training Record

Name		**Grade**	
Emergency Contact			
Contact Name		**Phone Number**	

I _____, agree to follow the FIRST Team 6865 safety rules.

_____ _____

Participant Signature Date

_____ _____

Parent Signature (if under 18) Date

Training	Date	Mentor	Student
Bronze Safety Quiz Badge			
Basic Shop Rules			
Drill Press			
Lathe			
Milling Machine			
Band Saw			
Grinding			
Table Saw			
Disc and Belt Sander			
Welding			
Chemicals			

Appendix 2: Safety Captain Checklists

Hourly Pit Safety Checklist

Checklist	All clear time	Safety Captain Initials
❑ Floor is swept		
❑ Tools not being used are put away/stored properly		
❑ Tools being used are following proper safety procedures		
❑ Batteries are stored properly		
❑ Everyone is wearing safety glasses		
❑ Everyone is wearing proper shoes		
❑ All long hair is pulled back/Keys or necklaces		
❑ No baggy clothes		
❑ Everyone is aware of any equipment currently being used		
❑ No tripping hazards		
❑ No more than five people in the pit (1 mentor max)		
❑ No food or open drinks		

Appendix 3: Safety Captain Checklists

BEE SAFE! FIRST Robotics Team Wellness Checklist

Team: _____ Date: _____ Time: _____

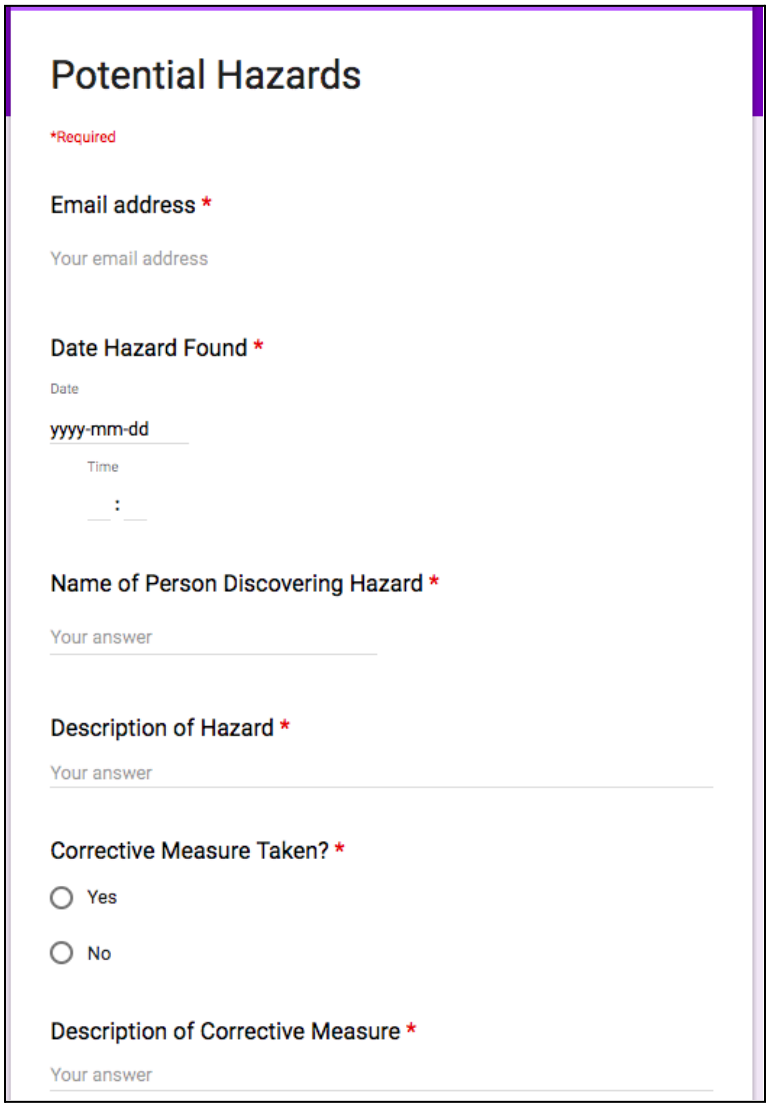
Team Member	Last time you drank water?	Last time you ate?	Are you well rested?	Any soreness or stiffness?	Any injuries? Explain	Feeling good?	Is anything making you feel uncomfortable or stressed?	Are you having fun?
Follow-up needed:								

Safety Captain Sign-off: _____

Courtesy of Team 6865 Manitoulin Metal. Duplicate form as needed.

Appendix 4: Potential Hazards Online Form

The Hazard Tracking form (http://bit.ly/MSSsafety) is used to track potential hazards. This form is used if something unsafe is spotted or if it has injured someone already. It indicates what corrective measures have been taken to make Team 6865 safer.



Potential Hazards

*Required

Email address *

Your email address

Date Hazard Found *

Date

yyyy-mm-dd

Time

:

Name of Person Discovering Hazard *

Your answer

Description of Hazard *

Your answer

Corrective Measure Taken? *

Yes

No

Description of Corrective Measure *

Your answer

Appendix 5: FIRST Team 6865 Incident Report

Injured Person's Name _____

Date_____ Time _____

Name of Person Completing Report _____

Injury_____

Witness(es) _____

Detailed description of how the injury occurred

_____
_____
_____
_____
_____
_____
_____
_____

Detailed description of how the injury was treated

_____
_____
_____
_____
_____

How to Prevent future incidents _____
_____
_____

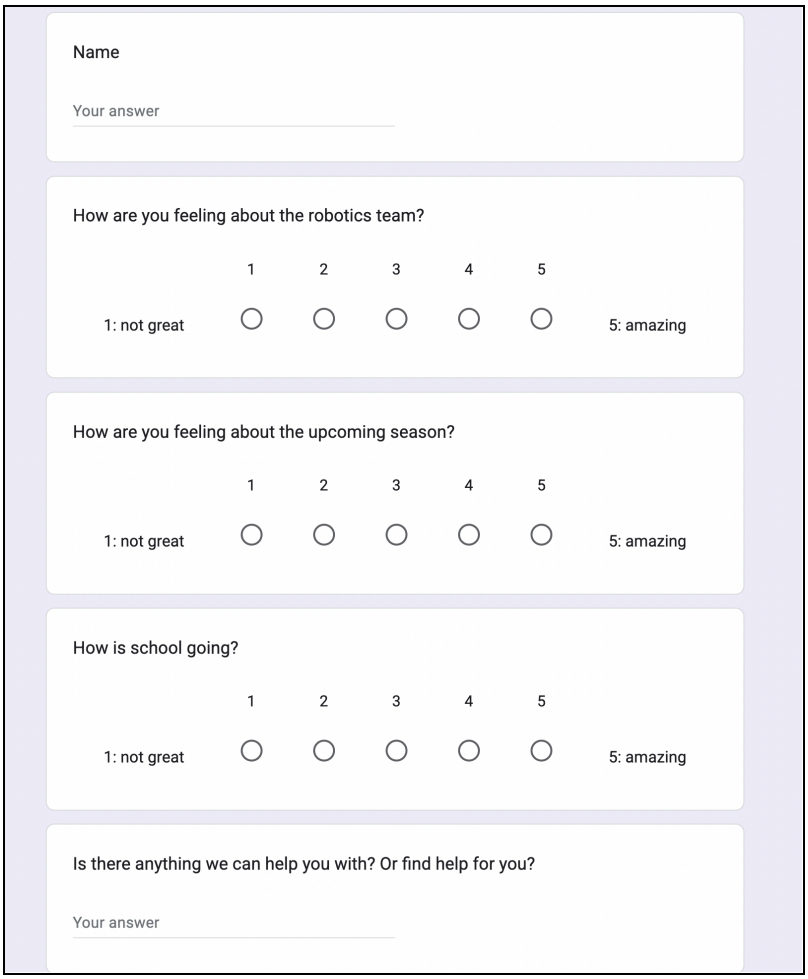
Injured Student's Signature _____

Safety Captain Signature _____

Adult/Mentor Signature _____

Appendix 6: Wellness Check-in form

The Wellness Check-in is a voluntary form (https://bit.ly/6865checkin) that can be filled out by students throughout the year and at competition. It helps the wellness team and mentors support students who might be struggling.



Name

Your answer

How are you feeling about the robotics team?

	1	2	3	4	5	
1: not great	○	○	○	○	○	5: amazing

How are you feeling about the upcoming season?

	1	2	3	4	5	
1: not great	○	○	○	○	○	5: amazing

How is school going?

	1	2	3	4	5	
1: not great	○	○	○	○	○	5: amazing

Is there anything we can help you with? Or find help for you?

Your answer

Wellness Safety Outreach

Safety is an issue that is really important to our team. We want to ensure, first and foremost, that all of our team is healthy and that they sustain no injuries, both mentally and physically. This year we are focusing on expanding our newly formed Wellness team. A sub-team created out of last year's Wellness Initiative. We know that competitions can be stressful and we want to make sure that everyone involved is safe and taking care of themselves properly.

> According to Statistics Canada[1] 33% of people working in the skilled trades report having a mental illness. Construction and engineering are reported to be the two most stressful professions. Wellness in the workplace increases productivity, has fewer injuries, and decreases absenteeism. According to the World Health Organization[2] mental illnesses cost the global economy 1 trillion dollars in productivity per year.
>
> In the past, team 6865 has made sure our own team has stayed healthy by having a wellness checklist for each member. This year, we are taking it one step further, in that we are going to provide every team at events we attend with a wellness checklist they can fill out for each of their team members. Things like drinking water and stress levels are often neglected but are quite important to maintain. In addition to the checklist, we are having each member carry around a small safety kit which includes a band-aid, hand sanitizer, extra safety glasses, hair ties, and alcohol swabs. A few of these safety kits will also be given to each team at events. Lastly, a survey will be posted in our team's google classroom that will be available for people to fill out year round. This survey is for students to privately ask for mental health help.

Future Plans

Next year, team 6865 is planning to run more FLL explore teams as an Outreach Project, aiming to put special emphasis on instilling safety in children. So that they can stay interested in robotics and hopefully join a team in secondary school.

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[1] "Making Headway on Mental Health | Express Scripts Canada." https://www.express-scripts.ca/news-room/important-information/Making-Headway-on-Mental-Health. Accessed 27 Feb. 2020.
[2] "Mental health in the workplace - WHO." https://www.who.int/mental_health/in_the_workplace/en/. Accessed 27 Feb. 2020.