ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

MANUFACTURING TECHNOLOGY

SAFE DOC

SAFE ACTIVITY FOUNDATIONS IN EDUCATION DOCUMENT

Revision May 2013, Revision July 2022, Revision July 2026

TMJ20	Manufacturing Technology: Open
TMJ3E/4E	Manufacturing Technology: Open
TMJ3C/4C	Manufacturing Technology: TMJ3 Prerequisite
TMJ3M/4M	Manufacturing Technology: TMJ4 Prerequisite

TMM3M	Manufacturing Engineering Technology: Mechanical Engineering
TMR3M	Manufacturing Engineering Technology: Robotics and Control Systems
TMC3C	Manufacturing Technology: Computer Aided Manufacturing
TMI3C	Manufacturing Technology: Industrial Maintenance
TMP3C	Manufacturing Technology: Precision Machining
TMT3C	Manufacturing Technology: Robotics and Control Technician
TMY3C	Manufacturing Technology: Welding Technician
TMO3E	Manufacturing Technology: Machine Operator
TMS3E	Manufacturing Technology: Sheet Metal
TMW3E	Manufacturing Technology: Welding
TMM4M	Manufacturing Engineering Technology: Mechanical Engineering
TMR4M	Manufacturing Engineering Technology: Robotics and Control Systems
TMC4C	Manufacturing Technology: Computer Aided Manufacturing
TMI4C	Manufacturing Technology: Industrial Maintenance
TMP4C	Manufacturing Technology: Precision Machining
TMT4C	Manufacturing Technology: Robotics and Control Technician
TMY4C	Manufacturing Technology: Welding Technician
TMO4E	Manufacturing Technology: Machine Operator
TMS4E	Manufacturing Technology: Sheet Metal
TMW4E	Manufacturing Technology: Welding

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This resource was produced by the Ontario Council for Technological Education (OCTE) in support by the Ministry of Education it may be used in its entirety, in part, or adapted.

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Disclaimer

This material was designed to assist teachers implement the Ontario Curriculum – Technological Education (revised Grade 9 -12), but is fully adaptable to the Ontario Curriculum Grade 1 – 8 Science and Technology curriculum. This material was created by members of the Ontario Council for Technology Education (OCTE) subject association and is intended as a working guide for classroom, lab or shop activities. Permission is given to reproduce these materials for any purpose except profit. Teachers are encouraged to amend, revise, edit and adapt this material for educational purposes. Please acknowledge the source in all uses. Any references in this document to particular to commercial resources, materials or equipment reflect only the opinions of the writers of this material, and do not reflect any official endorsement by the Ontario Council for Technology Education, the Ontario Ministry of Education, or any other agency or government body.

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SECTION 1: GENERAL

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Safe Activity Foundation in Education (SAFEdoc): Manufacturing

This **SAFEdoc** was designed to provide safety information, posters, safety passports, and safety resources for all technology educators. While originally developed as a resource for the course profiles, it is available for any grade level or any technology education environment.

The **SAFEdoc** has been created for eleven separate disciplines per Ontario Ministry Courses:

- Communications (COM)
- Hospitality and Tourism (HOST)
- Computer Engineering Technology (CET)
- Manufacturing (MANU)
- Construction, Custom Woodworking (CONS)
- Technological Design (DESIGN)
- Green Industries (GREEN)
- Transportation (TRANS)
- Hairstyling and Aesthetics (H&A)
- Technology and the Skilled Trades (TAS)
- Health Care (HC)

Please note that due to the cross-curricular nature of Technological Education, there may be a need to refer to other **SAFEdocs** for cross-discipline data sheets. For example, a Health Care teacher may need to utilize food production and handling equipment, therefore may need to refer to the HOST SAFEdoc. Teachers are encouraged to download **ALL SAFEdocs** for reference.

Teachers are encouraged to add to this **SAFEdoc** with data sheets, tests or other materials on an ongoing basis. Additions or revisions to this document will be posted on the Ontario Council for Technology Education (OCTE) website (OCTE) periodically.

This document is a practical safety resource that compliments and elaborates on other recommended resources for technical teachers. See the appendix for

linking information such as the Young Workers Awareness Program, and industry associations dedicated to safe working practices.

It is imperative that all students are made aware of the issues of health and safety particular to your class, and that you have assessed and evaluated their understanding before they are allowed to work in a shop environment or on specific procedures or tools. The use of Safety Passports, Safety Agreements, and Safety Tests (provided in this document) is highly recommended.
NOTE: While it is important to give students initial safety training and testing at the beginning of the semester, it is also important to practice **JIT Safety Training** (Just In Time). Reinforce specific safety procedures and rules each day before initiating new procedures or using equipment. For example, before students use a bandsaw, review the setup and ask key questions of students before allowing its use.

Usage of the SAFEdocs

Teachers are encouraged to use and modify this document as they see fit. Individual pages may be directly printed, or custom formatting may be applied for printing any part of the document. General Guidelines may be used in Board or school policy documents. Safety Guidelines may be used as student handouts, as a teacher reference for tests, or printed and mounted as posters around equipment.

The **SAFEdoc** also contains sample Safety Passports. These can be used as verification that students have been trained and understand the safety aspects of each equipment or procedure they need to use to accomplish their tasks. There are several formats that may be used. Teachers are encouraged to keep consistent records at all times.

It is important that teachers are knowledgeable about their own Board and school policies regarding safety, and that they are familiar with local municipal regulations.

Responsibilities for Safety

[from the Ontario Ministry of Education, The Ontario Curriculum (Revised)2009, Technological Education, Grade 11 and 12(page 33), The Ontario Curriculum Technology and the Skilled Trades, Grade 9 and 10(page 28,29)]

Health and safety is of paramount importance in technological education. In every course, students must be made aware that health and safety is everyone's responsibility at home, at school, and in the workplace. Before using any piece of equipment or any tool, students must be able to demonstrate knowledge of how the equipment or tool works and of the procedures they must follow to ensure its safe use. Personal protective gear must be worn as required.
Classroom practice and all aspects of the learning environment must comply with relevant municipal, provincial, or federal health and safety legislation, including the following:

- the Ontario Workplace Safety and Insurance Act
- the Workplace Hazardous Materials Information System (WHMIS2015)
- the Food and Drugs Act
- the Ontario Health Protection and Promotion Act
- the Ontario Building Code
- the Occupational Health and Safety Act
- local by-laws

Teachers should make use of all available and relevant resources to make students sufficiently aware of the importance of health and safety. These resources include:

Ministry of Labour, Immigration, Training and Skill Development – website (http://www.labour.gov.on.ca/english/) and related resources
WSIB Young Workers Awareness – website (WSIB - Young Worker Awareness Program) and related resources
Workplace Safety and Insurance Board (WSIB) – website (WSIB) and related resources
Workplace Safety and Prevention Services (WSPS) – website (Workplace Safety & Prevention Services) and related resources
Canadian Centre for Occupational Health and Safety (CCOHS) – website (CCOHS) and related resources

Ontario Ministry of Health – website (Ministry of Health | ontario.ca) and related resources
Appropriate Safe Workplace Associations (SWAs) and clinics, such as:
the Infrastructure Health & Safety Association of Ontario (IHSAO) – website (IHSA)
the Workers Health & Safety Centre (WHSC) – website (Workers Health & Safety Centre)
the Occupational Health Clinics for Ontario Workers (OHCOW) – website (OHCOW)

Teachers should also be aware of the Occupational Health and Safety Act, Regulations 857, Amended to O. Reg. 352/91. The Occupational Health and Safety Act can be found at:
http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_900857_e.htm

Delegating the Responsibilities for Safety

There are key areas of responsibility that must be clearly delegated for all technological subject areas and they must be addressed for their individual board, school and facility.
These may include administration, department heads, technology teachers, students, board facilities, custodian/maintenance and other local partners or board-defined roles.

**** An original source of this delegation example has been adapted from the Toronto District School Board – Experiential Learning Department – Technological Education 'Front Matter' for the purposes of the SAFEdoc revision 2013. Please note that this section is not original to the SAFEdoc writers but is a result of collaboration between the TDSB and OCTE. This in no way refers to any responsibility to the TDSB for this information, and has been provided as a guideline reference only.***

Administration

The responsibility rests with the Principal or his or her designate to ensure that each Technological Education Teacher has received the information and instruction on the safe use of equipment in the classroom.
In order to achieve safety goals, the School Board, Superintendents and Principals should:

1. establish and maintain a written Board safety policy and program
2. emphasize and enforce the safety policy and procedures
3. ensure that each Teacher has been satisfactorily trained on the use of equipment within the classroom
4. ensure in-service education sessions are held for Teachers concerning the safety policy and procedures therein, such as machine guarding, lock-out, fire prevention, first aid, personal protective equipment
5. be aware of current legal issues about liability for classroom accidents; ensure that such is part of in-service sessions for staff
6. assist and encourage the teacher to correct and avoid situations that could result in liability to the Teacher and the school
7. provide for proper safety equipment in all technology areas
8. hold staff accountable for safety practices in their respective areas
9. analyze accident records in order to determine the most frequent causes of accidents and the more severe types of accidents
10. take corrective measures to change accident-causing conditions
11. ensure that staff health and safety training and information is current
12. make safety literature, posters, and safety promotional material available to all persons associated with the technology program
13. set up a program for the safety orientation for new staff
14. ensure that all Occasional Teachers working in the Technology areas are informed about and understand the standard accident and emergency procedures
15. not permitting the overcrowding of classes, taking into account the physical size of a room, the arrangement of the equipment, furniture and facilities in the room, and the kind of activities that are being carried out in the room
16. ensure that the use of space has not changed unless changes have been designed by a qualified architect or engineer
17. at the beginning of the year/semester, make the Technological Education Teacher aware of any student medical condition that could result in a safety problem
18. ensure that individuals are designated to be responsible for safety in the Technology Department
19. limit after-hours access to the Technological Education facilities and equipment to qualified personnel

Department Heads / Curriculum Chairs/Program Leaders

The Department Head is the intermediary between the individual Teacher and Administration. Each Department Head is accountable to his or her Principal to ensure input into the administrative process and enforcement of both the Occupational Health and Safety Act and Board policies.

The Department Head should:

1. ensure that each Technology area has a floor plan posted in a strategic place to show the locations of items such as:
    a. fire extinguishers
    b. school Defibrillator
    c. posted emergency phone numbers
    d. fire blankets
    e. emergency power stop buttons
    f. emergency kit
    g. eyewash station(s)
    h. emergency exits
    i. special shut-off valves (gas, etc.)
    j. nearest fire pull station
2. ensure that a first-aid kit is available in each Technology area
3. ensure there is Personal Protective Equipment (PPE) available for Technology staff
4. ensure implementation and understanding of the safety policies and procedures. This includes developing specific departmental safety procedures or rules for specific areas.
5. ensure a designated Teacher is responsible for specific areas of safety in his or her specific areas
6. inform the Principal when the physical condition or other factors in the classroom may detrimentally affect safe instruction
7. when a program is disbanded, ensure equipment is locked-out and room is not accessible (rekeyed)
8. inform the Principal, in writing, of any known or potential safety hazard
9. encourage the use of safety posters, literature, and audiovisual aids
10. advise the Technological Education staff to ensure that all student projects are able to be completed with safety guards in place.
11. Keep safety guard and anti-kickback devices in position, if possible. Use approved alternate safety devices where appropriate.

12. advise Teachers to ensure that safety guards are placed back immediately when process is finished
13. where applicable, ensure that there is an appropriate spill kit and spill procedure present
14. develop, implement, and post a standard accident emergency procedure in each Technology area
15. ensure that current inventories of Material Safety Data Sheets (SDSs) are maintained
16. ensure that no unapproved or unsafe equipment, materials, or procedures are used in the area. Equipment should be purchased through Board-approved vendors.
17. advise Technology staff that any equipment deemed not to be safe must be taken out of service immediately, tagged, locked out, and reported to the Principal
18. advise the Technological Education staff to ensure that no practical shop work requiring the use of tools shall take place during their absence or when an unqualified Teacher in Technological Education is supervising the class
19. advise any certified Occasional Technological Education Teacher working in a specific subject area not to engage in practical work until familiar with the shop environment
20. encourage the Technology staff to receive first-aid training
21. ensure that all accidents and incidents are recorded and reported on the appropriate forms
22. conduct, along with the Health and Safety representative where appropriate, a follow-up analysis of all accidents and incidents
23. notify the Chief Custodian, Facility Services of any special needs or deficiencies in the area
24. review, at least annually, all procedures and rules

Technology Teacher

In order to provide a safe environment for students involved in any Technological Education course, the following procedures must be adhered to:

1. Teachers must be aware of their Board Safety Documents that outline safety procedures for machinery, tools, equipment, and procedures by completing advised Board Training.
2. Use of Board Safety Documents is required as the minimum basis for safety instruction. Enhancements and additions to these documents are permitted to meet program needs.
3. Students must receive instructions on the safe and proper operating procedures for specific machinery and equipment by a qualified Technological Education Teacher before permission is given to use tools, machinery, and equipment. The following excerpt from the Ontario Curriculum document for Technological Education explains this point further:
    a. ***Teachers are responsible for ensuring the safety of students during technology lab, shop, and classroom activities. Health and safety issues must also be addressed when learning involves cooperative education and other workplace experiences. Teachers need to encourage and motivate students to assume responsibility for their own safety and the safety of others, and they must help students develop the knowledge and skills needed for safe participation in all technology-related activities. For these reasons, teachers must model safe practices at all times and communicate safety expectations to students in accordance with school board policies and procedures, Ministry of Education policies, and Ministry of Labour regulations.***
4. To carry out their responsibilities with regard to safety, it is important not only that teachers have concern for their own safety and that of their students, but also that they have:
    a. the knowledge necessary to use the materials, tools, and procedures involved in science and technology safety
    b. the skills needed to perform tasks efficiently and safely

5. ***Note: Teachers supervising students using power equipment such as drills, sanders, and saws need to have specialized training in handling such tools. This specific training requirement applies to listed equipment in all areas of technology education specialization.***
6. Teachers of Technological Education courses must carefully maintain records of student attendance and records of safety instruction given.
7. Teachers are expected to be able to provide documentation:
    a. that the student was present on the date each safety lesson was taught (dated lesson plans, attendance records clear and unambiguous)
    b. of the safety lesson that was delivered (e.g., PowerPoint, note taking, signed safety pledge, pre-printed sheets, successful passing on an announced written test that is dated and stored by the teacher, correction of errors completed)
    c. that indicates student understanding of the safety lesson (e.g., completed evaluation tool, student notes)
    d. of how students are reminded of safe practice throughout the course (e.g., notation in teacher daybook)
    e. that the work and learning environments are kept safe, tidy, and in good condition (e.g., photos, focus on machines with guards in place, maintenance records, safety inspections, cleanup procedures, student safety stewards, modeling of best practices), and that the Head Caretaker is informed of any maintenance issues
    f. that students' different learning styles and needs are taken into account, both during the delivery of the safety lessons and during any follow-up evaluation (e.g., use of visuals, opportunities to demonstrate understanding orally)
    g. that safety procedures are explained using various strategies such as verbal explanation, demonstrations through modeling, and accompanied by both written and pictorial explanations that are posted throughout the work and learning environments
    h. those accommodations and, if necessary, modifications are made to the curriculum and included in the Individual Education Plan (IEP) in the event that the student cannot manage all curriculum expectations safely

i. that each student has signed the annual acknowledgment form, stating that he/she has been informed of the safety procedures

LOCKING OUT AND TAGGING OUT EQUIPMENT

The process for Teachers for locking out and tagging out equipment is as follows:
If the equipment can be locked out by way of a power switch located on the actual piece of equipment, by use of a padlock, then the Teacher can lock it out.
If the power cannot be locked out at the equipment, then the Head Caretaker must be notified and the power should be locked out at the panel box. Lockout is always required when repairs/adjustments are being performed on any piece of equipment.
Once the equipment is locked out, it must be "Tagged Out" by attaching an appropriate tag in a conspicuous location, showing the worker's name and reason for lockout, along with the date and time.
Notify the school Administration and the Head Caretaker once lockout and tag-out have occurred.

Students

Students demonstrate that they have the knowledge, skills, and habits of mind required for safe participation in Science and Technology activities when they:

1. maintain a well-organized and uncluttered workspace
2. follow established safety procedures
3. identify possible safety concerns and bring this to the attention of the teacher
4. suggest and implement appropriate safety procedures
5. carefully follow the instructions and example of the Teacher
6. consistently show care and concern for their own safety and that of others

Board Facilities

1. Inspect the Technology areas on at least an annual basis with respect to maintenance items such as gas leaks, electrical outlets, safety indicators or signs, ventilation, and any other potential hazards.

2. Report the results of the inspection to the principal.
3. If work is planned in a Technology area, ensure the Teachers are informed and check for special hazards which may be present.
4. Before working in a shop or on any of the shop services, inform the Teacher what will be done, and when the work will be starting and finishing. The classroom Teacher is responsible for ensuring that the work area within the room is free from physical and chemical hazards.
5. In situations where the hazard cannot be totally removed, specific work procedures must be developed in conjunction with the Teacher and the Health and Safety Officer.

Custodian / Maintenance

Daily removal of garbage, scraps, and waste must be organized and coordinated with the Caretaking staff. Note the policies and responsibility related cleaning varies from school board to school board as it relates to collective bargaining, therefore the teacher/department head is encouraged to consult with the head custodian and the school board health and safety officer to determine who is responsible for cleaning of hoppers, dust collectors, filters and ducts.

1. Be aware of the hazards in the Technological Education areas.
2. Know the hazard warning signs and symbols and proper safety precautions.
3. Do not handle unfamiliar materials. Do not handle or move chemicals in the shop.
4. In the event of an emergency or concern, know the individuals who should be contacted and how to reach them.
5. Know the proper handling and disposal of materials before disposing.
6. If the contents of any containers are spilled, the school must adhere to the Spill Procedures. DO NOT TOUCH OR ATTEMPT TO CLEAN UP. Contact the Principal or your supervisor, who will then contact the appropriate person/department.
7. Ensure that the Technology shops are secure during non-class hours after school, and at night. This is especially important if the school building is used after school by the community user groups.

Safety Perspective Overview

Health and Safety Resources and Curriculum

These resources identify safety rules associated with hazards and processes. They are applicable to a wide range of occupations and situations.
e.g. Occupational Health and Safety Act,1990, Live Safe! Work Smart!
Based on the Ontario curriculum this resource contains safety lessons for technology subjects

Classroom Safety Resources

These resources identify safety policies and procedures that ensure the safety of people in schools.
e.g., WHMIS 2015 Training Sessions, Board Safety Policies, **SAFEdocs**- These resources provide a framework for developing safety procedures in school classrooms
It is highly recommended that all teachers complete an **OCTE SafetyNET** template for their individual experience / program / classroom / school / board. This is an excellent starting point for self-reflection and preparation for MOL/MOE inspection.

Standard Operating Procedures (SOPs)

These resources are Just-in-Time (JIT) safety rules. They are applicable to specific equipment in the facility and may apply to specific hazards associated with a program emphasis. These rules are developed at the classroom/school level to implement safe work practices. They may be adapted from a variety of sources including equipment manufacturer's manuals. A summary is often posted near equipment.

Safety Management

The teacher develops these resources. The daily classroom safety routines and policies are based on the above safety resources and applied to each individual facility/classroom. Protocols developed to teach safe behaviour directly should include managing safe work practices and behaviour through demonstration and reinforcement of safe working procedures, establishment of clear safety rules, safety passports, assignments, quizzes, and research.

Again, it is highly recommended that teachers complete a **SafetyNET** template to review their unique projects and procedures and consider risks as advised by **OSBIE**, and other professional health and safety partners.

Safety Topics for the Classroom

*The following are suggested topics for teaching in the classroom. See **Appendix A** for available resources pertinent to general safety and particular safety rules and procedures for your subject area. See **Appendix B** for specific resources, SOPs or links that are associated with Manufacturing Technology. See also your Board, school and relevant municipal policies for local safety rules and procedures.*

Emergency Procedures - procedures for handling fire, security threats, and other emergencies

First Aid - procedures for handling breathing difficulties, bleeding, burns, allergic reactions, epileptic seizures, etc.

Hand Washing Health Canada procedures for hand washing require hand washing for at least twenty (20) seconds.

Personal Protective Equipment - use of eye, hearing, foot, body, respiratory protection

Ergonomics - safe posture when using equipment, avoiding repetitive stress injuries

Material Handling - procedures for safely handling heavy loads, chemicals, potentially hazardous materials

Housekeeping and Storage - procedures and rules regarding maintaining safe facilities and proper storage of materials and equipment

Fire Protection - location and types of fire protection equipment, procedures to follow in the event of a fire or fire alarm

WHMIS 2015 - Workplace Hazardous Materials Identification System 2015 governs the identification and safe use of hazardous materials

Communication

It is important to the safety of all students and staff at a school that safety be taught and reinforced daily. Some basic methods of communication are:

- Safety Notice Board, containing posted minutes from the joint health and safety committee and the Occupational Health and Safety Act (must be posted by law)
- visible WHMIS 2015 binders, symbols and SDS sheets
- readily available manuals for the operation of various types machinery, tools or equipment
- safety posters around major equipment and work areas
- clear and precise instructions, reinforced each time a procedure or equipment is used
- clearly marked areas that contain safety items such as fire extinguishers, eye wash stations, first aid kits, etc.

Safety Expectations

*The following are safety related expectations from **The Ontario Curriculum 2009 (Revised)** - **Technological Education** and **The Ontario Curriculum Technology and the Skilled Trades (TAS) 2025** for:*

TAS2O or TMJ2O Manufacturing Technology
Grade 10, Open

A4. APPLYING HEALTH AND SAFETY PRINCIPLES

A4.1 describe relevant health and safety regulations for a variety of settings, including mandated roles and responsibilities
A4.2 identify hazards in their environment, and apply strategies to minimize risks
A4.3 use tools and equipment safely, including using personal protective equipment and safety devices according to safety standards and regulations, as appropriate
A4.4 follow practices that support physical and mental health and well-being
A4.5 follow proper procedures for the safe handling, storage, and disposal of materials and waste products
A4.6 demonstrate a safety mindset by making safety a priority at all times and by engaging in industry-specific safety procedures

TMJ3M - Manufacturing Engineering Technology
Grade 11, University/College Preparation

B. MANUFACTURING TECHNOLOGY SKILLS

B3. demonstrate the safe and appropriate use of tools and equipment in the manufacture of a product or the development of a production process;
B3.3 demonstrate the safe and proper use of appropriate hand tools, machine tools, and equipment (e.g., files, wrenches, hack saws, electric drills, engine lathe, milling machine, planer, jointer, drill press, welder) during a manufacturing process or in the assembly or fabrication of a product
B3.4 demonstrate safe workplace practices and behaviours (e.g., follow instructions, keep the work area clean and dry, don't distract other workers) when using materials, tools, and equipment to manufacture a product.

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES

D1. demonstrate an understanding of and compliance with the health and safety legislation, standards, and practices that are essential to the safe operation of a manufacturing facility;
D1.3 handle materials safely and appropriately in compliance with the information included in the Safety Data Sheets (SDS) from the Workplace Hazardous Materials Information System (WHMIS 2015);

D1.4 demonstrate an understanding of procedures to ensure safe and productive work practices in the manufacturing workplace (e.g., perform safety inspections and audits that include ergonomic considerations related to workshop layout and set-up, material handling, ease of movement, lighting, workstation set-up);
D1.5 demonstrate the safe use of tools and equipment in compliance with safety manuals, instructions, and institutional requirements;
D1.7 use protective clothing and equipment as required to ensure their own and others' safety in the work environment.

TMJ3C - Manufacturing Technology
Grade 11, College Preparation

B. MANUFACTURING TECHNOLOGY SKILLS
B4. use tools, equipment, and machine processes safely and correctly in the manufacture of a product.
B4.2 use appropriate procedures (e.g., correct machine set-up, operational safety procedures) when setting up, maintaining, using, and storing tools and equipment used in manufacturing and production processes;

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES
D1. demonstrate an understanding of and compliance with health and safety legislation, standards, and practices related to the manufacturing industry;
D1.3 handle materials safely and appropriately in compliance with the information included in the Material Safety Data Sheets (SDS) from the Workplace Hazardous Materials Information System (WHMIS2015);
D1.4 demonstrate an understanding of procedures to ensure safe and productive work practices in the manufacturing workplace (e.g., perform safety inspections and audits that include ergonomic considerations related to workshop layout and set-up, material handling, ease of movement, lighting, workstation set-up);
D1.5 demonstrate the safe use of tools and equipment in compliance with safety manuals, instructions, and institutional requirements;
D1.7 use protective clothing and equipment as required to ensure their own and others' safety in the work environment.

TMJ3E - Manufacturing Technology
Grade 11, Workplace Preparation

B. MANUFACTURING TECHNOLOGY SKILLS

B4. demonstrate a working knowledge of the purpose, characteristics, and safe use of various hand tools, machine tools, power tools, and equipment used in the manufacture of products.

B4.1 demonstrate the correct selection and safe and proper use of hand and power tools and/or equipment (e.g., lathe, mill, drill press, wrenches, tin snips, shears, rivet guns, foot and hand brakes, rollers, bar folds, punching and notching machines; equipment for shielded metal arc welding [SMAW], gas metal arc welding [GMAW], and gas tungsten arc welding [GTAW]; spot welder, plasma cutter, oxy-fuel torch, soldering gun) when manufacturing a product;

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES

D1. demonstrate an understanding of and compliance with health and safety legislation, standards, and practices as they relate to processes, materials, tools, and equipment used in manufacturing;

D1.3 handle materials safely and appropriately in compliance with the information included in the Safety Data Sheets (SDS) from the Workplace Hazardous Materials Information System (WHMIS2015);

D1.4 describe health and safety roles, responsibilities and procedures in manufacturing (e.g., concerning choice of equipment and materials, maintenance of equipment, storing of materials and equipment, inspection of facilities and equipment, in-service and training);

D1.5 demonstrate the safe use of tools and equipment in compliance with safety manuals, instructions, and institutional requirements;

D1.6 use protective clothing and equipment as required to ensure their own and others' safety in the work environment.

TMJ4M - Manufacturing Engineering Technology
Grade 12, University/College Preparation

B. MANUFACTURING TECHNOLOGY SKILLS

B3. demonstrate the safe and effective use of tools, equipment, and materials in the production of a product or the development of a production process;
B3.1 demonstrate the skills required to safely operate machine tools and equipment (e.g., engine lathe, milling machine, drill press; equipment for gas tungsten arc welding [GTAW] and gas metal arc welding [GMAW]) in the assembly or fabrication of a product;
B3.4 demonstrate the safe and proper use of advanced cutting processes (e.g., plasma, laser,water jet);

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES

D1. demonstrate an understanding of and compliance with health and safety legislation, standards, and practices, including methods to address deficiencies, as they relate to the manufacturing industry;
D1.4 handle materials safely and appropriately in compliance with the information included in the Safety Data Sheets (SDS) from the Workplace Hazardous Materials Information System (WHMIS 2015);
D1.8 use and maintains protective clothing and equipment as required to ensure their own and others' safety in the work environment.

TMJ4C - Manufacturing Technology
Grade 12, College Preparation

B. MANUFACTURING TECHNOLOGY SKILLS

B4. use appropriate tools and equipment and a variety of manufacturing processes when planning and manufacturing a product to meet specifications.
B4.1 demonstrate a working knowledge of the skills required to properly select and safely operate hand tools, machine tools, and equipment (e.g., wrenches, electric drills, grinders, engine lathe, milling machine) when manufacturing a product;

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES

D1. demonstrate an understanding of and compliance with health and safety legislation, standards, and practices, including methods to address deficiencies, as they relate to the manufacturing industry;
D1.2 describe and assess ways to promote safe and productive work practices in the manufacturing workplace (e.g., develop and use a safety checklist for work practices, tools, equipment, and operations; develop and conduct safety audits and inspections of the school manufacturing facility; design a plan to address health and safety deficiencies);
D1.4 handle materials safely and appropriately in compliance with the information included in the Safety Data Sheets (SDS) from the Workplace Hazardous Materials Information System (WHMIS2015);

TMJ4E - Manufacturing Technology
Grade 12, Workplace Preparation

B. MANUFACTURING TECHNOLOGY SKILLS

B4. demonstrate the safe and proper use of tools and equipment when producing various projects to
meet specifications.
B4.3 adapt machine tools safely to allow for a variety of uses (e.g., grinding, drilling, cutting);

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES

D1. demonstrate an understanding of and compliance with health and safety legislation, standards, and practices, including methods to address deficiencies, as they relate to the manufacturing industry;
D1.4 handle materials safely and appropriately in compliance with the information included in the Safety Data Sheets (SDS) from the Workplace Hazardous Materials Information System (WHMIS2015);
D1.6 use and maintains protective clothing and equipment as required to ensure their own and others' safety in the work environment.

INTERNET ACCEPTABLE USE AGREEMENT FORM

The form below is a sample agreement form that can be used with your board Internet use policy and guidelines.

INTERNET ACCEPTABLE USE AGREEMENT FORM

To Students:

I, the undersigned, indicate by my signature that I have read and understand fully the Acceptable Use Policy and related guidelines. I agree that I will abide at all times to the rules and responsibilities as outlined in the Acceptable Use Policy and related guidelines. I also agree that I clearly understand the consequences of my failure to abide by these rules and regulations.

To Parents/Guardians

As a parent or guardian signing below, I indicate that I understand the rules, regulations and consequences of misuse governing my son or daughter's use of the Board's computer and information technology facilities and resources. I understand that all Board staff will make every attempt to ensure proper and acceptable use in line with relevant policies, laws and regulations. I hereby allow my son or daughter to access the Board's supervised facilities and resources.

Student Name:

Student Signature:

Date:

Parent/Guardian Full Name:

Parent/Guardian Signature

Date;

*****To be used as an example Only; Please See Board/School Policy*****

MANU Student Conduct Agreement

A signed agreement that outlines the student's responsibilities is one way of establishing the seriousness of daily safety vigilance. An agreement covers the elements common to all technology classrooms and labs and lays out the framework for a safe and healthy working environment for both staff and students. An example of an agreement is given below.

Safety Awareness

Personal Protective Equipment [PPE]

1. Wear gloves, safety eyewear, aprons, masks, and other PPE as per instructed when using chemicals, heat, biological materials, hand or powered instruments and tools.
2. Ensure other workers and customers are protected before performing operations that can be dangerous.

Lift Support and Movement

1. Move heavy objects only with teacher approval.
2. Use assistance to lift items over 20 kilograms (40 pounds) or 2 meters (six feet) in length
3. Secure and support heavy or long objects on approved shelves.

Equipment

1. Operate equipment, chemicals or tools only after receiving proper instruction and permission from the teacher.
2. Never leave equipment, chemicals or tools unattended.
3. Do not attempt to repair any electrical connections, see your instructor.
4. Remove from service any equipment or tools that need repairing.

Storage and Handling of Chemical Substances

1. Understand and follow **WHMIS 2015**, and **SDS** instructions before handling chemical substances.
2. Secure all flammable chemicals and corrosives in approved cabinets.
3. Maintain good housekeeping practices when dealing with chemical substances.
4. Be responsible for cleaning up your workstation, tools and work area.
5. Sort recyclable liquids and solids and biological materials into approved storage containers.

STUDENT CONDUCT AGREEMENT

A signed agreement that outlines the student's responsibilities is one way of establishing the seriousness of daily safety vigilance. An agreement covers the elements common to all technology classrooms and labs and lays out the framework for a safe and healthy working environment for both staff and students. An example of an agreement is given below.

*****To be used as an example Only; Please See Board/School Policy*****

STUDENT CONDUCT AGREEMENT FORM

I, _____ agree to:

Ensure a safe workplace

1. Inform teachers of all injuries, damaged equipment and potentially dangerous situations.
2. Make sure I know all fire exits and power shutdown switches and how to use them during emergency situations.
3. Not compromise the safety of others through horseplay or aggressive action.
4. Only use equipment when properly trained, always with any necessary personal protective equipment, and when I fully understand all related safety issues.
5. Ask for assistance from the teacher when I am unsure of the proper procedures or health and safety issues.

Prescribed and Non-prescribed Medications

1. Report any use of prescription medications and inform teachers of any possible side effects of the medication [e.g. penicillin, phenobarbital].
2. Report any use of non-prescription medication and any possible side effects of the medication [e.g. Reactine, Benadryl, cough syrups].
3. Never enter a shop or lab carrying, or under the influence of illegal substances.

Consequences for Improper Action

I understand that failure to comply with this agreement may result in injury to myself or others, and that failing to comply with safety procedures may result in my temporary removal from the class or shop.

I have read the above and understand the expectations and consequences.

Student signature: _____

Parents signature: _____

Date: _____

SECTION 2
SAFETY INFORMATION SHEETS

SECTION 2: SAFETY INFORMATION SHEETS

SECTION OVERVIEW

This section contains **Safety Information Sheets** (listed in alphabetical order) that can be used as:
Student handouts
Safety posters (can be mounted in and around specific equipment or bulletin boards)
Teacher notes in project binders, safety binders or assessment plans
Information that can support lesson plans

Safety Information Sheets contain information specific to various common tools and procedures. Before using them, ensure they accurately describe your own particular facilities and equipment, and that they align with specific manufacturer's safety instructions.

NOTE:
All materials within this document are to be considered as suggestions and recommendations only. These are not legal documents and are not to be considered as legal requirements or as official policy. OCTE or the individual contributors makes no claim to the accuracy or the completeness of the enclosed documents and accepts no responsibility for any damages pertaining to their use. Users of this document should not assume all warnings and precautionary measures are contained herein, that additional information or measures are not required, or that local by-laws, regulations, or Board policies are explicitly included.

Please see specific equipment manuals for further safety information, as well as local, Board and school policies and regulations. Please review exemplar TMJ OCTE lab Safety NET resource documents for experienced teacher tips and customization options for your course projects.

AIR COMPRESSED

1. Wear Personal Protective Equipment (PPE) such as safety glasses, safety goggles, face shields, gloves and proper clothing as appropriate.
2. Do not operate machines and equipment without the instructor's permission.
3. Know the purpose of each tool you use and use each for the specific task it was designed to do.
4. Never use any tool - hand or power tool unless you are trained to do so and are familiar with its use.
5. Always use the carrying handle to transport the compressor.
6. Always leave sufficient space (at least 5 meters) between the compressor and the work area in particular, when using tools for spraying liquids.
7. The compressor must be placed on a stable surface.
8. Never clean the machine with liquids or solvents when cleaning. Disconnect the machine from the electricity supply by removing the plug and use a damp cloth only.
9. The compressor is designed for air compression only and must never be used for any other type of gas.
10. Never direct the jet of air towards persons or your body.
11. When using compressed air, you must know and comply with the safety precautions to be adopted for the single applications (inflating, pneumatic tools, painting, washing with water-based detergents only, etc.).
12. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ARBOR PRESS

1. Wear **EYE PROTECTION AND OTHER PERSONAL PROTECTIVE EQUIPMENT** when using a press.
2. Mount all work to be pressed squarely.
3. Choose the appropriate opening for the shaft size to slide through.
4. Apply pressure in a steady manner; do not hammer down with the handle.
5. Oil the shaft and bearing while applying pressure.
6. Maintain pressure until the bearing is seated or disengaged.
7. If you are pressing out a bearing you should be aware that the shaft may fall to the floor, so watch where your feet are placed.
8. If the bearing doesn't move, make the teacher aware of the problem. Heat may be applied to the bearing under supervision.
9. Be aware that if you force too hard you will strain yourself or you may overtax the equipment and it may fail. This may result in the equipment breaking or the bearing flying apart resulting in injury. Injury could result from equipment failure.
10. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ARC WELDING (ALL TYPES)

1. **PROTECT YOUR SKIN** by wearing leather or flame-resistant canvas coat and gloves. **PROTECT YOUR HEAD AND EYES** by wearing an approved welding helmet equipped with a **minimum shade 10 lens** and protective cover glass. Observers must wear **EYE PROTECTION** (as above).
2. All welding equipment must be in good operating condition. Never use damaged equipment.
3. **NEVER STRIKE AN ARC** unless you and onlookers have protective lenses in place.
4. Always place a suitable barrier around the work area to protect others from arc radiation. Use shaded screens (**shade 8 minimum**) when possible. Be aware of others at all times when welding. Notify others that you are about to weld This is very important if you are not in a protected welding booth.
5. When welding the area must be free of water and your footwear dry.
6. Ensure all connectors are fastened securely.
7. Ensure the ventilation system is turned on and working.
8. Complete a "**Hot Work Permit**" and check for flammable substances before beginning to weld & **DO NOT** weld pressurized containers
9. Check for flammable substances before beginning to weld.
10. Always clamp ground cable to your work piece. Be aware of any bearings installed on the work piece.
11. Take breaks to help relieve arm fatigue.
12. Always pick up hot pieces using tongs or pliers.
13. All welding equipment must be in good operating condition, never use damaged equipment. Always ensure the teacher is aware of any equipment problems.
14. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BAND SAW - HORIZONTAL

1. Wear **Personal Protective Equipment** (PPE) such as safety glasses, safety goggles, face shields, gloves and proper clothing as appropriate.
2. No loose clothing, long hair or jewelry is allowed in the shop.
3. Do not operate the band saw without the instructor's permission.
4. Be aware of the position of the on/off switches and emergency **STOP** button.
5. Make all adjustments with the power off.
6. Clamp work firmly into the vice. Long material must be supported.
7. Ensure the blade is tracking correctly and runs freely through the blade guides. Ensure the blade is under correct tension. See your instructor for guidance.
8. Ensure that the blade is running at full speed before beginning a cut.
9. Allow the upper head assembly to come down slowly until the blade teeth are cutting the material.
10. Never push down on the cutting head while the saw is cutting.
11. Turn off the machine and bring it to a complete standstill if the blade is to be lifted out of an incomplete or jammed cut.
12. Turn off the machine and bring it to a complete standstill before removing material from the vice area or making adjustments.
13. Ensure the cutting head is locked in the up position before removing the workpiece from the vice.
14. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BAND SAW - VERTICAL (1)

1. Wear Personal Protective Equipment (PPE) such as safety glasses, safety goggles, face shields, gloves and proper clothing as appropriate.
2. No loose clothing, long hair or jewelry is allowed in the shop.
3. Do not operate the band saw without the instructor's permission.
4. Follow the manufacturer's instructions for changing tool accessories.
5. Be aware of the position of the on/off switches and emergency **STOP** button.
6. Make all adjustments with the power off.
7. Use both hands and keep fingers at least 10cm (4") from the blade at all times; adjust guard prior to turning the saw on.
8. Keep the upper guide less than 5mm (1/4") from the material being cut.
9. Plan your cuts carefully. Saw curves gradually. Sudden twists may cause the blade to bind or break. Use relief cuts if necessary.
10. If the blade breaks, turn the power off immediately and step back. Inform the instructor immediately.
11. Always make short cuts first. Avoid backing out of cuts with the power on. Backing out of a cut may cause the blade to come off the drive wheel.
12. Do not cut cylindrical stock without the use of a V-block clamp.
13. Remove scrap pieces from the table only after the blade has stopped.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BAND SAW - VERTICAL (2)

1. Always operate the saw from the front, never from the side.
2. Do not leave the band saw until the blade has stopped.
3. Ensure that the blade is running at full speed before starting a cut.
4. Cut on the waste side of your line, leaving the pattern line on the work.
5. Keep your hands beside or behind the blade. Never in front. Use a push stick on small pieces.
6. Make sure all guards are in place and properly adjusted. Ensure all band wheels are enclosed.
7. Ensure the blade is tracking correctly and runs freely in the upper and lower guide rollers. Ensure the blade is under proper tension. See your instructor for guidance.
8. Use band saw blades that are sharp, properly set and otherwise suitable for the job (e.g., the right tooth pitch; tooth form; blade width).
9. Hold the stock firmly and flat on the table to prevent the stock from turning and drawing your fingers against the blade.
10. Use a push stick when you remove cut pieces from between the fence and saw blade or when your hands are close to the blade. Keep your hands on either side of the blade - not in line with the cutting line and the blade.
11. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BELT AND DISK SANDER

1. Wear Personal Protective Equipment (PPE) such as safety glasses, safety goggles, face shields, gloves, and proper clothing as appropriate.
2. No loose clothing, long hair or jewelry is allowed in the shop.
3. Do not operate the belt and disc sander without the instructor's permission.
4. Be aware of the position of the on/off switches and emergency **STOP** button.
5. Remove all the sawdust around the belt/disc sander.
6. Do not operate if the abrasive paper is loose or torn.
7. Ensure that power is off when changing the belt.
8. Sand only on the rotating-*down side surface* of the disc-sander and keep your work firmly on the machine table. Do not free hand sand.
9. Sand only on dry wood. Never sand metal.
10. Belt sander roll end and side guards should be properly adjusted and in good condition.
11. Do not apply excessive force toward the belt or disc. Let the machine do the work.
12. When working on small pieces, be careful to keep your fingers and knuckles away from the sanding disk.
13. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CHEMICAL HANDLING

Many operations in manufacturing involve different types of chemicals. Make sure you know how to handle these chemicals: their use, as well as storage and disposal procedures. **ALWAYS FOLLOW WHMIS SDS SHEETS!**

1. Before handling any chemicals, ensure you understand the safe handling procedures as outlined on container labels, **WHMIS2015 data sheets**, designated instructions or posted classroom procedures as appropriate. If you are unsure, see your instructor before proceeding.
2. Place any chemicals in approved, labeled containers **ONLY**.
3. **DO NOT** mix chemicals without prior knowledge of the consequences.
4. Discard any used chemicals in approved disposal containers **ONLY**. Inform your instructor of near-full containers. **DO NOT** dispose of chemicals down drains. Ask your instructor for proper disposal methods and procedures.
5. Ensure that there is adequate ventilation when using chemical substances.
6. Do not use any chemical for any other purpose other than what it is designed for.
7. Always use appropriate **PPE** (personal protection equipment) when handling chemicals. **PPE** includes eye protection, skin protection, gloves, aprons or coveralls, foot protection, as required under safe operating procedures.
8. Take note of expiry dates and storage requirements of chemicals. Do not use chemicals beyond their expiration.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC GENERAL GUIDELINES

1. Any CNC machine may operate automatically without warning. Only a trained individual familiar with the software, machine and computer system should operate this equipment.
2. Be aware of the position of the on/off switches and emergency **STOP** button.
3. Keep the immediate work area around the CNC machine clear of materials that might cause interference with machine operation.
4. Do not leave the CNC machine unattended when power is on to any electronics.
5. Material cutting operations can create debris. Ensure guards are in place and proper eye protection is worn.
6. CNC machines in motion can create pinch points in normal operation. Be aware of all areas that may be potentially hazardous when the CNC machine is in motion.
7. CNC machines may use hard stops as part of a normal setup. While in motion these stops may be contacted creating a crush point.
8. Mechanical drives are in use while the CNC machine is in operation. Do not attempt to service, adjust or otherwise touch these components while the machine is on.
9. Certain components of CNC machines are heavy. Use caution when lifting or moving these components. Use team lifting or mechanical lifts when necessary to avoid personal injury.
10. CNC operations such as plasma arc cutting, machining and routing can cause high noise levels that can exceed safe limits. Use hearing protection as necessary to prevent permanent loss of hearing.
11. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC LATHE

1. CNC machines may start at any time. Be aware and know the position of the on/off switches and emergency **STOP** button.
2. Keep the immediate work area around the CNC machine clear of materials that might cause interference with machine operation.
3. Do not leave the CNC machine unattended when power is on to any electronics.
4. Material cutting operations can create debris and noise. Ensure guards are in place and that proper eye, and hearing protection is worn.
5. Ensure that the work-piece is secure in the chuck before switching on the machine.
6. Ensure all tool bits are sharp and properly secured at the correct height and location before attempting to remove any material from the work-piece.
7. When turning a workpiece that overhangs 4 inches or more from the chuck, a live center must be used to support the work-piece to avoid it from slipping out of the chuck.
8. Make sure the work-piece size is within the limits of the machine traverse limits on all axes.
9. CNC machines in motion can create pinch points in normal operation. Be aware of all areas that may be potentially hazardous when the CNC machine is in motion.
10. Never attempt to make any adjustments or measurements to the work-piece set up until the CNC Lathe has completely stopped.
11. Move the tool holder as far as possible from the chuck while setting up work in the chuck to avoid injury to your hands.
12. Mechanical drives are in use while the CNC machine is in operation. Do not attempt to service, adjust or otherwise touch these components while the machine is on.
13. Certain components of CNC machines are heavy. Use caution when lifting or moving these components. Use team lifting or mechanical lifts when necessary to avoid personal injury.
14. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC MILLING MACHINE

1. CNC machines may start at any time. Be aware and know the position of the on/off switches and emergency **STOP** button.
2. Keep the immediate work area around the CNC machine clear of materials that might cause interference with machine operation.
3. Do not leave the CNC machine unattended when power is on to any electronics.
4. Material cutting operations can create debris and noise. Ensure guards are in place and that proper eye, and hearing protection is worn.
5. Ensure that the work-piece, the work holding device and cutting tool are securely mounted before taking a cut.
6. Make sure the work-piece size is within the limits of the machine on all axes.
7. CNC machines in motion can create pinch points in normal operation. Be aware of all areas that may be potentially hazardous when the CNC machine is in motion.
8. Never attempt to make any adjustments or measurements to the work-piece setup until the CNC milling machine has completely stopped.
9. Move the table as far as possible from the cutter while setting up work in the vise to avoid injury to your hands.
10. Mechanical drives are in use while the CNC machine is in operation. Do not attempt to service, adjust or otherwise touch these components while the machine is on.
11. Certain components of CNC machines are heavy. Use caution when lifting or moving these components. Use team lifting or mechanical lifts when necessary to avoid personal injury.
12. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC PLASMA ARC CUTTER

1. Always wear proper **PPE** when operating the **CNC Plasma Cutter**. Ie. safety glasses with shade appropriate lenses, welding gloves for handling material after cutting.
2. Any CNC machine may operate automatically without warning. Only a trained individual familiar with the software, machine and computer system should operate this equipment.
3. Be aware and know the position of the on/off switches and emergency **STOP** button.
4. Keep the immediate work area around the CNC Plasma Cutter clear of materials that might cause interference with machine operation.
5. Ensure the exhaust fan is on and functioning properly before beginning to cut.
6. Always refer to the owners manual for proper speeds and feeds for the material type and thickness.
7. Do not leave the CNC Plasma Cutter unattended when the machine is running
8. Check the area around the CNC Plasma Cutter to ensure it is free from combustible materials.
9. Never use the CNC Plasma Cutter in areas where combustible or explosive gasses or materials are located.
10. Lock out the machine before performing any service or repair on the CNC Plasma Cutter.
11. Hearing protection is recommended when using the plasma arc cutter.
12. Use pliers, clamps or welding tongs to hold hot metal.
13. Quench hot metal or allow it to cool before handling.
14. Make sure others in the work area are protected from plasma arc rays, fumes and splatter.
15. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

DRILL PRESS

1. Make sure that your **FACE SHIELD OR SAFETY GLASSES and SAFETY GUARDS** are in place before you start the drill press.
2. Always tie back long hair and keep your head and clothes well away from all moving parts of the drill press and never operate with gloves.
3. Operate only after you have received instruction and permission from the instructor.
4. Select only drills that are sharp, in good condition and suitable for the job.
5. Remove **CHUCK KEYS/WRENCHES** from the drill chuck before starting the machine. **Never** secure **CHUCK KEYS/WRENCHES** to the column of drill press with a chain.
6. **CLAMP THE WORK SECURELY** to the table before starting the machine. Attempting to hold the work under the drill with one hand can result in serious and painful injuries.
7. Operate drills at the proper speed and feed. Forcing or trying to feed too quickly can cause drills to break or splinter with the chance of serious injuries.
8. If work slips from the clamp, never attempt to stop it with your hands. Never reach around or behind any rotating drill. Use a V-block for round stock.
9. Always ensure that the machine has been locked out before you attempt to change the belt for speed regulation.
10. If the drill sticks in the work, stop the motor and rotate the drill by hand to free it from the work.
11. As the drill begins to break through the work, ease up on the drilling pressure and allow the drill to break through gradually.
12. Remove all burrs from drilled holes with a countersink or file. Be sure the file has a proper handle.
13. Always clear away chips and curls with a **HAND BRUSH** only when the machine has come to a complete stop– do not use your hands!
14. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

DRILL PRESS - RADIAL ARM

1. Make sure that your **FACE SHIELD OR SAFETY GLASSES and SAFETY GUARDS** are in place before starting the drill press.
2. Always tie back long hair and keep your head and clothes well away from all moving parts of the drill press and never operate with gloves.
3. Operate only after you have received instruction and permission from the instructor.
4. Select only drills that are sharp, in good condition and suitable for the job.
5. Remove **CHUCK KEYS/WRENCHES** from the drill chuck before starting the machine. **Never** secure Chuck keys/wrenches to the column of drill press with a chain.
6. **CLAMP THE WORK SECURELY** to the table before starting the machine. Attempting to hold the work under the drill with one hand can result in serious and painful injuries.
7. Align drill bit to your spot mark on the work piece by moving the radial arm and drill head.
8. Clamp the radial arm and drilling head before starting to drill.
9. Operate drills at the proper speed and feed. Forcing or trying to feed too quickly can cause drills to break or splinter with the chance of serious injuries.
10. If work slips from the clamp, never attempt to stop it with your hands. Never reach around or behind any rotating drill. Use a V-block for round stock.
11. Always ensure that the machine has been locked out before you attempt to change the belt for speed regulation.
12. If the drill sticks in the work, stop the motor and rotate the drill by hand to free it from the work.
13. Remove all burrs from drilled holes with a countersink or file. Be sure the file has a proper handle.
14. Always clear away chips and curls with a **HAND BRUSH** only when the machine has come to a complete stop– do not use your hands!
15. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ELECTRICAL HAZARDS

Touching an exposed electrical wire or electrical equipment that has not been grounded properly causes shocks. Shock can vary from a slight tingle to a rocking jolt. A very severe shock can cause death. Do not touch equipment or electrical wires that have been exposed to fluids.

Protect yourself against shocks by following these rules:

1. Check the condition of electrical cords on equipment. Report all problems to your instructor immediately. Replace worn or damaged cords.

2. When disconnecting a cord, pull on the plug. Never pull on the cord. You may loosen the wires and get a shock.

3. Never handle electrical equipment with wet hands or while standing in water.

4. Wear rubber-soled shoes to prevent shocks. Rubber does not conduct electricity.

5. Be sure an appliance is turned off before plugging it into an outlet.

6. Make sure you use proper power supplies and cables designated for use with specific pieces of equipment.

7. Store all electrical equipment in areas designated by your instructor.

8. Never change or interfere with the operating environment set up by someone else without permission.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

FACILITY EMERGENCY PROCEDURES

Make sure you know the location of all fire alarms, first aid kits, emergency exits, exhaust ventilation switches, and emergency power stop buttons.

EMERGENCY PROCEDURES AND EVACUATION ROUTES must always be clear, and occupants must know and understand these procedures and routes.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

FALL PROTECTION

Studies of accidents in the manufacturing industry show that most injuries are caused by falls. Observing a few simple rules will help to avoid most accidents of this type.

The points below give guidelines for preventing falls.

1. Walk; do not run.

2. Keep the floor clean and dry. A wet floor is slippery, so wipe up any spills immediately. Sprinkle salt on any spots that are still slippery until the floor can be thoroughly washed. Warn others of slippery conditions.

3. Wear low-heeled comfortable shoes with rubber soles, these grip the floor well.

4. Keep floor mats flat to prevent stumbling. Wrinkled mats or ones with curled corners can cause falls.

5. Keep work areas and traffic lanes clear. Electrical cords should not extend across traffic lanes. Put mops and brooms away promptly. Never leave boxes or crates in the aisles.

6. Look where you are going at all times. Get assistance to carry items that can block your vision.

7. Use a stepladder, never a chair or table, if you need to reach something on a high shelf.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

FIRE EXTINGUISHERS

1. Know your Fire Safety Plan
2. If you see a fire, call for attention, get everyone out, pull the fire alarm.
3. Stay calm.
4. If using a fire extinguisher Remember **P.A.S.S.**:
5. **P**ULL THE PIN, **A**IM LOW AT BASE OF FIRE, **S**QUEEZE HANDLE, **S**WEEP SLOWLY AT BASE OF FIRE
6. **STAY LOW TO AVOID HEAT AND SMOKE**
7. Have the fire department check to make sure the fire is out.
8. Ventilate when fire is completely out.

Learn and know the types of fire extinguishers (see below):

CLASS A **water**		**Ordinary Combustibles**: paper, cloth, wood, rubber, many plastics.
CLASS B **CO2**		**Flammable Liquids:** oil, grease, gasoline, some paints, solvents etc.
CLASS C **dry chemical**		**Electrical:** wiring, fuse boxes, electrical equipment etc.
CLASS D **special liquid or powder**		**Combustible Metals:** magnesium, sodium.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

FIRST AID

The immediate response to an emergency often involves First Aid. First Aid involves assisting an injured person until professional medical help can be provided.

The general action tips in the list below should be followed in an emergency. They do not replace the need to be properly trained in first aid. Your teacher will provide you with instructions on what to do in cases of emergencies.

1. Check the scene for dangers, (e.g. electrical shock hazards, chemical spills, hot objects, fire), stay calm and call out for help. Do not touch the victim until immediate dangers such as electrical currents are removed.

2. Assist if asked by your teacher to keep the victim comfortable and calm.

3. Call the office for medical help if requested by the teacher.

4. Care for the victim by administering first aid according to your teacher's instructions.

5. Help keep people who are not needed away from the victim.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

FIRST AID KITS

ALL INJURIES MUST BE REPORTED TO MAIN OFFICE.
REPORT ANY USE OF FIRST AID KIT TO TEACHER TO ENSURE THAT ANY SUPPLIES THAT ARE USED ARE REPLACED.
Suggested list (add items specific to your needs) See WSIB Regulation 1101, required first aid kit items (at http://www.wsib.on.ca/wsib/wsibsite.nsf/Public/PreventionYHSRR).
DATE CHECKED:
CHECKED BY:

ITEM	Number
St. Johns Ambulance First Aid Manual	
Masks	
Disposable latex gloves	
Pair of scissors	
Plastic Emesis basin	
Wooden splints	
Rolls of splint padding	
Adhesive strip bandages	
3"x3" sterile gauze pads	
4" compress bandages	
6" Tensor bandages	
Triangular bandages	
Safety Pins	
Sterile gauze bandages	
Sterile gauze field dressing	
1 ½" width roll adhesive tape	
Antiseptic swabs	
Burn cream	
Instant cold packs	

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FLUID POWER SYSTEMS

THESE RULES PERTAIN TO BOTH HYDRAULIC AND PNEUMATIC SYSTEMS:

1. Wear safety glasses to protect against flying objects or fluid spray from ruptured lines.
2. Wear appropriate PPE (gloves, apron, etc.) when working with hydraulic fluids.
3. Do not wear loose clothing that could catch in rotating or moving parts.
4. Do not operate controls in a reckless manner that might cause hydraulic shock and damage.
5. Observe extreme caution when starting up equipment for the first time and after a modification has been made.
6. Never use damaging blows or excessive force when disassembling or assembling fluid power equipment.
7. If the system has an accumulator, be sure its pressure energy is released before it is serviced or modified.
8. Prior to working on a system, lock out any electrical circuits to motors, controls, etc.
9. Shore up or block machine parts that may drop because of gravity.
10. To relieve any residual pressure from a system, bleed fluid by cracking fittings with a rag over the joints until the pressure is zero.
11. When disassembling a component part, be careful not to unload a spring force that may cause parts to fly.
12. Do not over torque bolts or other fasteners, because doing so may distort housings and affect internal moving parts.
13. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

GENERAL HOUSEKEEPING

1. Everything has a proper storage location.
   If you don't know where it is, please ask.
   If you do know, put it back.

2. If it is broken, report it.
   If it doesn't work, report it.
   If it's broken or doesn't work, don't use it.

3. Dirt, dust, debris are harmful to your safety and health. Even if you didn't put it there, pick it up, clean it up, or move it aside.

4. If you spill or drop any fluid on the floor, clean it, or use absorbent materials.

5. You are responsible for prevention of injuries.

6. Never block fire exits, fire pull alarms, doorways, aisles, and electrical breakers of machine switches for any reason at any time.

7. Chemicals all have proper storage containers.
   Make sure you use them.
   Never mix chemicals.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

GRINDER - ANGLE AND HAND

1. **WEAR PERSONAL PROTECTIVE EQUIPMENT INCLUDING GLOVES, GLASSES, FACE SHIELD AND HEARING PROTECTION** when using a grinder.
2. Check the grinder disk for any flaws before using.
3. Make sure guards are in place and operating properly.
4. Inspect cord for damage before use.
5. Always disconnect power when mounting a new disc wheel.
6. Ensure that the grinder disk is secured and seated properly on the arbor.
7. Check the immediate area for any fire hazards such as flammable materials, liquids or batteries.
8. Make sure you are at least 6 meters (20 feet) away from other workers.
9. Start the grinder off the work, grip the grinder solidly with two hands (beware of the torque). Also make sure you have a solid stance before starting to grind.
10. Aim the sparks towards the floor and away from others.
11. When you have finished grinding, raise the grinder off the work and allow it to stop on its own.
12. If the grinder is dropped during use it should be thoroughly inspected by the teacher before being used again.
13. Never cut on closed containers.
14. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

GRINDER - BENCH AND PEDESTAL

1. **WEAR PERSONAL PROTECTIVE EQUIPMENT INCLUDING AN APPROVED SAFETY SHIELD AND/OR SAFETY GLASSES** when using a grinder, even if the grinder is equipped with protective glass shields.
2. Keep the work area clean and free of oil, grease and debris.
3. Operate only after you have received instruction, gloves should not be worn.
4. Always check the **CLEARANCE OF THE TOOL REST** before starting work. Clearance should never be more than **3mm or 1/8 inch**. Always set the tool rest clearance when the wheel is not in motion.
5. Always ensure a new grinding wheel has the **CORRECT RPM RATING** for the grinder it is being installed on.
6. When mounting or replacing any grinding wheel, always ensure that it fits properly on the shaft.
7. When installing the grinding wheel to the spindle, be certain the blotters are affixed to both sides of the wheel and that washers and nuts are of the correct size and are tightened securely.
8. When starting up any grinding wheel, **STAND TO ONE SIDE** out of line with the wheel and make sure no one is in line with the grinding wheel in case of breakage.
9. Only grind on the face of the wheel, use the entire face to avoid grooving the wheel.
10. Always **FEED THE WORK TO THE WHEEL GRADUALLY**. Too much pressure or striking the wheel suddenly may cause it to fracture.
11. Ensure there is ample water for cooling work pieces at the machine.
12. **STOP THE GRINDER IMMEDIATELY IF IT BEGINS TO CHATTER OR VIBRATE. NEVER USE TOOLS OR HANDS TO STOP ANY GRINDER.**
13. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

HAND TOOLS

Hand tools in poor condition are responsible for a vast number of injuries.

1. Wear **EYE PROTECTION** whenever using hand tools.
2. Have a proper storage location for your tools to protect them from loss or damage. After use, clean and **RETURN THEM TO THEIR PROPER PLACE** so they are always ready when you need them.
3. Never leave tools on the floor, hanging over edges, on ramps or hoists where they could be forgotten or cause a tripping hazard.
4. When tools become worn or damaged, they should be repaired or replaced immediately. Show your instructor.
5. Use chisels, knives, blades that are sharp. Do not use blunt tools.
6. Use tools only for their intended purpose. For example, screwdrivers should not be used as pry bars – if they bend under load, they are no longer useful and may be dangerous to use as a screwdriver.
7. Files should not be used as pry bars – they are extremely brittle and when breaking will release fragments which could injure or blind you.
8. **NEVER STAND BEHIND OR INFRONT** of anyone who is swinging a hammer. If you must observe what is being done, stand off to the side out of the way of the hammerhead.
9. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

LIFTING

A strain is a feeling of stiffness or soreness from using muscles too long or the wrong way. Strains usually occur in the lower back, the weakest point of the spinal column. In the manufacturing industry, lifting heavy loads incorrectly often causes strains. Once your back has been strained or weakened, it can easily be injured again.

1. In the Province of Ontario, unassisted manual lifting is limited to 23 kg (51 pounds). Do not lift any load if it cannot be handled safely due to its size/shape.

2. You can prevent back strain by lifting with your strong leg muscles. When you must lift a heavy object, squat with knees bent, feet apart, and back straight. With your arms straight, get a firm grip on the load. Stand up keeping your back straight. Make your leg muscles do the work. Do not twist or bend.

3. Set objects down by using the same method in reverse. Ask for help if the object is too heavy. Use a cart to carry heavy objects any distance.

4. Heavy articles should be stored on the bottom shelves.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

LASER CUTTER/ENGRAVER

Many operations in manufacturing involve different types of Computer Aided Machinery. Laser Cutting is one of these. Make sure you know how to handle the machine and conduct regular cleaning maintenance.

1. **WEAR PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING SAFETY GLASSES**, gloves, and respiratory and hearing protection as required. Always wear proper, close fitting clothing to cover arms and legs. Long hair must be tied back.
2. LASER cutters pose a fire hazard. To further increase risk, some of the materials engaged by the laser cutter can leave flammable debris and can ignite inside the cutter.
3. Do not use this machine unless a teacher has instructed you in its safe use and a safety passport has been issued.
4. Before beginning a cut, make sure the bed is clear of built up material, debris, tools or other objects.
5. Keep the interior of the LASER cutter clean and free of debris.
6. NEVER LEAVE THE LASER CUTTER when it is in operation.
7. Ensure the fume extraction system is on before beginning cutting operation.
8. Ensure material to be cut is on the approved list and poses no hazard. Where possible consult the manufacturer's Safety Data Sheets (SDS) for specific technical data and precautionary measures concerning any materials cut with this equipment. If in doubt, ask your teacher.
9. Refer to the cutting manual for appropriate engraving and cutting Power and Speed settings for varied materials
10. Consult laser cutter Project Log Book prior to starting the project. Make sure you have documented your project and are compliant with the manufacturer's maintenance procedures.
11. If in doubt, ask your teacher.
12. Ensure all safety devices are in place before operating.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

METAL CUT OFF (CHOP) SAW - ABRASIVE

1. **WEAR PERSONAL PROTECTIVE EQUIPMENT INCLUDING GLOVES AND FACE SHIELD OR GLASSES** when using a metal chop saw.
2. All jewelry must be removed, and long hair tied back securely.
3. Stand to the side of the disc assembly when operating the saw.
4. Students who are left-handed should use their right hand for cutting operations.
5. Clamp material firmly and ensure you are aware of the blade path before you make your cut.
6. Prior to using the saw, check the condition of the cord and the abrasive cutting disc.
7. Long stock pieces should be supported safely.
8. Ensure the guard is functioning correctly during operations.
9. When making angle cuts ensure the cutting disc has adequate clearances.
10. Start the saw off the metal and gradually make the cut with even force on the abrasive disc.
11. Pieces of metal that have just been cut will have **SHARP EDGES AND WILL BE HOT** to touch.
12. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

METAL LATHE

Wear Personal Protective Equipment (PPE) such as safety glasses, safety goggles, face shields, gloves and proper clothing as appropriate. No loose clothing, long hair or jewelry is allowed in the shop.

1. Keep the work area clean and free of oil, grease and debris.
2. Do not operate the lathe without proper instruction and the instructor's permission.
3. Be aware of the position of the on/off switches and emergency **STOP** button.
4. Make sure headstock, tailstock and tool rests are tight before operating.
5. Ensure your material is secure before starting the motor.
6. Ensure all tool bits are sharp,without nicks and are properly centred. Show your instructor any problems with the tooling.
7. Do not operate the lathe until you have established proper speeds, stops, tool heights and angles.
8. Make sure you have proper speeds and feeds for the type of material and tool bits, type of operation, and diameter of material. When in doubt, ask.
9. Do not attempt to remove a large depth of cut from material at a single pass.
10. Remove cut off material or chips with a brush after the lathe has come to a complete stop. Never use your hands.
11. Turn the lathe off immediately if it does not sound right or if there is excessive vibration.
12. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

MILLING MACHINE - VERTICAL

Wear Personal Protective Equipment (P.P.E) such as safety glasses, safety goggles, face shields, proper clothing as appropriate. No loose clothing, long hair, or jewelry is allowed in the shop.

1. Be aware of the position of the on/off switches and emergency **STOP** button.
2. Keep the work area clean and free of oil, grease and debris.
3. Make sure the spindle, beds and control handles are working properly before operating.
4. Ensure the work holding device is mounted securely to the table.
5. Ensure the work piece and cutter are mounted securely before starting the motor and making a cut.
6. To avoid injury, move the machine table as far as possible away from the cutter when setting up or measuring work.
7. Do not attempt to set up or measure the workpiece until the cutter is completely stopped. Keep hands away from moving parts.
8. When setting up or removing a milling cutter from its holder, proper precautions should be taken to avoid injury, use a rag or cloth.
9. Ensure all tool bits are sharp and undamaged. Show your instructor any problems with tooling before operating the milling machine.
10. Make sure you have proper speeds and feeds for the type of material being machined. When in doubt, ask the instructor.
11. When the machine comes to a complete stop, remove cut material and chips with a brush.
12. Turn the milling machine off immediately if it does not sound correct or there is excessive vibration.
13. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

MILLING MACHINE - HORIZONTAL(1)

Wear Personal Protective Equipment (P.P.E.) such as safety glasses, safety goggles, and face shields. No loose clothing, long hair or jewelry is allowed in the shop.

1. Operate the milling machine only after you have received instruction and permission from the instructor.
2. Be aware of the position of the on/off switches and emergency STOP button.
3. Keep the work area clean and free of oil, grease and debris.
4. Make sure the spindle, beds and control handles are working properly before operating.
5. Ensure the work holding device is mounted securely to the table.
6. Ensure the work piece and cutter are mounted securely before starting the motor and making a cut.
7. To avoid injury when setting up or measuring work, move the machine table as far as possible away from the cutter.
8. Do not attempt to set up or measure a workpiece until the cutter is completely stopped. Keep hands away from revolving parts.
9. When setting up or removing a milling cutter from its holder or arbor, ensure proper procedures are followed in order to avoid injury.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

MILLING MACHINE - HORIZONTAL(2)

10. When setting up a cutter on the horizontal milling machine, always make sure that the cutter
11. When assembling or disassembling a tool on the arbor with an over-arm support, always leave the support in place when loosening or tightening the arbor nut.
12. Tighten the arbor nut with a wrench. Never use a hammer to strike the wrench when tightening the nut.
13. Ensure all tool bits are sharp and not damaged. Show your instructor any problems with the tooling.
14. Do not operate the milling machine until you have established proper speeds, stops, and tool depths.
15. Make sure you have proper speeds and feeds for the type of material, tooling and the operation to be performed.
16. Be sure to have firm footing when operating the milling machine.
17. When the machine comes to a complete stop, remove cut off material and chips with a brush. Never use your hands to clear cut materials.
18. Turn the milling machine off immediately if it does not sound correct or if there is excessive vibration.
19. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

OXY-FUEL CUTTING/WELDING(1)

1. **PROTECT YOUR HEAD AND EYES** by wearing welding goggles or shield equipped with a minimum shade 5 level of protection. Observers must wear **EYE PROTECTION**.
2. Cylinders must always be secured and upright and stored in a well-ventilated area.
3. Full and empty cylinders must be stored separately. Mark all empty cylinders appropriately.
4. Gas cylinders must have **PROTECTIVE CAPS** in place for transporting and storing.
5. Ensure that all regulators, hoses, and torches are in good condition, leak-free, and the hoses are equipped with approved **FLASHBACK ARRESTORS**.
6. Perform leak tests as part of a preventive maintenance procedure.
7. Use only approved pressure-reducing regulators with each gas cylinder.
8. **OXYGEN COMBINES WITH OIL AND GREASE** to cause violent fires. Do not use oxygen to blow dust off clothing.
9. Keep equipment free of oil or grease.
10. Make certain a fire extinguisher is readily available.
11. **PROTECT YOUR SKIN** by wearing safety footwear and leather or flame-resistant canvas coats and gloves.
12. Do not carry a Butane lighter or other flammable in your pockets.
13. Only use a proper striker to ignite torches.
14. Check for flammable substances in the vicinity before beginning to weld or cut.
15. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

OXY-FUEL WELDING/CUTTING(2)

START UP

1. Open the oxygen cylinder valve slowly ½ turn to prevent damage to the regulator. Then open all the way.
2. Open acetylene/fuel cylinder valve 1/4 turn only.
3. Adjust hose pressures using the T-handles on the regulator gauges.
4. Purge acetylene/fuel and the oxygen lines individually before lighting the torch.
5. Open the acetylene/fuel torch valve 1/3 turn and light the acetylene gas using a striker (before opening the oxygen torch valve).
6. Open the oxygen valve slowly until a neutral flame is achieved.

SHUTDOWN

1. Close the torch acetylene/fuel gas valve to extinguish the flame. **(A before O).**
2. Close the torch oxygen valve.
3. Close the acetylene/fuel gas cylinder valve.
4. Close the oxygen cylinder valve.
5. Drain the acetylene/fuel gas line by opening the torch acetylene/fuel gas valve. Release the acetylene/fuel gas regulator knob (T-handle) on the gauge.
6. Close the torch acetylene/fuel gas valve.
7. Drain the oxygen lines by opening the torch oxygen valve. Release oxygen regulator knob (T-handle) on the gauge.
8. Close the torch oxygen valve. Oxygen and acetylene/fuel gauges for both tank and hose pressures should read zero.
9. Neatly wrap hoses on holders, and place torch handle and tip in a position that will prevent damage to them.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

PLASMA ARC CUTTER (PAC)

1. Wear protective clothing when using the plasma arc cutter. Clothing should be wool or cotton, long sleeves, leather shoes (high top), gauntlet gloves and leather apron.
2. Wear industrial quality eye protection minimum #5 shaded lens for plasma arc cutting operations.
3. Ensure that the work area is well ventilated when using the plasma arc cutter.
4. The operator should position themself so there will be minimum exposure to fumes during the cutting process.
5. Never use the plasma arc cutter in areas where combustible or explosive gases or materials are located.
6. Never touch any parts on the plasma arc cutter that are electrically connected.
7. Disconnect the electrical power before performing any service or repair on the plasma arc cutter.
8. Never use the plasma arc cutter to cut into an enclosed container.
9. Hearing protection should be worn when using the plasma arc cutter.
10. Use pliers or clamps to hold hot metal.
11. Quench hot metal or allow it to cool before handling.
12. Make sure others in the work area are protected from plasma arc rays, fumes and splatter.
13. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

POWER TOOLS(1)

1. Wear Personal Protective Equipment (PPE) such as safety glasses, safety goggles, face shields, gloves and proper clothing as appropriate.
2. Do not operate power tools without the instructor's permission.
3. Do not wear loose clothing or jewelry when operating power tools. Long hair must be tied back.
4. Follow the manufacturer's instructions for lubricating and changing tool accessories.
5. Keep guards in place and follow lockout/tag-out procedures.
6. Know the purpose of each tool you use and use each tool for the specific task it was designed to do.
7. Always use two hands on the tool when operating. Clamp the workpiece to a solid surface; do not attempt to hold the workpiece with hand or foot.
8. Unless it's designed for it, never use a portable electric tool where there are flammable vapors or gasses present.
9. Electrical cords must be in good condition; report any broken, damaged or bare cords. Keep cords away from heat, oil, and sharp edges.
10. All power tools must be effectively grounded and/or be of the double insulated type.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

POWER TOOLS(2)

11. If the tool is equipped with a three-prong plug, it should be plugged into a three-holed electrical receptacle. Never remove the third prong.
12. Never use power tools in damp or wet locations or if the worker is perspiring. Moisture helps electricity flow more easily through the body.
13. Rubber gloves and footwear are recommended when working outdoors in damp conditions.
14. Never carry a tool by its cord or pull the cord to disconnect it from a receptacle. Never carry a plug-in tool with your finger on the switch.
15. Unplug tools before replacing any broken, dull or damaged bits or blades.
16. Be careful not to overreach. Keep your balance and proper footing when working with power tools.
17. 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.
18. Keep the floor around the work area clean.
19. Be sure the power switch for a portable tool is "off" before plugging it in.
20. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

PROGRAMMABLE LOGIC CONTROLLERS WIRING PRECAUTIONS

1. Do not attempt to take any unit apart while power is being supplied to the PLC.
2. Do not touch any of the terminals or terminal blocks while the power is being supplied to the PLC.
3. Completely turn off external power when installing or replacing wiring.
4. When wiring in the PLC, be sure that it is done correctly by checking the products rated voltage and the terminal layout.
5. Tighten terminal screws with the specified torque. Loose screws may result in burning.
6. Wiring bare wires directly to PLC terminals may result in fires. Use solderless terminals or solid wires for wiring.
7. Do not pull on cables or wires running to the PLC. Bending wires or cables beyond their natural limit may also cause damage.
8. Before turning on the power supply or operating the module after installation or wiring work, ensure that the module's terminal covers are correctly attached.
9. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ROBOTICS

1. Make sure the robot base is secure to the work surface.
2. Make sure the robot arm has enough space in which to move freely.
3. Do not place your hands or fingers or any object within the robot arm's operating range, particularly while it is in motion.
4. Ensure the device is powered off before approaching or handling the robot.
5. Do not exert force on any part of the system.
6. Do not use physical or mechanical means to stop the movement of any part of the robot arm.
7. Do not drive the arm into another object or an obstacle.
8. Do not overload the arm. Check the manufacturer's instructions for maximum workload. The gripper should grasp the workload at its centre of gravity.
9. Never leave the arm or gripper under mechanical strain for extended periods of time.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

SHEET METAL - BENDER/BREAK/SLIP ROLLS/SHEAR

1. The floor around the machine should be clean and free of scraps, oil or grease. A suitable non-skid material should be applied to the floor at the workstation.
2. Do not operate the machine when other persons are in contact with the machine or the workpiece.
3. Obtain assistance for moving large sheets of material to and from sheet metal machines.
4. Keep fingers clear of the area in front and rear of the shear blades.
5. Keep clear of the slip roll pinch points.
6. Keep fingers clear of the brake when clamping/forming materials.
7. Be aware of the maximum capacity of the machine. Exceeding the capacity of the machine may be hazardous to the operator.
8. Never use excessive force when operating sheet metal equipment.
9. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

SURFACE GRINDER

1. Wear Personal Protective Equipment (P.P.E) such as safety glasses, safety goggles, face shields, proper clothing as appropriate. No loose clothing, long hair, or jewelry is allowed in the shop.
2. Only operate the surface grinder after you have received instruction and permission from the teacher.
3. Be aware of the positions of the on/off switches and emergency **STOP** button.
4. Keep the work area clean and free of oil, grease and debris.
5. Always ring test the grinding wheel before mounting it to the machine.
6. When starting a grinder, always stand to one side of the wheel and make sure no one is in line with the grinding wheel in case of breakage.
7. See that the grinding wheel clears the work before starting a grinder.
8. Allow a new wheel to run for about one minute before using it.
9. Never run a grinding wheel faster than the recommended speed on its blotter.
10. Ensure the wheel guard is in place and it covers ½ of the wheel.
11. Keep the magnetic chuck clean and free of burrs.
12. Always dress the wheel when turning it on.
13. Remove all burrs from the workpiece before placing on the magnetic chuck.
14. Ensure the magnetic chuck is on and holding the workpiece by trying to remove the work.
15. Never attempt to clean the magnetic chuck or mount and remove work until the wheel has stopped completely.
16. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

3D PRINTER

1. Always wear proper PPE when operating the 3D Printer. i.e. safety glasses, goggles, gloves, or lab coats.
2. Be sure to read and understand the owner's manual before operating.
3. Limit equipment access to trained or authorized personnel.
4. Before beginning a 3D print, make sure the bed is clear of build material, debris, tools or other objects.
5. Use enclosures for 3D printers and proper ventilation to capture chemical emissions.
6. There is a slight smell from ABS when it is being extruded. A well-ventilated room is recommended; however, when printing, keep the printer away from any drafts as this can affect the warping of ABS prints. Using printer filament with lower emissions is recommended.
7. Never reach inside the 3D printer while it is in operation. In addition to the risk of burn, injury from moving mechanical parts or electric shock.
8. Never touch the extruder nozzles. They reach temperatures in excess of 200 degrees Celsius and may be hot enough to cause a serious burn during operation, or when heating up and cooling down. Use needle nose pliers to remove bits of debris from the nozzles.
9. Always refer to the owners manual for instructions on adding or removing filament.
10. Reduce time spent near the printer while it is running to limit exposure to fumes.
11. Use caution when removing parts from the build platform as the extruder and build platform may be hot.
12. Use only the power adapter supplied with the printer, or the printer may be damaged, with a risk of fire.
13. Consult the Safety Data Sheets (SDSs) for safety information regarding the plastic(s) you will be using.
14. Always reference the owner's manual before operating and servicing equipment.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

SECTION 3
WHMIS

SECTION 3: WHMIS

WHMIS 2015 Regulations and Labels

Overview

- The acronym **WHMIS** stands for Workplace Hazardous Materials Information System.
- Canada aligned the original WHMIS 1988 with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) in 2015.
- Suppliers and employers must use and follow the WHMIS 2015 requirements for labels and safety data sheets (SDSs) for hazardous products sold, distributed, or imported into Canada.

Safety Data Sheets (SDS)

- **Definition:** A printout on paper that identifies how to handle, store, use, health effects if exposed, emergency procedures, and protective measures.
- **Employer Responsibilities:** Employers are required to make sure that all hazardous products have an up-to-date SDS when they enter the workplace.
- **Availability:** SDSs must be readily available to the workers who are exposed to the hazardous product, and to the health and safety committee or representative.

Label Updates

- **Requirement:** A label must be updated within 180 days of the supplier becoming aware of "significant new data."
- **Definition:** *"New data regarding the hazard presented by a hazardous product that changes its classification in a category or subcategory of a hazard class, or result in its classification in another hazard class, or change the ways to protect against the hazard presented by the hazardous product."*
- **Purchasing Protocol:** If a product is purchased within this 180-day time period, the supplier must inform you of the changes, and the date they became available, in writing.

Supplier Labels

Supplier labels must be attached to the controlled product container to provide detailed information. Legislation states that **10 kg or more** of a controlled product or hazardous material from a supplier must contain a label.

Design and Formatting Requirements

- **Language:** Must be in English and French. They may be bilingual (as one label) or presented as two labels (one in English, one in French).
- **Visibility:** To be clearly and prominently displayed on the container, easy to read (without using any item except corrective glasses), and in contrast with other information on the product or container.
- **Grouping:** The pictogram, signal word, and hazard statement must be grouped together.
- **Border:** The hatched border that was required under WHMIS 1988 is not required under WHMIS 2015, but it is also not forbidden.

WHMIS 1988 VS. WHMIS 2015

WHMIS 1988

Controlled products regulations

Controlled products

6 hazard classes, 3 divisions

Label:

- Hatched border
- No standardized phrases

Symbol in black circle

Material Safety Data Sheets (MSDS)

- Must be updated every 3 years
- 9 sections

WHMIS 2015

Hazardous products regulations

Hazardous products

30+ hazard classes, multiple categories

Label:

- Solid border
- Standardized phrases

Pictograms: symbol in a red square on its point (Diamond)

Safety Data Sheets (SDS)

Must be updated when new information is available

16 sections

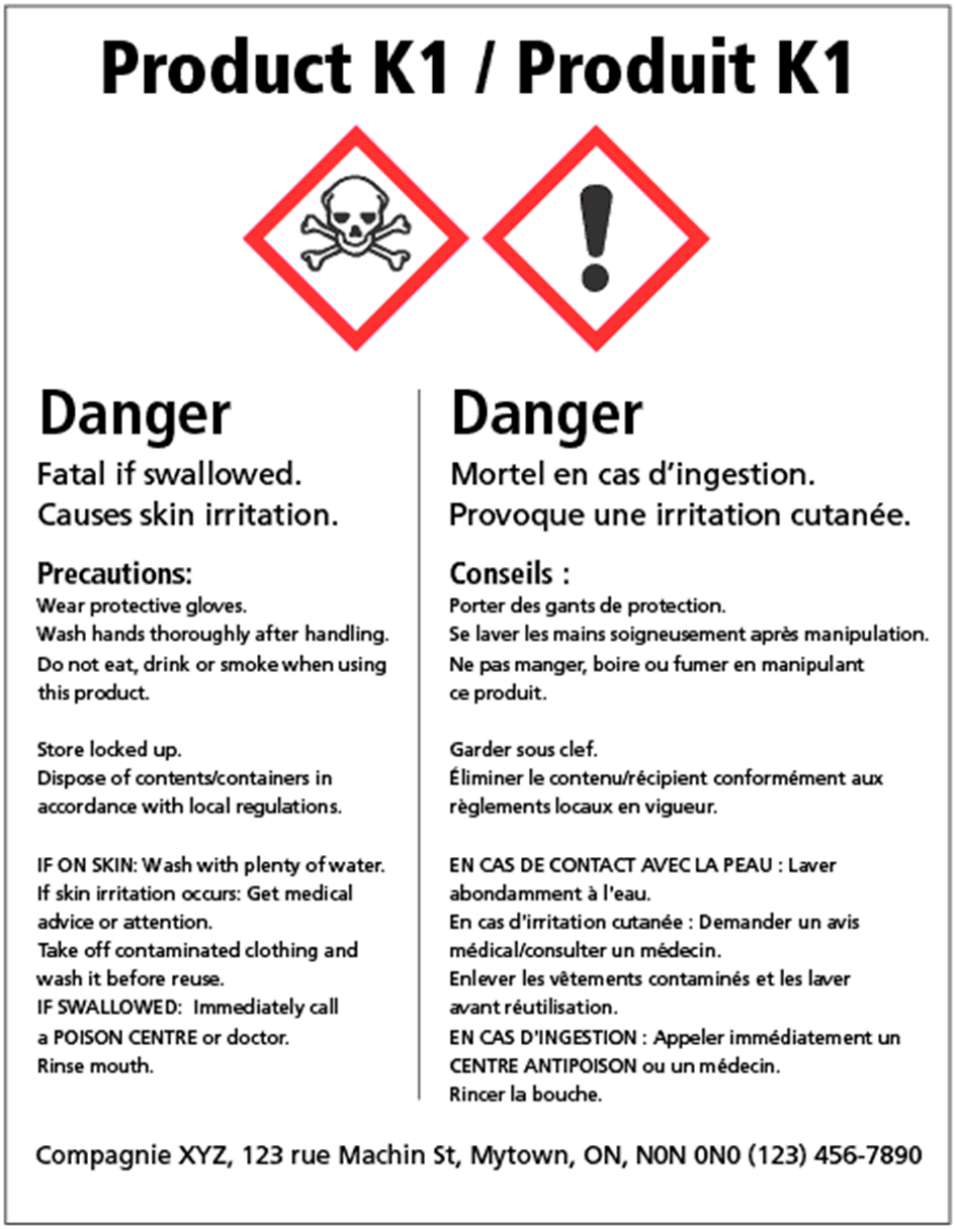
WHMIS 2015

The acronym WHMIS stands for Workplace Hazardous Materials Information System

1. Canada aligned the **Workplace Hazardous Materials Information System** (**WHMIS**) from 1988 with the **Globally Harmonized System of Classification and Labelling of Chemicals** (**GHS**) in 2015.
2. Suppliers and employers must use and follow the **WHMIS 2015** requirements for labels and safety data sheets (SDSs) for hazardous products sold, distributed, or imported into Canada.
3. **SDS** stands for **Safety Data Sheets**
4. **SDS** is a printout on paper that identifies how to handle, store, use, health effects if exposed, emergency procedures, and protective measures
5. Employers will be required to make sure that all hazardous products (as defined by the Hazardous Products Regulations have an up-to-date **SDS** when it enters the workplace.
6. The **SDS** must be readily available to the workers who are exposed to the hazardous product, and to the health and safety committee or representative.
7. A label will be required to be updated when the supplier becomes aware of any "significant new data".
8. Labels will be required to be updated within 180 days of the supplier being aware of the new information. If you purchase a product within this 180-day time period, the supplier must inform you of the changes, and the date they became available, in writing

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

This is an example of an updated 2015 supplier label using the **Globally Harmonized System**.



Product K1 / Produit K1

Danger

Fatal if swallowed.
Causes skin irritation.

Precautions:

Wear protective gloves.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Store locked up.
Dispose of contents/containers in accordance with local regulations.

IF ON SKIN: Wash with plenty of water.
If skin irritation occurs: Get medical advice or attention.
Take off contaminated clothing and wash it before reuse.
IF SWALLOWED: Immediately call a POISON CENTRE or doctor.
Rinse mouth.

Danger

Mortel en cas d'ingestion.
Provoque une irritation cutanée.

Conseils :

Porter des gants de protection.
Se laver les mains soigneusement après manipulation.
Ne pas manger, boire ou fumer en manipulant ce produit.

Garder sous clef.
Éliminer le contenu/récipient conformément aux règlements locaux en vigueur.

EN CAS DE CONTACT AVEC LA PEAU : Laver abondamment à l'eau.
En cas d'irritation cutanée : Demander un avis médical/consulter un médecin.
Enlever les vêtements contaminés et les laver avant réutilisation.
EN CAS D'INGESTION : Appeler immédiatement un CENTRE ANTIPOISON ou un médecin.
Rincer la bouche.

Compagnie XYZ, 123 rue Machin St, Mytown, ON, N0N 0N0 (123) 456-7890

More information can be found on the Government of Canada, Canadian Centre for Occupational Health and Safety Website. See the link below.

https://www.ccohs.ca/oshanswers/chemicals/whmis_ghs/pictograms.html

WHMIS 2015 Pictograms

	Exploding bomb (for explosion or reactivity hazards)		**Flame** (for fire hazards)		**Flame over circle** (for oxidizing hazards)
	Gas cylinder (for gases under pressure)		**Corrosion** (for corrosive damage to metals, as well as skin, eyes)		**Skull and Crossbones** (can cause death or toxicity with short exposure to small amounts)
	Health hazard (may cause or suspected of causing serious health effects)		**Exclamation mark** (may cause less serious health effects or damage the ozone layer*)		**Environment*** (may cause damage to the aquatic environment)
	Biohazardous Infectious Materials (for organisms or toxins that can cause diseases in people or animals)				

* The GHS system also defines an Environmental hazards group. This group (and its classes) was not adopted in WHMIS 2015. However, you may see the environmental classes listed on labels and Safety Data Sheets (SDSs). Including information about environmental hazards is allowed by WHMIS 2015.

The **flame** pictogram is used for the following classes and categories:

- Flammable gasses (Category 1)
- Flammable aerosols (Category 1 and 2)
- Flammable liquids (Category 1, 2 and 3)
- Flammable solids (Category 1 and 2)
- Pyrophoric liquids (Category 1)
- Pyrophoric solids (Category 1)
- Pyrophoric gasses (Category 1)
- Self-heating substances and mixtures (Category 1 and 2)
- Substances and mixtures which, in contact with water, emit flammable gasses (Category 1, 2 and 3)
- Self-reactive substances and mixtures (Types B*, C, D, E and F)
- Organic peroxides (Types B*, C, D, E and F)

The **flame over circle** pictogram is used for the following classes and categories:

- Oxidizing gases (Category 1)
- Oxidizing liquids (Category 1, 2 and 3)
- Oxidizing solids (Category 1, 2 and 3

The **gas cylinder** pictogram is used for the following classes and categories:

- Gases under pressure (Compressed gas, Liquefied gas, Refrigerated liquefied gas, and Dissolved gas)

The **corrosion** pictogram is used for the following classes and categories:

- Corrosive to metals (Category 1)
- Skin corrosion/irritation – Skin corrosion (Category 1, 1A, 1B and 1C)
- Serious eye damage/eye irritation – Serious eye damage (Category 1)

The **exploding bomb** pictogram is used for the following classes and categories:

- Self-reactive substances and mixtures (Types A and B*)
- Organic peroxides (Types A and B*)

The **skull and crossbones** pictogram are used for the following classes and categories:

- Acute toxicity –
- Oral (Category 1, 2 and 3)
- Dermal (Category 1, 2 and 3)
- Inhalation (Category 1, 2 and 3)

The **health hazard** pictogram is used for the following classes and categories:

- Respiratory or skin sensitization – Respiratory sensitizer (Category 1, 1A and 1B)
- Germ cell mutagenicity (Category 1, 1A, 1B and 2)
- Carcinogenicity (Category 1, 1A, 1B, and 2)
- Reproductive toxicity (Category 1, 1A, 1B and 2)
- Specific Target Organ Toxicity – Single exposure (Category 1 and 2)
- Specific Target Organ Toxicity – Repeated exposure (Category 1 and 2)
- Aspiration hazard (Category 1)

The **exclamation mark** pictogram is used for the following classes and categories:

- Acute toxicity – Oral, Dermal, Inhalation (Category 4)
- Skin corrosion/irritation – Skin irritation (Category 2)
- Serious eye damage/eye irritation – Eye irritation (Category 2 and 2A)
- Respiratory or skin sensitization – Skin sensitizer (Category 1, 1A and 1B)
- Specific target organ toxicity – Single exposure (Category 3)

The **biohazardous infectious** materials pictogram is used for the following classes and categories:

- Biohazardous Infectious Materials (Category 1)

Environment. May cause damage to the aquatic environment.

The Global Harmonized System has defined an environmental hazard group. This group was not adopted in WHMIS 2015; However, you may see this symbol on labels and Safety Data Sheets, and WHMIS allows this, so we are including it in this document.

WHMIS Chemical Hazards Pictograms 2015

WHMIS 1988 Hazard Class	WHMIS 1988 Symbols	WHMIS 2015 Symbols	WHMIS 2015 Hazard Class
A			Gases Under Pressure
B1 to B6			Flammables, Self-Heating, Emit Flammable Gases, Pyrophoric Gases, Liquids & Solids Organic Peroxides
C			Oxidizing Gases, Liquids, Solids
D1			Acute Toxicity - Oral, Dermal, Inhalation
D2			Eye Irritation, Skin Irritation Skin/Respiratory Sensitization, Carcinogenicity Mutagenicity Reproductive Hazards
D3			Biohazardous Infectious Materials
E			Skin/Eye Corrosion Corrosive to Metals
F			Self-Reactive Substances Organic Peroxides
N/A	N/A		Explosive Substances (Explosives are still covered under WHMIS exclusions for now)
N/A	N/A		Aspiration, STOT (Single Exposure, Repeated Exposure)
N/A	N/A	N/A	Combustible Dusts
N/A	N/A	N/A	Simple Asphyxiants
N/A	N/A	Use appropriate symbol	Physical Hazards Not Otherwise Classified, Health Hazards Not Otherwise Classified

SECTION 4

SAFETY ASSIGNMENT AND QUIZZES

SECTION 4: SAFETY ASSIGNMENTS AND QUIZZES

SECTION OVERVIEW

This section contains sample tests and assignments related to safety. They are designed as samples that can be used as written or edited for your purposes. They can be used for evaluation of the safety expectations of the course, or as tools to assess the student's knowledge and understanding of safety. It is recommended that all teachers keep a record of all tests or assignment results and/or passports (next section) as verification of each student's understanding of safe concepts and practices.

The equipment and safety practices in individual facilities will determine how a teacher can best use these resources in the teaching of safe work practices. As well, with the **SafetyNET** resources online at **OCTE** lab, there are additional resources always being updated, and available for download in .zip files.

NOTE:
All materials within this document are to be considered as suggestions and recommendations only. These are not legal documents and are not to be considered as legal requirements or as official policy. OCTE or the individual contributors makes no claim to the accuracy or the completeness of the enclosed documents and accepts no responsibility for any damages pertaining to their use. Users of this document should not assume all warnings and precautionary measures are contained herein, that additional information or measures are not required, or that local by-laws, regulations or Board policies are explicitly included.

Please see specific equipment manuals for further safety information, as well as local, Board and school policies and regulations. Please review exemplar TMJ OCTE lab Safety NET resource documents for experienced teacher tips and customization options for your course projects.

Direct Text Format for Google Forms Importers

Copy and paste the *Plain Text* below into Google Docs or any Google Forms import add-on such as Form Builder / FormApp

Safety Assignment # 1 – Room Inventory and Safety Identification

Use a ruler/straight edge to draw a neat floor plan of your shop and identify the location of the following. Show the work zones around major equipment. Check off each item to ensure you have covered everything:

Entrance/exit doors	
Safety exit	
Fire extinguishers	
Fire alarm	
First aid kit	
Power shut-off or emergency "stop" buttons	
Electrical outlets	
Exhaust fans/hoods	
Sink areas	
Waste disposal containers	
Work tables/work surfaces	
Computer work areas	
Equipment and tool storage areas	
Chemicals storage	
Consumable supplies storage	
Gloves storage	
Apron/coverall storage	
Safety glasses storage	
Welding Gas storage	
Traffic areas	
Machining areas	
Welding areas	
Materials Supplies Storage	

****Note: Teachers are encouraged to add additional equipment or areas to this list as it suits their particular needs and shop equipment.****

Safety Assignment # 2 – General Safety

In groups of two, analyze the issue you have been assigned and provide a detailed description of the safety requirements for that issue. Information for research may be found in a variety of places including textbooks, the Internet, equipment manuals, or from local suppliers. A 5-10 minute group presentation will be made to the class in which your group will describe the topic and the importance of safety in a manufacturing technology environment.

- Group 1 Arc/MIG/TIG welding
- Group 2 Oxy-acetylene welding and cutting
- Group 3 Plasma Arc cutting
- Group 4 Sheet Metal fabrication
- Group 5 Grinding
- Group 6 Engine lathe operations
- Group 7 Drilling operations
- Group 8 Milling operation
- Group 9 Sanding/Finishing
- Group 10 Chemicals, solvents, and fluids

****Note: Teachers are encouraged to add additional equipment or areas to this list as it suits their particular needs and shop equipment.****

Safety Assignment # 3 – Perform a Safety Audit

Once a month, a group of you will be assigned to perform a safety audit of the workshop. To accomplish this task, the group must first design a safety checklist that will be used for the inspection. The checklist must include the headings of:

1. First aid kit content status
2. Status of safety equipment
3. Status of fire protection equipment
4. Status of cleaning supplies and equipment
5. Status of storage areas
6. Status of tools and equipment
7. Status of materials storage
8. Status of housekeeping

Your teacher will give you information about safety standards. Prepare a checklist for a safety audit of the shop. When you have approval for your checklist, perform the initial audit and report back to your teacher.

WELDING SAFETY & HAZARDS ASSESSMENT

Name: _____

Date: _____

Score: _____ **/ 36**

PART 1: WELDING HAZARDS

1. What are the ten major hazards in welding operations?
   Answer:
   _____
   __
2. What four types of radiant energy should the welder guard against?
   Answer:
   _____
   __
3. What effects can metal fumes have on the body?
   Answer:
   _____
   __
4. How can sparks and slag pose a hazard?
   Answer:
   _____
   __
5. What two main hazards may result from the use of electricity?
   Answer:
   _____
   __
6. What chemical sources can a welder be exposed to?
   Answer:
   _____
   __
7. What are four welding heat sources that may cause fires?
   Answer:
   _____
   __

8. What four causes of explosions must the welder guard against?
   Answer:

   _____

   __

PART 2: WELDING SAFETY EQUIPMENT & APPAREL

1. Name the three natural clothing materials recommended for welders.
   Answer:

   _____

   __
2. What laundry product reduces the ability of clothing to repel sparks?
   Answer:

   _____

   __
3. Why are synthetic materials not recommended for welders?
   Answer:

   _____

   __
4. Give two requirements regarding the fit of welding goggles.
   Answer:

   _____

   __
5. What device should be used to prevent fumes from accumulating in a poorly ventilated area?
   Answer:

   _____

   __
6. What are two functions of earmuffs and earplugs in welding?
   Answer:

   _____

   __
7. Name three things that can affect the seal of a full-face respirator.
   Answer:

   _____

   __

PART 3: WELDING FIRES AND EXPLOSIONS

1. How do air ducts and shafts increase fire hazards?
   Answer:

   _____
   __
2. What danger is posed by excessive oxygen in the atmosphere?
   Answer:

   _____
   __
3. What must flammable gases, vapours, liquids, or dusts be mixed with to create an explosive atmosphere?
   Answer:

   _____
   __
4. Why should gas cylinders, hoses, and torches be kept outside a confined space where welding is being done?
   Answer:

   _____
   _

PART 4: WELDING FUMES AND GASES

1. To reduce the danger of fumes, what is the first, simplest, and most basic precaution?
   Answer:

   _____
   __
2. What product, used to treat metal surfaces, will produce phosphine gas?
   Answer:

   _____
   __
3. What gas may be produced by degreasing fluids?
   Answer:

   _____
   __
4. What plastic material should be stripped or removed from the weld area

before welding or cutting?
Answer:

_____
__

5. What vapours change into a dangerous gas when acted upon by ultraviolet light?
   Answer:

   _____
   __
6. What causes negative pressure in some respirator face pieces?
   Answer:

   _____
   __
7. Which is better: a negative or a positive pressure face piece?
   Answer:

   _____
   __
8. If the cartridge or canister of an air-purifying respirator becomes hot, what does this signify?
   Answer:

   _____
   __
9. Name four factors, other than clothing, that can interfere with the fit of a respirator face piece.
   Answer:

   _____
   __

PART 5: CONTAINERS AND WELDING

1. If it is not known what substance a container has held, what should you assume?
   Answer:

   _____
   __
2. Name four substances whose dust are flammable.
   Answer:

3. What gas may be produced when an acid reacts with a metal container?
   Answer:

4. Name three methods of cleaning a container.
   Answer:

5. Name the five major steps that must be taken before welding or cutting on a container.
   Answer:

6. How does purging a vessel differ from cleaning?
   Answer:

7. What does it mean to "isolate" a container?
   Answer:

8. At the same voltages, why is AC more dangerous than DC?
   Answer:

ANSWER KEY

PART 1: WELDING HAZARDS

1. Ten Hazards: Radiant energy, temperature extremes, fumes and gases, noise, sparks and slag, electrical shock, chemicals, fires, explosions, tripping hazards.
2. Four Types of Radiant Energy: Visible light, ultraviolet (UV) light, infrared (IR) rays, X-rays and gamma rays.
3. Metal Fumes Effects: Can damage the lining of the lungs. Prolonged exposure can damage other organs or cause death.
4. Sparks and Slag Hazards: Can cause fires, burn exposed skin, damage hearing, and cause eye injuries.
5. Two Electrical Hazards: Shock and burns.
6. Chemical Sources: Fluxes, anti-spatter compounds, glues, rust inhibitors, paints, degreasers, and plastics.
7. Four Heat Sources: The torch flame; sparks from welding, cutting, and grinding; used welding rods and electrode stubs; the weld deposit; the base metal; slag.
8. Four Explosion Causes: Incorrect equipment usage, using damaged equipment/containers, welding on a pressurized container, welding near explosive materials.

PART 2: WELDING SAFETY

1. Recommended Materials: Cotton, wool, and leather.
2. Spark Repellent Reducer: Fabric softeners.
3. Synthetic Materials Warning: They can melt when struck by sparks (Note: specialized treated synthetic flame barriers exist, but standard synthetics melt).
4. Goggle Fit Requirements: Must fit comfortably over safety glasses/spectacles and make full-face contact.
5. Fume Prevention Device: A portable exhaust fan / local exhaust ventilation.
6. Hearing Protection Functions: Excludes high noise levels and prevents sparks/slag from entering the ear canal.
7. Seal Interference: Facial hair, clothing, goggles, and eyeglasses.

PART 3: WELDING FIRES AND EXPLOSIONS

1. Air Ducts/Shafts: Can carry sparks to distant areas of a facility unnoticed.
2. Excess Oxygen Danger: Causes non-combustible materials to burn or causes flammable materials to burn far more fiercely.
3. Explosive Atmosphere Mix: Oxygen (or the oxygen present in air).
4. Confined Spaces Precaution: Because they may leak, allowing dangerous gases to accumulate in the confined atmosphere

PART 4: WELDING FUMES AND GASES

1. First Line of Defense: Staying to one side of the welding plume.
2. Phosphine Gas Producer: Rust inhibitors.
3. Degreasing Fluid Gas: Phosgene.
4. Plastic Removal: Teflon-type plastics.
5. UV Reactive Vapours: Vapours of chlorinated hydrocarbon degreasers.
6. Negative Pressure Cause: Inhalation by the wearer.
7. Best Face Piece: Positive pressure face piece.
8. Hot Filter Cartridge Sign: High concentrations of gas or vapour are being absorbed.
9. Respirator Fit Factors: Sideburns, beard, mustache, eyeglasses, and goggles.

PART 5: CONTAINERS AND WELDING

1. Unknown Substance Assumption: Assume the container held a flammable or dangerous substance.
2. Flammable Dusts: Sugar, wheat, coal, and wood.
3. Acid-Metal Reaction Gas: Hydrogen gas.
4. Three Cleaning Methods: Water washing, low-pressure steam, or chemical cleaning combined with low-pressure steam.
5. Five Steps Before Welding Containers:
    a. Identify contents
    b. Determine internal combustion potential
    c. Clean
    d. Purge
    e. Isolate
6. Purging vs. Cleaning: *Cleaning* removes bulk liquids, solids, and loose

vapours. *Purging* displaces remaining vapours and excludes air/oxygen.

7. Isolating a Container: Disconnecting or blanking off any connected pipes that carry dangerous substances.
8. AC vs. DC Danger: AC can cause muscle spasms that force a person to tighten their grip on the conductor; DC tends to cause a single violent muscle contraction that can throw a person away from the conductor.

**** The format of this assessment is designed to be imported into Google Forms.****

MANUFACTURING EQUIPMENT SAFETY GUIDELINES CULMINATING ACTIVITY

Each piece of equipment we use in the manufacturing facility has specific safety and operating guidelines and procedures. The purpose of this activity is to research the equipment and produce safety information sheets on all of the equipment. The safety sheets will be laminated and used as reference material for all manufacturing technology students. You must include the following information on all safety information sheets:

1. **name of equipment (i.e., Plasma arc cutter)**
2. **function of equipment (i.e., Cut and shape metal)**
3. **safety guidelines**
4. **correct operating procedures**

You are developing important mandatory material that will be used by all manufacturing students. The information sheets must be precise and easy to follow. Material reference information such as equipment manuals provided by the manufacturer is your main source.
The web may give you additional information as well as the training you received through the manufacturing program. If you have any questions at any time, please ask!

Equipment list:

1. Engine Lathe
2. Vertical Milling Machine
3. Oxy-Acetylene Welder
4. MIG Welder
5. TIG Welder
6. Horizontal Bandsaw
7. Vertical Bandsaw
8. Arbor Press
9. Plasma Arc Cutter
10. Squaring Shear
11. Pedestal Grinder
12. Tube Bender
13. Angle Grinder
14. Robot

Sample

Manufacturing Facilities Health and Safety Inspection Checklist

Teacher Inspecting: _____

Student Inspecting: _____

Date of Inspection: _____

AREA INSPECTED	CONDITION	ACTIONS NEEDED	DATE RECTIFIED
Outlets			
Electrical Equipment and Extension Cords			
Emergency Power Switches/Breakers			
Fire Extinguishers			
Exit and Light Fixtures			
Exhaust Fans and Hoods			
Traffic Areas			
Ceiling Tiles and Fixtures			
Floor Tiles/Carpet and Surfaces			
Sink Area and Cleaning Areas			
Chemical Storage and Labeling			
Eye Wash Station			
First Aid Kit			
Safety Glasses/Goggles			

AREA INSPECTED	CONDITION	ACTIONS NEEDED	DATE RECTIFIED
Outlets			
Electrical Equipment and Extension Cords			
Emergency Power Switches/Breakers			
Fire Extinguishers			
Exit and Light Fixtures			
Exhaust Fans and Hoods			
Traffic Areas			
Ceiling Tiles and Fixtures			

****Note: Teachers are encouraged to add additional equipment or areas to this list as it suits their particular needs and shop equipment.****

WHMIS 2015 & SDS QUIZ

Name: _____

Date: _____

Part 1: Short Answer

1. Define WHMIS and SDS.

2. What is the responsibility of the employer in regards to WHMIS 2015 according to the Occupational Health and Safety Act of Ontario?

Part 2: Multiple Choice

1. If a hazardous material has more than 100 milliliters in one container, the label must have additional information which includes:

a) the company's chemist b) risk time factor

c) b and d d) precautionary measures while exposed to the product

2. Workplace labels must contain a material identifier or product name, reference to

a SDS, precautionary steps, and:

a) an emergency phone number b) the hospital's phone number

c) first aid measures d) the company's phone number

3. In Canada, a supplier's WHMIS 2015 label must be written in:

a) French b) English

c) Chinese d) both Official Languages

4. A supplier when selling a hazardous material product must include:

a) a rebate b) SDS

c) WHMIS 2015 d) OH&S

5. A Safety Data Sheet should be:

a) kept on file forever b) read and then thrown out

c) photocopied for all workers d) placed in a binder and kept for 3 years

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

Part 1: Short Answer

1. WHMIS: Workplace Hazardous Materials Information System
   SDS: Safety Data Sheets
2. To inform employees of hazardous materials.

Part 2: Multiple Choice

1. c *(b and d)*
2. c *(first aid measures)*
3. d *(both Official Languages)*
4. b *(SDS)*
5. d *(placed in a binder and kept for 3 years)*

Direct Text Format for Google Forms Importers

(Copy and paste the plain text below into Google Docs or any Google Forms import add-on such as Form Builder / FormApp)

Plaintext

None

```
Part 1: Short Answer

1. Define WHMIS and SDS.

2. What is the responsibility of the employer in regards to
WHMIS 2015 according to the Occupational Health and Safety Act
of Ontario?

Part 2: Multiple Choice

1. If a hazardous material has more than 100 milliliters in
one container, the label must have additional information
which includes:
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c) b and d
d) precautionary measures while exposed to the product

2. Workplace labels must contain a material identifier or
product name, reference to a SDS, precautionary steps, and:
a) an emergency phone number
b) the hospital's phone number
c) first aid measures
d) the company's phone number

3. In Canada, a supplier's WHMIS 2015 label must be written
in:
a) French
b) English
c) Chinese
d) both Official Languages
```

4. A supplier when selling a hazardous material product must include:
a) a rebate
b) SDS
c) WHMIS 2015
d) OH&S

5. A Safety Data Sheet should be:
a) kept on file forever
b) read and then thrown out
c) photocopied for all workers
d) placed in a binder and kept for 3 years

GENERAL SAFETY QUIZ

Name: _____ **Date:** _____

Instructions: Circle **T** for True or **F** for False.

1. **T / F** — If you are uncertain about something in the shop, it is okay to ask a peer.
2. **T / F** — If the fire alarm sounds, continue working until told to stop.
3. **T / F** — Shop equipment needs to be cleaned only at the end of the period each day.
4. **T / F** — It is okay to bring a drink into the shop as long as none of the equipment is running.
5. **T / F** — Any adjustments to a machine must be made with the power off.
6. **T / F** — It is okay to talk to a person while they are using a piece of equipment, as long as you do not distract them.
7. **T / F** — It is okay to use a flat screwdriver to scrape some old paint off of a piece of metal.
8. **T / F** — The first aid kit can be stored in the school main office so no one steals the contents.
9. **T / F** — A class "D" fire extinguisher is a must in a manufacturing shop.
10. **T / F** — Once you have passed the safety test/quiz on a piece of equipment you may use the equipment any time without permission.
11. **T / F** — Minor injuries need not be reported.
12. **T / F** — If a machine does not work, report it to the instructor.
13. **T / F** — All guards must be in place and properly working before using the equipment.
14. **T / F** — A safety zone is an area where shop rules do not apply.
15. **T / F** — As long as no one is using the equipment after you, leave it running until you need it again.
16. **T / F** — Safety equipment is necessary only when power is on.
17. **T / F** — A safety zone is an area where shop rules do not apply.
18. **T / F** — Long hair must be tied back before using any power tool.
19. **T / F** — Before working in a construction shop you should know where the emergency exits are.
20. **T / F** — Any adjustments to a machine must be made with the power off.

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Plaintext

```
None
1. If you are uncertain about something in the shop, it is
okay to ask a peer.
a) True
b) False

2. If the fire alarm sounds, continue working until told to
stop.
a) True
b) False

3. Shop equipment needs to be cleaned only at the end of the
period each day.
a) True
b) False

4. It is okay to bring a drink into the shop as long as none
of the equipment is running.
a) True
b) False

5. Any adjustments to a machine must be made with the power
off.
a) True
b) False

6. It is okay to talk to a person while they are using a piece
of equipment, as long as you do not distract them.
a) True
b) False

7. It is okay to use a flat screwdriver to scrape some old
paint off of a piece of metal.
a) True
b) False
```

8. The first aid kit can be stored in the school main office so no one steals the contents.
a) True
b) False

9. A class “D” fire extinguisher is a must in a manufacturing shop.
a) True
b) False

10. Once you have passed the safety test/quiz on a piece of equipment you may use the equipment any time without permission.
a) True
b) False

11. Minor injuries need not be reported.
a) True
b) False

12. If a machine does not work, report it to the instructor.
a) True
b) False

13. All guards must be in place and properly working before using the equipment.
a) True
b) False

14. A safety zone is an area where shop rules do not apply.
a) True
b) False

15. As long as no one is using the equipment after you, leave it running until you need it again.
a) True
b) False

16. Safety equipment is necessary only when power is on.
a) True
b) False

17. A safety zone is an area where shop rules do not apply.
a) True
b) False

18. Long hair must be tied back before using any power tool.
a) True
b) False

19. Before working in a construction shop you should know where the emergency exits are.
a) True
b) False

20. Any adjustments to a machine must be made with the power off.
a) True
b) False

Answer Key

1. **b) False 2. a) True 3. b) False 4. b) False 5. b) False 6. b) False 7. b) False 8. b) False 9. b) False 10. b) False 11. a) True 12. a) True 13. b) False 14. a) True 15. b) False 16. b) False 17. b) False 18. a) True 19. a) True 20. a) True**

GENERAL SAFETY RULES QUIZ

Name: _____ **Date:** _____

1. What is the rule regarding tool selection?
a) Use whatever tool is nearest to you
b) Always use the proper tool for the job
c) Modify tools to fit non-standard jobs
d) Use hand tools for heavy power machinery tasks

2. How should hand tools be carried safely?
a) In your pockets with cutting edges facing up
b) Pointed down and away from your body
c) Tossed gently to a coworker
d) Over your shoulder

3. What is the correct procedure for handling electrical cords and plugs?
a) Pull the cord directly to disconnect from the wall
b) Inspect cords for damage and pull by the plug, not the cord
c) Use taped cords even if internal wires are visible
d) Run cords across active traffic pathways

4. What should be done with portable tools when they are not in use?
a) Leave them running on the workbench
b) Leave them plugged in on the floor
c) Turn them off, unplug them, and store them properly
d) Lock the power switch to ON

5. How must a workpiece be secured before starting a machine operation?
a) Hold it loosely with one hand
b) Have a partner hold it down
c) Firmly clamp or secure it using a vice or fixture
d) Let gravity hold it in place

6. What is the rule regarding safety guards on shop equipment?
a) Guards may be removed for better visibility
b) Guards are optional for experienced operators
c) Safety guards must be in place and properly functioning before operation
d) Guards are only needed when using high speeds

7. How should operators handle moving parts on equipment?

a) Keep hands, clothing, and hair clear of all moving parts
b) Touch moving parts to test machine vibration
c) Clean moving parts while the machine is running
d) Wear loose gloves while touching rotating spindles

8. How many people should operate a single machine at one time?

a) As many people as can fit around the work table
b) Two people controlling switches together
c) Only one person operates a machine at a time
d) Three people per machine

9. What must you ensure before leaving a machine unattended?

a) Make sure it is completely stopped before walking away
b) Walk away while it slows down on its own
c) Leave it running for the next student
d) Slow it down using your hands

10. What should you do if you discover a broken or damaged tool?

a) Try to repair it yourself without telling anyone
b) Put it back in storage quietly
c) Report it immediately to the instructor and do not use it
d) Use it carefully anyway

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Plaintext

None

```
1. What is the rule regarding tool selection?
a) Use whatever tool is nearest to you
b) Always use the proper tool for the job
c) Modify tools to fit non-standard jobs
d) Use hand tools for heavy power machinery tasks

2. How should hand tools be carried safely?
a) In your pockets with cutting edges facing up
b) Pointed down and away from your body
c) Tossed gently to a coworker
d) Over your shoulder

3. What is the correct procedure for handling electrical cords
and plugs?
a) Pull the cord directly to disconnect from the wall
b) Inspect cords for damage and pull by the plug, not the cord
c) Use taped cords even if internal wires are visible
d) Run cords across active traffic pathways

4. What should be done with portable tools when they are not
in use?
a) Leave them running on the workbench
b) Leave them plugged in on the floor
c) Turn them off, unplug them, and store them properly
d) Lock the power switch to ON

5. How must a workpiece be secured before starting a machine
operation?
a) Hold it loosely with one hand
b) Have a partner hold it down
c) Firmly clamp or secure it using a vice or fixture
d) Let gravity hold it in place

6. What is the rule regarding safety guards on shop equipment?
a) Guards may be removed for better visibility
b) Guards are optional for experienced operators
```

c) Safety guards must be in place and properly functioning before operation
d) Guards are only needed when using high speeds

7. How should operators handle moving parts on equipment?
a) Keep hands, clothing, and hair clear of all moving parts
b) Touch moving parts to test machine vibration
c) Clean moving parts while the machine is running
d) Wear loose gloves while touching rotating spindles

8. How many people should operate a single machine at one time?
a) As many people as can fit around the work table
b) Two people controlling switches together
c) Only one person operates a machine at a time
d) Three people per machine

9. What must you ensure before leaving a machine unattended?
a) Make sure it is completely stopped before walking away
b) Walk away while it slows down on its own
c) Leave it running for the next student
d) Slow it down using your hands

10. What should you do if you discover a broken or damaged tool?
a) Try to repair it yourself without telling anyone
b) Put it back in storage quietly
c) Report it immediately to the instructor and do not use it
d) Use it carefully anyway

Answer Key

1. **b**
2. **b**
3. **b**
4. **c**
5. **c**
6. **c**
7. **a**
8. **c**
9. **a**
10. **c**

BAND SAW SAFETY QUIZ

Name: _____ **Date:** _____

1. When using the band saw, _____ are required when making curved cuts.

a) relief cuts
b) straight cuts
c) cross cuts
d) bevel cuts

2. You should adjust the _____ above the work before beginning to cut.

a) lower guide
b) upper guide
c) miter gauge
d) tension wheel

3. Narrow blades are best suited for cutting _____ curves.

a) wide
b) tight
c) straight
d) thick

4. When cutting with the band saw, the blade should cut on the _____ side of the work piece line.

a) keep
b) center
c) waste
d) finished

5. Saw curves gradually. Sudden twists will cause the blade to _____ or _____.

a) slip or turn
b) bend or melt
c) bind or break
d) stretch or dull

6. When using the band saw, keep your hands _____ or _____ the blade. Never in front.

a) beside or behind
b) above or below
c) under or against
d) over or near

7. Inspect all _____ before using any saw.

a) measurements
b) guards
c) extensions
d) table slots

8. Always support _____ pieces properly.

a) square
b) flat
c) round
d) thin

9. Use _____ sticks on small pieces.

a) push
b) ruler
c) guide
d) stop

10. Use the _____ procedure when changing blades.

a) high speed
b) lock-out
c) fast track
d) manual push

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **a** (relief cuts)
2. **b** (upper guide)
3. **b** (tight)
4. **c** (waste)
5. **c** (bind, break)
6. **a** (beside, behind)
7. **b** (guards)
8. **c** (round)
9. **a** (push)
10. **b** (lock-out)

Plaintext

None

```
1. When using the band saw, _____________ are required when
making curved cuts.
a) relief cuts
b) straight cuts
c) cross cuts
d) bevel cuts

2. You should adjust the _____________ above the work before
beginning to cut.
a) lower guide
b) upper guide
c) miter gauge
d) tension wheel

3. Narrow blades are best suited for cutting _____________
curves.
a) wide
b) tight
c) straight
d) thick

4. When cutting with the band saw, the blade should cut on the
_____________ side of the work piece line.
a) keep
b) center
c) waste
d) finished

5. Saw curves gradually. Sudden twists will cause the blade to
_____________ or _____________.
a) slip or turn
b) bend or melt
c) bind or break
d) stretch or dull
```

6. When using the band saw, keep your hands _____ or _____ the blade. Never in front.
a) beside or behind
b) above or below
c) under or against
d) over or near

7. Inspect all _____ before using any saw.
a) measurements
b) guards
c) extensions
d) table slots

8. Always support _____ pieces properly.
a) square
b) flat
c) round
d) thin

9. Use _____ sticks on small pieces.
a) push
b) ruler
c) guide
d) stop

10. Use the _____ procedure when changing blades.
a) high speed
b) lock-out
c) fast track
d) manual push

HORIZONTAL BANDSAW SAFETY QUIZ

Name: _____ **Date:** _____

1. Always wear _____ when operating the horizontal bandsaw.
a) face shields
b) safety glasses
c) leather gloves
d) tinted goggles

2. Ensure all _____ are fitted, secure and functional.
a) handles
b) clamps
c) guards
d) belts

3. Ensure the hydraulic _____ mechanism is functioning, and the head of the unit is locked in the upward position.
a) damping
b) lifting
c) cooling
d) pumping

4. Check the _____ to ensure it is in good condition.
a) power cord
b) blade
c) frame
d) stand

5. Check for proper blade speed, _____, and tracking.
a) width
b) sharpness
c) tension
d) length

6. Clamp the workpiece firmly into the _____.
a) vise
b) table
c) chuck
d) frame

7. Long material must be properly _____.
a) balanced
b) supported
c) clamped twice
d) measured

8. Allow the blade to come down _____ until the teeth are contacting the material.
a) quickly
b) slowly
c) automatically
d) heavily

9. Keep your _____ away from blade and cutting area.
a) elbows
b) fingers
c) sleeves
d) feet

10. Turn off the machine and bring it to a complete _____ if the blade needs to be lifted out of an incomplete or jammed cut.
a) pause
b) speed
c) stop
d) position

11. Ensure the cutting head is locked in the _____ position before removing the workpiece from the vice.
a) downward
b) upward
c) neutral
d) locked-down

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ANSWER KEY

1. **b** (safety glasses)
2. **c** (guards)
3. **a** (damping)
4. **b** (blade)
5. **c** (tension)
6. **a** (vise)
7. **b** (supported)
8. **b** (slowly)
9. **b** (fingers)
10. **c** (stop)
11. **b** (upward)

Plaintext

None

```
1. Always wear _____________ when operating the horizontal
bandsaw.
a) face shields
b) safety glasses
c) leather gloves
d) tinted goggles

2. Ensure all _____________ are fitted, secure and functional.
a) handles
b) clamps
c) guards
d) belts

3. Ensure the hydraulic _____________ mechanism is
functioning, and the head of the unit is locked in the upward
position.
a) damping
b) lifting
c) cooling
d) pumping

4. Check the _____________ to ensure it is in good condition.
a) power cord
b) blade
c) frame
d) stand

5. Check for proper blade speed, _____________, and tracking.
a) width
b) sharpness
c) tension
d) length

6. Clamp the workpiece firmly into the _____________.
a) vise
b) table
```

c) chuck
d) frame

7. Long material must be properly _____.
a) balanced
b) supported
c) clamped twice
d) measured

8. Allow the blade to come down _____ until the teeth are contacting the material.
a) quickly
b) slowly
c) automatically
d) heavily

9. Keep your _____ away from blade and cutting area.
a) elbows
b) fingers
c) sleeves
d) feet

10. Turn off the machine and bring it to a complete _____ if the blade needs to be lifted out of an incomplete or jammed cut.
a) pause
b) speed
c) stop
d) position

11. Ensure the cutting head is locked in the _____ position before removing the workpiece from the vice.
a) downward
b) upward
c) neutral
d) locked-down

BELT AND DISK SANDER SAFETY QUIZ

Name: _____ **Date:** _____

1. Wear _____ goggles or a face shield.
a) tinted
b) safety
c) clear
d) standard

2. Secure the _____ position before beginning sanding procedures.
a) belt
b) table
c) guard
d) motor

3. Check the _____ of the disk. Work on the downward side of the motion.
a) speed
b) rotation
c) size
d) grit

4. Wear a _____ mask when sanding treated wood. Put the vacuum on.
a) cloth
b) dust
c) full face
d) paper

5. Only one person _____ the machine at a time.
a) cleans
b) operates
c) adjusts
d) inspects

6. Remove _____ and tie back long hair.
a) gloves
b) jewelry
c) aprons
d) rings

7. Let the work _____ on the table and do not force it into the disk or the belt.
a) push
b) rest
c) slide
d) press

8. Keep your _____ away from the edge that contacts the sandpaper.
a) clothes
b) fingers
c) hands
d) wrists

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (safety)
2. **b** (table)
3. **b** (rotation)
4. **b** (dust)
5. **b** (operates)
6. **b** (jewelry)
7. **b** (rest)
8. **b** (fingers)

Plaintext

None

```
1. Wear _____________ goggles or a face shield.
a) tinted
b) safety
c) clear
d) standard

2. Secure the _____________ position before beginning sanding
procedures.
a) belt
b) table
c) guard
d) motor

3. Check the _____________ of the disk. Work on the downward
side of the motion.
a) speed
b) rotation
c) size
d) grit

4. Wear a _____________ mask when sanding treated wood. Put
the vacuum on.
a) cloth
b) dust
c) full face
d) paper

5. Only one person _____________ the machine at a time.
a) cleans
b) operates
c) adjusts
d) inspects

6. Remove _____________ and tie back long hair.
a) gloves
b) jewelry
```

c) aprons
d) rings

7. Let the work _____ on the table and do not force it into the disk or the belt.
a) push
b) rest
c) slide
d) press

8. Keep your _____ away from the edge that contacts the sandpaper.
a) clothes
b) fingers
c) hands
d) wrists

CNC PLASMA CUTTER QUIZ

Name: _____ **Date:** _____

1. Always wear proper _____ when operating the CNC Plasma Cutter.
a) clothing
b) PPE
c) boots
d) apron

2. Any CNC machine may operate _____ without warning.
a) slowly
b) automatically
c) continuously
d) backward

3. Be aware and know the position of the on/off switches and emergency _____ button.
a) STOP
b) PAUSE
c) RESET
d) START

4. Keep the immediate work area around the cutter clear of materials that might cause _____ with machine operation.
a) damage
b) interference
c) fire
d) clutter

5. Ensure the _____ is on and functioning properly before beginning to cut.
a) water bed
b) exhaust fan
c) compressor
d) torch height controller

6. Always refer to the _____ for proper speeds and feeds for the material type and thickness.

a) chart on wall
b) owner's manual
c) instructor
d) computer screen

7. Do not leave the CNC Plasma Cutter _____ when the machine is running.

a) open
b) unattended
c) ungrounded
d) unmonitored

8. Check the area around the CNC Plasma Cutter to ensure it is free from _____ materials.

a) wet
b) combustible
c) metal
d) heavy

9. Never use the CNC Plasma Cutter in areas where combustible or _____ gasses/materials are located.

a) inert
b) explosive
c) compressed
d) toxic

10. _____ the machine before performing any service or repair on the CNC Plasma Cutter.

a) Turn off
b) Lock out
c) Unplug
d) Clean

11. _____ is recommended when using the plasma arc cutter to protect your ears.
a) Ear plugs
b) Hearing protection
c) Noise hood
d) Ear muffs

12. Use pliers, clamps or welding tongs to hold _____ metal.
a) sharp
b) hot
c) heavy
d) thin

13. _____ hot metal or allow it to cool before handling.
a) Wash
b) Quench
c) Drop
d) Paint

14. Make sure others in the work area are protected from _____, fumes and splatter.
a) sparks
b) plasma arc rays
c) heat
d) flash

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (PPE)

2. **b** (automatically)
3. **a** (STOP)
4. **b** (interference)
5. **b** (exhaust fan)
6. **b** (owner's manual)
7. **b** (unattended)
8. **b** (combustible)
9. **b** (explosive)
10. **b** (Lock out)
11. **b** (Hearing protection)
12. **b** (hot)
13. **b** (Quench)
14. **b** (plasma arc rays)

Plaintext

None

```
1. Always wear proper _____________ when operating the CNC
Plasma Cutter.
a) clothing
b) PPE
c) boots
d) apron

2. Any CNC machine may operate _____________ without warning.
a) slowly
b) automatically
c) continuously
d) backward

3. Be aware and know the position of the on/off switches and
emergency _____________ button.
a) STOP
b) PAUSE
c) RESET
d) START

4. Keep the immediate work area around the cutter clear of
materials that might cause _____________ with machine
operation.
a) damage
b) interference
c) fire
d) clutter

5. Ensure the _____________ is on and functioning properly
before beginning to cut.
a) water bed
b) exhaust fan
c) compressor
d) torch height controller
```

6. Always refer to the _____ for proper speeds and feeds for the material type and thickness.
a) chart on wall
b) owner's manual
c) instructor
d) computer screen

7. Do not leave the CNC Plasma Cutter _____ when the machine is running.
a) open
b) unattended
c) ungrounded
d) unmonitored

8. Check the area around the CNC Plasma Cutter to ensure it is free from _____ materials.
a) wet
b) combustible
c) metal
d) heavy

9. Never use the CNC Plasma Cutter in areas where combustible or _____ gasses/materials are located.
a) inert
b) explosive
c) compressed
d) toxic

10. _____ the machine before performing any service or repair on the CNC Plasma Cutter.
a) Turn off
b) Lock out
c) Unplug
d) Clean

11. _____ is recommended when using the plasma arc cutter to protect your ears.

a) Ear plugs
b) Hearing protection
c) Noise hood
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12. Use pliers, clamps or welding tongs to hold _____ metal.
a) sharp
b) hot
c) heavy
d) thin

13. _____ hot metal or allow it to cool before handling.
a) Wash
b) Quench
c) Drop
d) Paint

14. Make sure others in the work area are protected from _____, fumes and splatter.
a) sparks
b) plasma arc rays
c) heat
d) flash

DRILL PRESS SAFETY QUIZ

Name: _____ **Date:** _____

1. Always keep _____ around drill press clean and free of oil and grease.
a) table
b) floor
c) belt
d) handles

2. Always wear _____ when operating the drill press.
a) gloves
b) safety glasses
c) apron
d) earplugs

3. Keep your hands and loose _____ away from revolving parts.
a) hair
b) clothing
c) straps
d) tools

4. The work piece should be _____ before drilling to prevent any accidents.
a) marked
b) clamped
c) oiled
d) measured

5. Never clear metal chips with your hand; always use a _____.
a) rag
b) brush
c) glove
d) compressed air line

6. Forcing a drill into the work can cause the drill to _____.

a) stall
b) break
c) slip
d) bend

7. Never attempt to hold the work piece by _____ when drilling.

a) vice
b) hand
c) pliers
d) clamp

8. Always remove _____ from a hole that has been drilled.

a) chips
b) burrs
c) oil
d) dust

9. Never leave the _____ in the spindle.

a) drill bit
b) chuck key
c) center punch
d) drift punch

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ANSWER KEY

1. **b** (floor)
2. **b** (safety glasses)
3. **b** (clothing)
4. **b** (clamped)
5. **b** (brush)
6. **b** (break)
7. **b** (hand)
8. **b** (burrs)
9. **b** (chuck key)

Plaintext

None

```
1. Always keep _____________ around drill press clean and free
of oil and grease.
a) table
b) floor
c) belt
d) handles

2. Always wear _____________ when operating the drill press.
a) gloves
b) safety glasses
c) apron
d) earplugs

3. Keep your hands and loose _____________ away from revolving
parts.
a) hair
b) clothing
c) straps
d) tools

4. The work piece should be _____________ before drilling to
prevent any accidents.
a) marked
b) clamped
c) oiled
d) measured

5. Never clear metal chips with your hand; always use a
_____________.
a) rag
b) brush
c) glove
d) compressed air line

6. Forcing a drill into the work can cause the drill to
_____________.
```

a) stall
b) break
c) slip
d) bend

7. Never attempt to hold the work piece by _____ when drilling.
a) vice
b) hand
c) pliers
d) clamp

8. Always remove _____ from a hole that has been drilled.
a) chips
b) burrs
c) oil
d) dust

9. Never leave the _____ in the spindle.
a) drill bit
b) chuck key
c) center punch
d) drift punch

FLUID POWER SAFETY QUIZ

Name: _____ **Date:** _____

1. Always wear appropriate _____ when working with fluid power systems.

a) boots
b) PPE
c) coveralls
d) respirators

2. Before working on a fluid power system, remove _____ from the system by operating components and/or removing the fluid power source.

a) oil
b) pressure
c) dirt
d) air

3. Some hydraulic fluid vapours can be quite harmful if _____.

a) touched
b) inhaled
c) heated
d) spilled

4. Accumulators often contain hydraulic and _____ pressure.

a) water
b) air
c) gas
d) mechanical

5. Be careful not to unload a _____ that may cause parts to fly during component disassembly.

a) heavy valve
b) spring force
c) hydraulic hose
d) pressure gauge

6. Over torque of fasteners may _____ fluid power components and cause failure.

a) strip
b) distort
c) crack
d) loosen

7. Use extreme caution when starting up a system for the _____ time.

a) last
b) first
c) second
d) final

8. Keep your work area clean and free of spilled _____.

a) tools
b) fluids
c) hoses
d) fittings

9. Ensure proper _____ are in place where there are moving parts.

a) signs
b) guards
c) locks
d) covers

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (PPE)

2. **b** (pressure)
3. **b** (inhaled)
4. **b** (air)
5. **b** (spring force)
6. **b** (distort)
7. **b** (first)
8. **b** (fluids)
9. **b** (guards)

Plaintext

None

```
1. Always wear appropriate _____________ when working with
fluid power systems.
a) boots
b) PPE
c) coveralls
d) respirators

2. Before working on a fluid power system, remove
_____________ from the system by operating components and/or
removing the fluid power source.
a) oil
b) pressure
c) dirt
d) air

3. Some hydraulic fluid vapours can be quite harmful if
_____________.
a) touched
b) inhaled
c) heated
d) spilled

4. Accumulators often contain hydraulic and _____________
pressure.
a) water
b) air
c) gas
d) mechanical

5. Be careful not to unload a _____________ that may cause
parts to fly during component disassembly.
a) heavy valve
b) spring force
c) hydraulic hose
d) pressure gauge
```

6. Over torque of fasteners may _____ fluid power components and cause failure.
a) strip
b) distort
c) crack
d) loosen

7. Use extreme caution when starting up a system for the _____ time.
a) last
b) first
c) second
d) final

8. Keep your work area clean and free of spilled _____.
a) tools
b) fluids
c) hoses
d) fittings

9. Ensure proper _____ are in place where there are moving parts.
a) signs
b) guards
c) locks
d) covers

LASER CUTTING SAFETY QUIZ

Name: _____ **Date:** _____

1. NEVER LEAVE THE LASER CUTTER when it is:
a) In operation
b) On
c) In the middle of a job
d) All of the above

2. Do not use this machine unless:
a) It is clean and free of debris
b) The fume extraction system is on
c) Both a and b
d) Neither a nor b

3. This type of plastic releases toxic gasses when melted:
a) PLA
b) ABC
c) ABS
d) PVC

4. When setting up a file to be cut, the laser cutter should be set to:
a) Full power
b) The lightest power available
c) The appropriate power and speed based on the material being cut
d) All of the above

5. Why is ventilation/extraction required?
a) Reduction of fire hazard
b) To reduce smoke and smell
c) To keep the machine clean
d) All of the above

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **d**
2. **c**
3. **d** (PVC releases chlorine gas; ABS produces harmful fumes)
4. **c**
5. **d**

Plaintext

None

```
1. NEVER LEAVE THE LASER CUTTER when it is:
a) In operation
b) On
c) In the middle of a job
d) All of the above

2. Do not use this machine unless:
a) It is clean and free of debris
b) The fume extraction system is on
c) Both a and b
d) Neither a nor b

3. This type of plastic releases toxic gasses when melted:
a) PLA
b) ABC
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4. When setting up a file to be cut, the laser cutter should
be set to:
a) Full power
b) The lightest power available
c) The appropriate power and speed based on the material being
cut
d) All of the above

5. Why is ventilation/extraction required?
a) Reduction of fire hazard
b) To reduce smoke and smell
c) To keep the machine clean
d) All of the above
```

PEDESTAL GRINDER SAFETY QUIZ

Name: _____ **Date:** _____

1. Always use a _____ or goggles when grinding.
a) respirator
b) face mask
c) welding helmet
d) clear visor

2. Inspect the grinding _____ before starting the machine.
a) motor
b) wheel
c) rest
d) guard

3. Check the clearance of the tool rest. It should not exceed _____ of an inch.
a) one-quarter
b) one-eighth
c) one-half
d) one-sixteenth

4. When starting up the grinder, always _____ to one side, not directly in front of the wheel.
a) stand
b) look
c) sit
d) lean

5. Check the _____ of the wheel. Excessive revolutions could cause the wheel to shatter.
a) size
b) speed
c) balance
d) width

6. Only use the _____ of the wheel.
a) side
b) face
c) edge
d) corner
7. Feed the work into the wheel _____.
a) quickly
b) gradually
c) firmly
d) intermittently
8. Shut off the machine immediately if the wheel begins to _____ or vibrate.
a) chatter
b) spin
c) spark
d) slow
9. Never use _____ or hands to stop any grinder.
a) wood
b) tools
c) metal
d) rags

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (face mask)

2. **b** (wheel)
3. **b** (one-eighth)
4. **a** (stand)
5. **b** (speed)
6. **b** (face)
7. **b** (gradually)
8. **a** (chatter)
9. **b** (tools)

Plaintext

None

```
1. Always use a _____________ or goggles when grinding.
a) respirator
b) face mask
c) welding helmet
d) clear visor

2. Inspect the grinding _____________ before starting the
machine.
a) motor
b) wheel
c) rest
d) guard

3. Check the clearance of the tool rest. It should not exceed
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a) size
b) speed
c) balance
d) width

6. Only use the _____________ of the wheel.
a) side
```

b) face
c) edge
d) corner

7. Feed the work into the wheel _____.
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b) gradually
c) firmly
d) intermittently

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a) chatter
b) spin
c) spark
d) slow

9. Never use _____ or hands to stop any grinder.
a) wood
b) tools
c) metal
d) rags

HAND TOOLS SAFETY QUIZ

Name: _____ **Date:** _____

1. Hand tools in _____ condition are responsible for many injuries.
a) sharp
b) poor
c) new
d) clean

2. After use, _____ and return the tool to its proper place.
a) oil
b) clean
c) wash
d) inspect

3. All _____ should be removed before beginning work.
a) gloves
b) jewelry
c) aprons
d) hats

4. _____ are the cause of many accidents. Use only sharp tools that are in good condition.
a) Heavy hammers
b) Blunt cutting tools
c) Steel rulers
d) Screwdrivers

5. Always push a chisel _____ from yourself.
a) toward
b) away
c) parallel
d) downward

6. Keep _____ hands on the chisel, unless striking it with a mallet.
a) one
b) both
c) no
d) dominant
7. Use the _____ tool for the job.
a) nearest
b) proper
c) largest
d) newest
8. Always use a file with a _____. Protect your hand from serious injury.
a) glove
b) handle
c) clamp
d) guard
9. Wear _____ whenever you use striking tools.
a) gloves
b) eye protection
c) boots
d) aprons
10. Never _____ behind a person swinging a hammer.
a) walk
b) stand
c) work
d) talk

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (poor)
2. **b** (clean)
3. **b** (jewelry)
4. **b** (blunt cutting tools)
5. **b** (away)
6. **b** (both)
7. **b** (proper)
8. **b** (handle)
9. **b** (eye protection)
10. **b** (stand)

Plaintext

None

1. Hand tools in _____ condition are responsible for many injuries.
a) sharp
b) poor
c) new
d) clean

2. After use, _____ and return the tool to its proper place.
a) oil
b) clean
c) wash
d) inspect

3. All _____ should be removed before beginning work.
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b) jewelry
c) aprons
d) hats

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c) Steel rulers
d) Screwdrivers

5. Always push a chisel _____ from yourself.
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b) away
c) parallel
d) downward

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a) one
b) both

c) no
d) dominant

7. Use the _____ tool for the job.
a) nearest
b) proper
c) largest
d) newest

8. Always use a file with a _____. Protect your hand from serious injury.
a) glove
b) handle
c) clamp
d) guard

9. Wear _____ whenever you use striking tools.
a) gloves
b) eye protection
c) boots
d) aprons

10. Never _____ behind a person swinging a hammer.
a) walk
b) stand
c) work
d) talk

METAL LATHE SAFETY QUIZ

Name: _____ **Date:** _____

1. Always wear _____ when operating the engine lathe.
a) gloves
b) safety glasses
c) aprons
d) face shield

2. Remove _____ and tie back long hair.
a) rings
b) jewelry
c) watches
d) belts

3. Ensure you are familiar with the location and _____ of ON/OFF and Emergency Stop switches.
a) size
b) operation
c) color
d) wiring

4. Make all adjustments/measurements to tools and workpieces with the _____ off.
a) lathe
b) power
c) motor belt
d) light

5. Remove the _____ before starting the lathe.
a) tool bit
b) chuck key
c) tailstock
d) guard

6. Check the tool bit and _____ for security before operating the machine.
a) workpiece
b) chuck key

c) carriage
d) motor

7. Make sure the _____ is sharp and has proper clearance before beginning lathe work.

a) workpiece
b) tool bit
c) center drill
d) chuck key

8. Never leave the lathe running _____.

a) fast
b) unattended
c) overnight
d) in neutral

9. Keep your _____ away from chuck until it has come to a complete stop.

a) hands
b) fingers
c) body
d) tools

10. Remove metal chips and cuttings with a _____.

a) rag
b) brush
c) gloved hand
d) scraper

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (safety glasses)
2. **b** (jewelry)
3. **b** (operation)
4. **b** (power)
5. **b** (chuck key)
6. **a** (workpiece)
7. **b** (tool bit)
8. **b** (unattended)
9. **b** (fingers)
10. **b** (brush)

Plaintext

None

```
1. Always wear _____________ when operating the engine lathe.
a) gloves
b) safety glasses
c) aprons
d) face shield

2. Remove _____________ and tie back long hair.
a) rings
b) jewelry
c) watches
d) belts

3. Ensure you are familiar with the location and _____________
of ON/OFF and Emergency Stop switches.
a) size
b) operation
c) color
d) wiring

4. Make all adjustments/measurements to tools and workpieces
with the _____________ off.
a) lathe
b) power
c) motor belt
d) light

5. Remove the _____________ before starting the lathe.
a) tool bit
b) chuck key
c) tailstock
d) guard

6. Check the tool bit and _____________ for security before
operating the machine.
a) workpiece
b) chuck key
```

c) carriage
d) motor

7. Make sure the _____ is sharp and has proper clearance before beginning lathe work.
a) workpiece
b) tool bit
c) center drill
d) chuck key

8. Never leave the lathe running _____.
a) fast
b) unattended
c) overnight
d) in neutral

9. Keep your _____ away from chuck until it has come to a complete stop.
a) hands
b) fingers
c) body
d) tools

10. Remove metal chips and cuttings with a _____.
a) rag
b) brush
c) gloved hand
d) scraper

MILLING MACHINE - VERTICAL

Name: _____ **Date:** _____

1. Always wear _____ when operating a vertical milling machine.
a) gloves
b) safety glasses
c) apron
d) ear defenders

2. Ensure _____ and _____ are mounted securely before starting the motor and making a cut.
a) table and vise
b) milling cutter and work piece
c) drawbar and collet
d) head and quill

3. Remove chips and cut off material with a _____ when the machine comes to a complete stop.
a) rag
b) brush
c) gloved hand
d) air hose

4. Work areas need to be clean and free of _____.
a) oil
b) debris
c) tools
d) coolants

5. When setting up or removing a _____ from its holder, proper precaution should be taken.
a) vise
b) cutter
c) drawbar
d) workpiece

6. Keep _____ away from revolving parts.
a) hair
b) hands
c) sleeves
d) tools

7. One person only should _____ a machine at any time.
a) adjust
b) operate
c) clean
d) set up

8. Never _____ or _____ work until the cutter is completely stopped.
a) move or touch
b) adjust or measure
c) clean or blow
d) clamp or unclamp

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (safety glasses)
2. **b** (milling cutter, work piece)

3. **b** (brush)
4. **b** (debris)
5. **b** (cutter / milling cutter)
6. **b** (hands)
7. **b** (operate)
8. **b** (adjust, measure)

Plaintext

None

```
1. Always wear _____________ when operating a vertical milling
machine.
a) gloves
b) safety glasses
c) apron
d) ear defenders

2. Ensure _____________ and _____________ are mounted securely
before starting motor and making a cut.
a) table and vise
b) milling cutter and work piece
c) drawbar and collet
d) head and quill

3. Remove chips and cut off material with a _____________ when
the machine comes to a complete stop.
a) rag
b) brush
c) gloved hand
d) air hose

4. Work areas need to be clean and free of _____________.
a) oil
b) debris
c) tools
d) coolants

5. When setting up or removing a _____________ from its
holder, proper precaution should be taken.
a) vise
b) cutter
c) drawbar
d) workpiece

6. Keep _____________ away from revolving parts.
a) hair
```

b) hands
c) sleeves
d) tools

7. One person only should _____ a machine at any time.
a) adjust
b) operate
c) clean
d) set up

8. Never _____ or _____ work until cutter is completely stopped.
a) move or touch
b) adjust or measure
c) clean or blow
d) clamp or unclamp

PLC SAFETY QUIZ

Name: _____ **Date:** _____

1. Minimum PPE for working with PLCs are _____ safety glasses.
a) tinted
b) CSA approved
c) scratch resistant
d) prescription

2. Ensure _____ power is completely turned off when installing or replacing wiring.
a) main
b) external
c) machine
d) control

3. Use wiring _____ or solid wires for wiring to the PLC.
a) nuts
b) terminals
c) clips
d) tape

4. Make all _____ to the PLC and its associated components with the power off.
a) connections
b) adjustments/measurements
c) programs
d) tests

5. Tightening terminal screws to the specified _____ will prevent damage and possible failure.
a) depth
b) torque
c) thread
d) pressure

6. Excessive _____ of wires or cables where they attach to the PLC may lead to wire failure.

a) pulling
b) bending
c) stripping
d) twisting

7. To avoid electrical shock, make sure that _____ are in place and securely attached.

a) wire ties
b) terminal covers
c) fuse boxes
d) relays

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (CSA approved)
2. **b** (external)

3. **b** (terminals)
4. **b** (adjustments/measurements)
5. **b** (torque)
6. **b** (bending)
7. **b** (terminal covers)

Plaintext

None

```
1. Minimum PPE for working with PLCs are _____________ safety
glasses.
a) tinted
b) CSA approved
c) scratch resistant
d) prescription

2. Ensure _____________ power is completely turned off when
installing or replacing wiring.
a) main
b) external
c) machine
d) control

3. Use wiring _____________ or solid wires for wiring to the
PLC.
a) nuts
b) terminals
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4. Make all _____________ to the PLC and its associated
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5. Tightening terminal screws to the specified _____________
will prevent damage and possible failure.
a) depth
b) torque
c) thread
d) pressure
```

6. Excessive _____ of wires or cables where they attach to the PLC may lead to wire failure.
a) pulling
b) bending
c) stripping
d) twisting

7. To avoid electrical shock, make sure that _____ are in place and securely attached.
a) wire ties
b) terminal covers
c) fuse boxes
d) relays

PLASMA ARC CUTTER SAFETY QUIZ

Name: _____ **Date:** _____

1. A minimum _____ #5 should be used when plasma arc cutting.
a) clear lens
b) shaded lens
c) safety visor
d) filter cap

2. _____ clothing should not be worn when plasma arc cutting because they are highly flammable.
a) Cotton
b) Synthetic
c) Wool
d) Leather

3. The _____ plume when plasma arc cutting is large and needs to be well ventilated.
a) smoke
b) fume
c) gas
d) dust

4. Avoid cutting with the plasma arc cutter in _____ locations.
a) outdoors
b) damp or wet
c) cramped
d) elevated

5. PPE including shaded lens, gloves, leather apron and _____ are recommended for plasma arc cutting operations.
a) steel toes
b) hearing protection
c) dust mask
d) arm guards

6. Avoid using the plasma arc cutter in areas where _____ gasses are stored.

a) inert
b) combustible
c) compressed
d) nitrogen

7. Attach the _____ securely to the workpiece or the work table with good metal to metal contact.

a) ground rod
b) work cable
c) power line
d) arc torch

8. Do not connect work cable to material that will _____ when the cut is complete.

a) melt
b) fall away
c) warp
d) drop oil

9. _____ hot metal or allow it to cool before handling or letting it touch combustible materials.

a) Wash
b) Quench
c) Paint
d) Clamp

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (shaded lens)
2. **b** (synthetic)
3. **b** (fume)
4. **b** (damp or wet)
5. **b** (hearing protection)
6. **b** (combustible)
7. **b** (work cable)
8. **b** (fall away)
9. **b** (quench)

Plaintext

None

```
1. A minimum _____________ #5 should be used when plasma arc
cutting.
a) clear lens
b) shaded lens
c) safety visor
d) filter cap

2. _____________ clothing should not be worn when plasma arc
cutting because they are highly flammable.
a) Cotton
b) Synthetic
c) Wool
d) Leather

3. The _____________ plume when plasma arc cutting is large
and needs to be well ventilated.
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5. PPE including shaded lens, gloves, leather apron and
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operations.
a) steel toes
b) hearing protection
c) dust mask
d) arm guards
```

6. Avoid using the plasma arc cutter in areas where _____ gasses are stored.
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b) combustible
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b) work cable
c) power line
d) arc torch

8. Do not connect work cable to material that will _____ when the cut is complete.
a) melt
b) fall away
c) warp
d) drop oil

9. _____ hot metal or allow it to cool before handling or letting it touch combustible materials.
a) Wash
b) Quench
c) Paint
d) Clamp

ROBOTICS SAFETY QUIZ

Name: _____ **Date:** _____

1. Always wear _____ when working with robotic equipment.
a) gloves
b) safety glasses
c) ear protection
d) steel toe boots

2. Ensure that adequate _____ such as safety barriers or light curtains are installed around the robot work area.
a) fences
b) safeguards
c) alarms
d) warning tape

3. Ensure you are familiar with the location and _____ of ON/OFF and Emergency Stop switches.
a) size
b) operation
c) brand
d) wiring

4. Inspect the robot on a _____ basis to ensure that all moving parts are in good working order.
a) weekly
b) regular
c) monthly
d) yearly

5. Remove the _____ before making adjustments to the robot or equipment within the work area.
a) fuse
b) power
c) tool
d) key

6. The robot work cell must _____ with applicable local and national standards.

a) match
b) comply
c) fit
d) align

7. Make sure the _____ limits for the robot are not exceeded.

a) speed
b) payload
c) reach
d) height

8. Never leave the robot running _____.

a) slowly
b) unattended
c) overnight
d) in manual mode

9. Operate the robot in a _____ sequence when running new or modified programs for the first time.

a) fast
b) single step
c) continuous
d) automatic

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (safety glasses)

2. **b** (safeguards)
3. **b** (operation)
4. **b** (regular)
5. **b** (power)
6. **b** (comply)
7. **b** (payload)
8. **b** (unattended)
9. **b** (single step)

Plaintext

None

```
1. Always wear ______________ when working with robotic
equipment.
a) gloves
b) safety glasses
c) ear protection
d) steel toe boots

2. Ensure that adequate ______________ such as safety barriers
or light curtains are installed around the robot work area.
a) fences
b) safeguards
c) alarms
d) warning tape

3. Ensure you are familiar with location and ______________ of
ON/OFF and Emergency Stop switches.
a) size
b) operation
c) brand
d) wiring

4. Inspect the robot on a ______________ basis to ensure that
all moving parts are in good working order.
a) weekly
b) regular
c) monthly
d) yearly
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9. Operate the robot in a _____ sequence when running new or modified programs for the first time.
a) fast
b) single step
c) continuous
d) automatic

SHEET METAL TOOL SAFETY QUIZ

Name: _____ **Date:** _____

1. Ensure the machine is _____ attached to the bench top or floor.
a) loosely
b) securely
c) temporarily
d) double

2. _____ are minimum PPE for sheet metal work.
a) Gloves
b) Safety glasses
c) Aprons
d) Earplugs

3. Cutting sheet metal often creates sharp edges. Wear _____ and use caution when handling sharp edges.
a) aprons
b) gloves
c) sleeves
d) wrist bands

4. Work areas need to be clean and free of _____.
a) oil
b) debris
c) dust
d) tools

5. Ensure that the tool is rated to cut the _____ of metal you're using.
a) width
b) gauge
c) length
d) temper

6. Use the _____ to cut only sheet metal.

a) saw
b) shear
c) punch
d) bender

7. Avoid using excessive _____ when operating any sheet metal tool.

a) speed
b) force
c) pressure
d) weight

8. Ensure all _____ are in place and properly functioning.

a) latches
b) guards
c) levers
d) stops

9. Keep _____ away from working areas.

a) elbows
b) hands and feet
c) hair
d) tools

10. One person only should _____ a machine at any time.

a) adjust
b) operate
c) clean
d) hold

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (securely)

2. **b** (safety glasses)
3. **b** (gloves)
4. **b** (debris)
5. **b** (gauge)
6. **b** (shear)
7. **b** (force)
8. **b** (guards)
9. **b** (hands and feet)
10. **b** (operate)

Plaintext

None

```
1. Ensure the machine is _____________ attached to the bench
top or floor.
a) loosely
b) securely
c) temporarily
d) double

2. _____________ are minimum PPE for sheet metal work.
a) Gloves
b) Safety glasses
c) Aprons
d) Earplugs

3. Cutting sheet metal often creates sharp edges. Wear
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c) sleeves
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c) dust
d) tools

5. Ensure that the tool is rated to cut the _____________ of
metal you're using.
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b) gauge
c) length
d) temper

6. Use the _____________ to cut only sheet metal.
a) saw
b) shear
```

c) punch
d) bender

7. Avoid using excessive _____ when operating any sheet metal tool.
a) speed
b) force
c) pressure
d) weight

8. Ensure all _____ are in place and properly functioning.
a) latches
b) guards
c) levers
d) stops

9. Keep _____ away from working areas.
a) elbows
b) hands and feet
c) hair
d) tools

10. One person only should _____ a machine at any time.
a) adjust
b) operate
c) clean
d) hold

SURFACE GRINDER SAFETY QUIZ

Name: _____ **Date:** _____

1. Always wear _____ when operating a surface grinder.
a) gloves
b) safety glasses
c) ear defenders
d) face shields

2. Operate the surface grinder only after you have received _____ and permission from the instructor.
a) training
b) instruction
c) manual
d) approval

3. Always _____ test the grinding wheel before mounting it to the machine.
a) tap
b) ring
c) spin
d) balance

4. When _____ a grinder, always stand to one side of the wheel.
a) stopping
b) starting
c) cleaning
d) adjusting

5. Ensure that the grinding wheel clears the _____ before starting the grinder.
a) table
b) work
c) guard
d) coolant nozzle

6. Ensure the wheel guard is in place and it covers _____ the wheel.
a) all of
b) half
c) a third of
d) the top of

7. Ensure the _____ is on and holding the workpiece by trying to remove the work.
a) vice
b) magnetic chuck
c) clamp
d) table lock

8. Never attempt to _____ the magnetic chuck or mount/remove work until the wheel has stopped completely.
a) adjust
b) clean
c) move
d) wipe

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (safety glasses)
2. **b** (instruction)

3. **b** (ring)
4. **b** (starting)
5. **b** (work)
6. **b** (half)
7. **b** (magnetic chuck)
8. **b** (clean)

Plaintext

None

```
1. Always wear _____________ when operating a surface grinder.
a) gloves
b) safety glasses
c) ear defenders
d) face shields

2. Operate the surface grinder only after you have received
_____________ and permission from the instructor.
a) training
b) instruction
c) manual
d) approval

3. Always _____________ test the grinding wheel before
mounting it to the machine.
a) tap
b) ring
c) spin
d) balance

4. When _____________ a grinder, always stand to one side of
the wheel.
a) stopping
b) starting
c) cleaning
d) adjusting

5. Ensure that the grinding wheel clears the _____________
before starting the grinder.
a) table
b) work
c) guard
d) coolant nozzle

6. Ensure the wheel guard is in place and it covers
_____________ the wheel.
```

a) all of
b) half
c) a third of
d) the top of

7. Ensure the _____ is on and holding the workpiece by trying to remove the work.
a) vice
b) magnetic chuck
c) clamp
d) table lock

8. Never attempt to _____ the magnetic chuck or mount/remove work until the wheel has stopped completely.
a) adjust
b) clean
c) move
d) wipe

3D PRINTER QUIZ

Name: _____ **Date:** _____

1. Always wear proper _____ when operating the 3D Printer (e.g., safety glasses, goggles, gloves, or lab coats).

a) clothing
b) PPE
c) footwear
d) headgear

2. Be sure to read and understand the _____ before operating.

a) wiring diagram
b) owner's manual
c) material safety sheet
d) software guide

3. Limit equipment access to trained or _____ personnel.

a) certified
b) authorized
c) student
d) senior

4. Before beginning a 3D print, make sure the _____ is clear of build material, debris, or tools.

a) nozzle
b) bed
c) spool holder
d) enclosure

5. Use enclosures for 3D printers and proper _____ to capture chemical emissions.

a) filters
b) ventilation
c) fans
d) ducting

6. Keep the printer away from any _____ as this can affect warping of ABS prints.
a) heat sources
b) drafts
c) windows
d) direct lights

7. Using a printer _____ with lower emissions is recommended.
a) nozzle
b) filament
c) bed cover
d) power supply

8. Never reach inside the 3D printer while it is in operation to avoid the risk of _____ or mechanical injury.
a) cut
b) burn
c) shock
d) pinch

9. Extruder nozzles reach temperatures in excess of _____ degrees Celsius and can cause serious burns.
a) 100
b) 200
c) 300
d) 400

10. Always refer to the owner's manual for instructions on _____ filament.
a) buying
b) adding or removing
c) storing
d) drying

11. Reduce time spent near the printer while it is running to limit _____ to fumes.
a) reaction
b) exposure
c) sensitivity
d) proximity

12. Use caution when removing parts from the _____ as the extruder and platform may be hot.

a) bed
b) build platform
c) printer body
d) glass frame

13. Use only the _____ supplied with the printer, or the printer may be damaged with a risk of fire.

a) filament
b) power adapter
c) USB cable
d) scraper

14. Consult Safety Data Sheets (SDSs) regarding safety information for the _____ you will be using.

a) resin
b) filament
c) glue
d) cleaner

15. Always reference the _____ before operating and servicing equipment.

a) poster
b) owner's manual
c) safety checklist
d) instructor

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

Answer Key

1. **b** (PPE)
2. **b** (owner's manual)
3. **b** (authorized)
4. **b** (bed)
5. **b** (ventilation)
6. **b** (drafts)
7. **b** (filament)
8. **b** (burn)
9. **b** (200 degrees)
10. **b** (adding or removing)
11. **b** (exposure)
12. **b** (build platform)
13. **b** (power adapter)
14. **b** (filament)
15. **b** (owner's manual)

Plaintext

None

```
1. Always wear proper _____________ when operating the 3D
Printer (e.g., safety glasses, goggles, gloves, or lab coats).
a) clothing
b) PPE
c) footwear
d) headgear

2. Be sure to read and understand the _____________ before
operating.
a) wiring diagram
b) owner's manual
c) material safety sheet
d) software guide

3. Limit equipment access to trained or _____________
personnel.
a) certified
b) authorized
c) student
d) senior

4. Before beginning a 3D print, make sure the _____________ is
clear of build material, debris, or tools.
a) nozzle
b) bed
c) spool holder
d) enclosure

5. Use enclosures for 3D printers and proper _____________ to
capture chemical emissions.
a) filters
b) ventilation
c) fans
d) ducting
```

6. Keep the printer away from any _____ as this can affect warping of ABS prints.
a) heat sources
b) drafts
c) windows
d) direct lights

7. Using a printer _____ with lower emissions is recommended.
a) nozzle
b) filament
c) bed cover
d) power supply

8. Never reach inside the 3D printer while it is in operation to avoid the risk of _____ or mechanical injury.
a) cut
b) burn
c) shock
d) pinch

9. Extruder nozzles reach temperatures in excess of _____ degrees Celsius and can cause serious burns.
a) 100
b) 200
c) 300
d) 400

10. Always refer to the owner's manual for instructions on _____ filament.
a) buying
b) adding or removing
c) storing
d) drying

11. Reduce time spent near the printer while it is running to limit _____ to fumes.

a) reaction
b) exposure
c) sensitivity
d) proximity

12. Use caution when removing parts from the _____ as the extruder and platform may be hot.
a) bed
b) build platform
c) printer body
d) glass frame

13. Use only the _____ supplied with the printer, or the printer may be damaged with a risk of fire.
a) filament
b) power adapter
c) USB cable
d) scraper

14. Consult Safety Data Sheets (SDSs) regarding safety information for the _____ you will be using.
a) resin
b) filament
c) glue
d) cleaner

15. Always reference the _____ before operating and servicing equipment.
a) poster
b) owner's manual
c) safety checklist
d) instructor

SECTION 5
SAFETY PASSPORTS AND RECORD CARDS

SECTION 5: SAFETY PASSPORTS AND RECORD CARDS

Overview

This section contains **Safety Passports and Record Cards**, which provide a means to track individual student safety knowledge and skills. These documents ensure that students have passed the required safety tests and understand the safety procedures and rules specific to the tools and equipment. It is recommended that all teachers keep records of signed passports at all times.

Safety Passports may be signed by teachers, parents and students before working on any workshop machine or tool. Signing signifies completion of safety training and testing. There are three variations; teachers may select the most appropriate method to suit their needs. Ensure that the selected passports meet board and school policies.

Safety Record Card: for individual student records their proficiency rating for each machine on one sheet.

Safety Passport: Form 1: single sheet for individual student and machine, has signature area and note area to be used in student notebook

Safety Passport Form 2: sheets for individual students listing machines, for teacher record book

Safety Passport Form 3: individual machine for each individual student, has line for parent signature to be used as a safety reinforcement or authorization, (see principal for permissions)

NOTE:

All materials within this document are to be considered as suggestions and recommendations only. These are not legal documents and are not to be considered as legal requirements or as official policy. OCTE or the individual contributors makes no claim to the accuracy or the completeness of the enclosed documents and accepts no responsibility for any damages pertaining to their use. Users of this document should not assume all warnings and precautionary measures are contained herein, that additional information or measures are not required, or that local by-laws, regulations or Board policies are explicitly included. Please see specific equipment manuals for further safety information, as well as local, Board and school policies and regulations.

Sample Student Safety Record Card

Student Information	**Levels Chart**
Name: **Student #:** **Grade:** **Course/Section:**	**Rating 1:** May set-up equipment only, Instructor must do the work. **Rating 2:** Use only with an instructor's assistance. **Rating 3:** Full use with an instructor standing by to supervise. **Rating 4:** Full use of the machine with an instructor's permission. (**Note:** Lower levels can be upgraded to higher levels with further instruction, practice and proof of competence. **All students** must have Instructor's permission before using any equipment.)

Manufacturing Equipment				**Manufacturing Equipment**			
Equipment	**Rate**	**Sign**	**Date**	**Equipment**	**Rate**	**Sign**	**Date**
Arbor Press				Radial Drill Press			
SMAW Welder				Squaring Shear			
GMAW Welder				Metal Roller			
GTAW Welder				Sheet Metal Brake			
Oxy-Acetylene Welder				Tube Bender			
Plasma Arc Cutter				Angle Grinder			
Beverly Shear				PLC			
Drill Press				Belt/Disk Sander			
Pedestal Grinder				CNC Milling Machine			
Vertical Bandsaw				CNC Plasma Arc Cutter			
Horizontal Bandsaw				Robotics			
Abrasive Cut Off Saw							
Engine Lathe							
Vertical Milling Machine							
Horizontal Milling Machine							
Surface Grinder							

Technology Lab Safety Passport

The purpose of the safety passport is to ensure that students are fully aware of all safety features on each piece of equipment in the technical facility prior to using them independently.

The general process is as follows:

1. **Teacher Demonstration**: When the teacher introduces a new piece of equipment, the student records the date of the safety demonstration on their safety passport. This is to be initiated by the teacher (see sample below). The teacher demonstrates techniques for the safe operation and procedures, as well as use of personal protective equipment (e.g. eye protection, secure loose hair, removing jewelry, protective clothing, etc.). Students prepare notes in their notebooks. This safety note is carefully recorded in each student's notebook along with the signed passport. The teacher also carefully notes attendance for that day in their daybook if any students are absent for the safety lesson; makeup opportunities must be provided.

2. **Test**: Each student should complete a written (or oral) test on the safe operation or procedure, outlining all safety features that must be observed. The individual tests are designed to complement any general facility safety rules. Upon satisfactory completion of the test the student dates the "tested" column and teacher initializes this as complete. **IMPORTANT NOTE: A copy of the test should be kept by the teacher.**

3. **Student Demonstration**: Students must demonstrate to the teacher that they have a thorough knowledge of the safety rules for the equipment and are able to demonstrate their competency on the equipment. Once the teacher has observed the required safe setup and operation of the equipment by a student the teacher signs off that portion of their passport.

4. Once the student has completed #1, 2 and 3, the teacher signs the final column of the student's safety passport indicating they have permission to use that equipment or perform the procedures. Students must be able to provide the teacher with their signed passport for that equipment each time they wish to use that equipment.

Note: Three forms are provided, Form 1 can be used as a student notebook form for each machine; Form 2 can be used for signing several machines per student. With the 2nd form, students keep safety notes on separate paper. The third form requires one sheet per tool per student, and may be used in the student notebook or kept on file by the teacher (or both).

Safety Passport Form 1

Student Name: _____ Course/class: _____

Equipment: _____							
Attended Teacher Safety Instruction and Demonstration (notes recorded)		Passed Written or Oral Testing		Demonstrated Safe Setup and Operation of Equipment to Teacher		Granted Permission to use Equipment by Teacher	
Date of Lesson	Teacher Initial	Date Tested	Teacher Initial	Date of Demo.	Teacher Initial	Date	Teacher Initial

NOTES:

Safety Passport Form 2

Student Name: _____ **Course/Class:** _____

Equipment/Procedure:_____

Attended Teacher Safety Instruction and Demonstration (Notes recorded)		Passed Written or Oral Testing		Demonstrated Safe Set-up and Operation to Teacher		Granted Permission by Teacher	
Date of Lesson	Teacher Initial	Date Tested	Teacher Initial	Date of Demo.	Teacher Initial	Date	Teacher Initial

Equipment/Procedure:_____

Attended Teacher Safety Instruction and Demonstration (Notes recorded)		Passed Written or Oral Testing		Demonstrated Safe Set-up and Operation to Teacher		Granted Permission by Teacher	
Date of Lesson	Teacher Initial	Date Tested	Teacher Initial	Date of Demo.	Teacher Initial	Date	Teacher Initial

Equipment/Procedure:_____

Attended Teacher Safety Instruction and Demonstration (Notes recorded)		Passed Written or Oral Testing		Demonstrated Safe Set-up and Operation to Teacher		Granted Permission by Teacher	
Date of Lesson	Teacher Initial	Date Tested	Teacher Initial	Date of Demo.	Teacher Initial	Date	Teacher Initial

Safety Passport Form 3 Equipment/Procedure Passport

[EQUIPMENT/PROCEDURE]

General Conditions

Personal Protective Equipment

Possible Risk Factor

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ERGONOMICS PASSPORT

General Conditions

1. Improper posture, equipment placement, and repetitive use of equipment may cause injuries and pain.
2. Students must be trained on the safe and proper use of equipment before they may begin using them.
3. The student must demonstrate the ability to use the equipment safely.

Personal Protective Equipment

- Proper posture
- Proper equipment placement
- Change in sitting arrangements, etc. to avoid repetitive stress injuries

Possible Risk Factor

- Spine and back injuries
- Hand Injuries
- Eye strain

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

AIR - COMPRESSED

General Conditions

1. Do not operate machines without the instructor's permission and proper training.
2. Maintain at least 5 meters clearance from the work area, especially when spraying liquids.
3. Designed for air compression only; never compress any other gas.
4. Never direct the air jet toward persons, animals, or yourself.

Personal Protective Equipment

- Safety glasses / Safety goggles /Face shield
- Gloves and proper clothing as appropriate

Possible Risk Factor

- High-pressure skin penetration or embolism from directed air jets
- Electrical shock during cleaning/maintenance
- Pressure vessel rupture if unauthorized gases are compressed

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ARBOR PRESS

General Conditions

1. Mount all work squarely and select the correct plate opening for the shaft size.
2. Apply pressure in a steady, controlled manner; never hammer down on the handle.
3. Oil the shaft and bearing while applying pressure until seated or disengaged.
4. Watch foot placement as heavy shafts may fall when pressed out.
5. Inform the instructor if the bearing fails to move (heat may be applied under supervision).

Personal Protective Equipment

- ➢ Eye protection (safety glasses)
- ➢ Heavy-duty work footwear

Possible Risk Factor

- ➢ Bearing shattering and flying fragments from forcing/overtaxing
- ➢ Foot or toe crushing injuries from falling heavy shafts
- ➢ Physical overexertion or strain

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ARC WELDING (ALL PROCESSES)

General Conditions

1. Ensure the work area is dry, footwear is dry, and the ventilation system is active.
2. Complete a Hot Work Permit; ensure the area is free of flammables; never weld closed/pressurized containers.
3. Never strike an arc without proper welding lenses and welding screens in place.
4. Clamp ground cable firmly to workpiece; handle hot metals using tongs or pliers only.
5. Note: Students wearing contact lenses MUST NOT operate or be exposed to electric arc welders.

Personal Protective Equipment

- ➢ Leather or flame-resistant coat and gauntlet gloves
- ➢ Approved welding helmet with min. shade 10 lens and cover glass (min. shade 8 for observers)

Possible Risk Factor

- ➢ Severe arc eye (photokeratitis) and permanent retinal damage from UV radiation
- ➢ Extreme thermal burns from hot metal, arc rays, or slag
- ➢ Fire or explosion from nearby flammables or pressurized containers
- ➢ Electric shock and toxic fume inhalation

The student has been trained on this equipment and procedure.
The student understands the required personal protective equipment to operate this equipment and perform this procedure.
The student is aware of the possible risk factors.

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BAND SAW (VERTICAL)

General Conditions

1. Operate only with instructor permission; keep upper blade guide <5mm (1/4") from material.
2. Operate strictly from the front; keep hands beside or behind the blade, never directly in line with it.
3. Keep fingers at least 10cm (4") away from the blade; use a push stick on small stock.
4. Make relief cuts before cutting tight curves; use a V-block clamp for cylindrical stock.
5. Hold stock flat on table; clear scrap only after the blade has completely stopped.

Personal Protective Equipment

- Safety glasses / Safety goggles / Face shield
- Proper tight clothing (no loose sleeves, tie long hair back, no jewelry)

Possible Risk Factor

- Severe lacerations or finger/hand amputation from moving blade contact
- Violent blade breakage or binding from twisting stocK
- Workpiece kickback or spinning drawing hands into the blade

---

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***
-

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BAND SAW (HORIZONTAL)

General Conditions

1. Clamp work firmly in the vise; support long overhangs with a stock stand.
2. Verify blade tracking and tension before starting.
3. Lower the upper head assembly slowly onto work; never force or push down on the head.
4. Allow the machine to stop completely before unclamping or clearing jammed cuts.
5. Ensure the cutting head is locked in the top position before removing material.

Personal Protective Equipment

- ➢ Safety glasses / goggles
- ➢ Work gloves (when handling raw stock)
- ➢ Proper clothing (long hair tied back, no loose clothing)

Possible Risk Factor

- ➢ Severe blade cuts or lacerations
- ➢ Crushing injuries from unsupported heavy stock or falling saw head
- ➢ Blade binding throwing metal fragments

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

BELT AND DISK SANDER

General Conditions

1. Clean away accumulated dust around the machine before starting.
2. Sand ONLY on the downward-rotating side of the disc sander; hold work flat on table.
3. ONLY sand metal on machines made for metal, do not use wood.
4. Do not freehand sand or force material aggressively against belt or disc

Personal Protective Equipment

- Safety glasses / Face shieldDust mask / Respirator
- Proper clothing (tie long hair back, no loose clothing)

Possible Risk Factor

- Severe skin and knuckle abrasions from abrasive contact.
- Violent workpiece ejection if sanded on the upward-rotating side of the disc.
- Fire/explosion hazard if metal sparks ignite wood dust

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC TECHNOLOGIES

General Conditions

1. The machine operates automatically without warning; operates only if fully trained.
2. Keep the work area clear of obstruction; do not touch drive components while powered.
3. Never leave CNC equipment unattended while electronics/spindles are powered.
4. Use team lifting or mechanical lifts for heavy CNC components.

Personal Protective Equipment

- ➢ Safety glasses / Safety goggles
- ➢ Hearing protection

Possible Risk Factor

- ➢ Severe pinch, crush, and entrapment points from multi-axis movement.
- ➢ Permanent hearing loss from high operational noise.
- ➢ Flying debris or high-velocity component ejection

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC LATHE

General Conditions

1. Clamp workpiece securely in chuck within axis travel limits.
2. Ensure tool bits are sharp, locked, and set to center height; avoid excessive cut depths.
3. Position tool turret away from the chuck during setup to avoid hand injuries.
4. Perform measurements or adjustments ONLY after the spindle has completely stopped.

Personal Protective Equipment

- ➢ Safety glasses / Safety goggles
- ➢ Hearing protection

Possible Risk Factor

- ➢ Entanglement in high-speed spinning chuck or stock.
- ➢ Pinch and crush injuries from rapid automated tool carriage motion.
- ➢ Thrown workpieces or shattered cutting tool fragments.

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

CNC MILLING MACHINE

General Conditions

1. Ensure the workpiece, vise, and cutter are firmly clamped.
2. Verify part dimensions stay within the machine X/Y/Z travel envelope.
3. Move the table away from the cutter during workpiece loading and setup.
4. Make adjustments or measurements only when the cutter has come to a complete stop.

Personal Protective Equipment

- Safety glasses / Safety goggles
- Hearing protection

Possible Risk Factor

- Rotating cutter entanglement causing severe lacerations or amputation
- Pinch/crush points between moving table and machine frame
- Ejected high-velocity metal chips and broken tool bits

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

DRILL PRESS

General Conditions

1. Tie back long hair and secure clothing; NEVER OPERATE WITH GLOVES.
2. Clamp workpiece SECURELY to table (use V-block for round stock); never hold work by hand.
3. Remove the chuck key immediately after bit changes (never chain key to column).
4. Clear metal chips using a hand brush ONLY after the spindle stops completely.

Personal Protective Equipment

- ➢ Face shield or safety glasses
- ➢ **GLOVES STRICTLY PROHIBITED** during operation

Possible Risk Factor

- ➢ Entanglement in rotating spindle pulling hair, clothing, or skin
- ➢ Severe impact/laceration from unclamped workpiece spinning out of control
- ➢ Shattered bit fragments striking operator

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

DRILL PRESS - RADIAL ARM

General Conditions

1. Tie back long hair and secure clothing; NEVER OPERATE WITH GLOVES.
2. Clamp workpiece SECURELY to table (use V-block for round stock); never hold work by hand.
3. Remove the chuck key immediately after bit changes (never chain key to column).
4. Lock the radial arm and head securely before drilling.
5. Clear metal chips using a hand brush ONLY after the spindle stops completely.
6. Use the correct size **drill drift** to remove morse taper tools.

Personal Protective Equipment

- ➢ Face shield or safety glasses
- ➢ GLOVES STRICTLY PROHIBITED during operation

Possible Risk Factor

- ➢ Entanglement in rotating spindle pulling hair, clothing, or skin
- ➢ Severe impact/laceration from unclamped workpiece spinning out of control
- ➢ Shattered bit fragments striking operator

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

GRINDER - ANGLE/DISK

General Conditions

1. Inspect disc and cord for cracks or fraying before use; disconnect power during wheel changes.
2. Do not over tighten the nut when installing a new disk.
3. Ensure the nut is installed the correct way before starting the grinder.
4. Inspect surrounding area for flammables/batteries; never cut sealed or closed containers.
5. Hold the grinder firmly with two hands and maintain a solid stance against starting torque.
6. Direct spark stream downward and away from other people.

Personal Protective Equipment

- Work gloves
- Face shield or safety glasses

Possible Risk Factor

- Explosive wheel disintegration throwing abrasive shrapnel
- Violent tool kickback causing loss of control and deep lacerations
- Fire or explosion from grinding sparks hitting flammables
- Entanglement of hair and clothing

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

GRINDER - BENCH/PEDESTAL

General Conditions

1. Adjust tool rest gap to maximum 3mm (1/8") with wheel stationary.
2. Match wheel RPM rating to machine spindle speed; verify mounting blotters are installed.
3. Stand to ONE SIDE upon startup.
4. Grind on the face of the wheel using light, gradual feed; never force work.
5. GLOVES MUST NOT BE WORN during bench grinding.

Personal Protective Equipment

- Approved safety shield / Safety glasses
- GLOVES PROHIBITED during operation

Possible Risk Factor

- Full-speed wheel explosion throwing fatal shrapnel
- Workpiece wedging into tool rest gap, pulling fingers into rotating wheel
- High-velocity abrasive particles causing severe eye injury

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

LASER CUTTING/ENGRAVING

General Conditions

1. Requires instructor permission; **NEVER** leave laser cutter unattended while running.
2. Keep the cabinet bed clear of scrap materials and flammable residues.
3. Ensure fume extraction unit is **ON** before starting the job.
4. Cut **ONLY** materials listed as safe; consult **SDS** sheets when uncertain.

Personal Protective Equipment

- ➢ Safety glasses
- ➢ Sturdy footwear and gloves
- ➢ Close-fitting clothing covering limbs; tie back long hair

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Possible Risk Factor

- ➢ Uncontrolled fire inside cabinet from debris ignition
- ➢ Inhalation of carcinogenic or toxic chemical fumes
- ➢ Direct laser skin burns or severe retinal eye damage

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

METAL CUT OFF (CHOP) SAW

General Conditions

1. Stand to the side of the abrasive disc assembly (left-handed operators use right hand on handle).
2. Clamp material firmly in vise; support long overhangs.
3. Inspect cord and disc condition; verify guard moves freely.
4. Start saw before contacting metal; apply smooth, gradual downward pressure.

Personal Protective Equipment

- ➢ Work gloves
- ➢ Face shield or safety glasses
- ➢ Hearing protection
- ➢ Tie back long hair, remove jewelry

Possible Risk Factor

- ➢ Abrasive wheel explosion sending high-velocity shards
- ➢ Severe amputation or laceration from cutting disc
- ➢ Severe thermal burns from hot cut edges

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

METAL LATHE

General Conditions

1. Ensure headstock, tailstock, tool post, and workpiece are securely tightened.
2. Select correct speed, feed, and cutting depth; avoid heavy single-pass cuts.
3. Ensure that your tool is centred before use.
4. Remove continuous chips with a brush **ONLY** after the lathe comes to a complete stop.

Personal Protective Equipment

- Safety glasses / goggles / face shield
- Tight-fitting clothing (no loose sleeves, tie long hair, no jewelry)
- **NO GLOVES**

Possible Risk Factor

- Traumatic entanglement of hair, clothing, or limbs in high-torque rotating chuck/workpiece
- Flying chuck keys or thrown workpieces
- Severe lacerations from razor-sharp continuous metal stringers

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- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

MILLING MACHINE - HORIZONTAL

General Conditions

1. Obtain instructor permission before operation; check spindle and table controls.
2. Ensure the workpiece, vise, arbor, and cutter are clamped securely.
3. Move the table far from the cutter during setup and workpiece loading.
4. Adjust the machine or take measurements ONLY when the cutter has stopped completely.
5. Clear chips with a brush ONLY when the machine is stopped.

Personal Protective Equipment

- ➢ Safety glasses / goggles / face shield
- ➢ Tight clothing (tie long hair back, no loose sleeves, no jewelry)
- ➢ **NO GLOVES**

Possible Risk Factor

- ➢ Entanglement in rotating cutter/arbor causing severe lacerations or amputation
- ➢ Lacerations from sharp cutter handling
- ➢ High-velocity flying metal chips

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

MILLING MACHINE - VERTICAL

General Conditions

1. Obtain instructor permission before operation; check spindle and table controls.
2. Ensure the workpiece, vise, arbor, and cutter are clamped securely.
3. Move the table far from the cutter during setup and workpiece loading.
4. Adjust the machine or take measurements ONLY when the cutter has stopped completely.
5. Clear chips with a brush ONLY when the machine is stopped.

Personal Protective Equipment

- Safety glasses / goggles / face shield
- Tight clothing (tie long hair back, no loose sleeves, no jewelry)

Possible Risk Factor

- Entanglement in rotating cutter/arbor causing severe lacerations or amputation
- Lacerations from sharp cutter handling
- High-velocity flying metal chips
- **NO GLOVES**

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

OXY- FUEL CUTTING/WELDING

General Conditions

1. Complete Hot Work Permit; keep cylinders upright, chained, and clear of heat.
2. Keep all torch equipment, regulators, and hoses strictly free of oil or grease.
3. Ensure flashback arrestors are installed on regulators.
4. **Lighting**: Purge lines, open acetylene **1/3 turn**, light with striker, then add oxygen.
5. **Shutdown**: Close acetylene torch valve first (**A before O**), then oxygen, close tank valves, and bleed lines to zero.

Personal Protective Equipment

- ➢ Welding goggles (min. shade 5 protection)
- ➢ Leather jacket/sleeves and welding gloves
- ➢ Protective head covering (beanie)
- ➢ Protective footwear

Possible Risk Factor

- ➢ Fuel gas explosion or high-pressure cylinder rupture
- ➢ Flashback fire traveling back through hoses into tanks
- ➢ Severe flame burns and clothing ignition

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

PLASMA ARC CUTTER (MANUAL & CNC)

General Conditions

1. Operate in well-ventilated areas with exhaust fan running.
2. Keep clear of combustible materials; never cut sealed or closed containers.
3. Disconnect power / lock out machine before servicing torch parts.
4. Handle hot metal using tongs or pliers; cool or quench before handling.

Personal Protective Equipment

- ➢ Shaded face shield / goggles (minimum shade #5)
- ➢ Leather gauntlet gloves, leather apron, cotton long sleeves, high-top boots
- ➢ Hearing protection

Possible Risk Factor

- ➢ High-voltage electric shock from plasma power supply
- ➢ Severe arc radiation burns to eyes and skin
- ➢ Explosion when cutting sealed containers; severe molten metal splatter burns
- ➢ Toxic fume inhalation

- ➢ ***The student has been trained on this equipment and procedure.***
- ➢ ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ➢ ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

SHEET METAL SHEAR / ROLLER / BENDER

General Conditions

1. Keep the floor area clean, dry, and free of sheet metal drop-offs.
2. Ensure no other person touches the machine or metal during operation.
3. Get help when handling large sheet metal stock; do not exceed machine rated capacity.
4. Keep fingers completely clear of shear blades, slip roll nip points, and brake clamping lines.

Personal Protective Equipment

- Safety glasses
- Heavy-duty leather work gloves
- Safety footwear

Possible Risk Factor

- Traumatic finger/hand crushing, shearing, or amputation
- Severe razor lacerations from sharp sheet metal edges

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

SURFACE GRINDER

General Conditions

1. Ring test grinding wheel before mounting; run new wheel 1 minute before grinding.
2. Stand to one side upon startup; ensure the wheel guard covers 1/2 of the wheel.
3. Make sure the wheel is at full speed before starting work.
4. Keep the magnetic chuck clean; verify the magnetic grip firmly holds the workpiece before grinding.
5. Stop the wheel completely before mounting, measuring, or removing work.

Personal Protective Equipment

- Safety glasses / goggles / face shield
- Proper clothing (tie long hair back, no loose clothing)

Possible Risk Factor

- Catastrophic wheel burst sending high-velocity shrapnel
- Workpiece ejection due to magnetic chuck failure
- High-velocity abrasive particle eye injury

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

3D PRINTER

General Conditions

1. Limit access to trained personnel; clear build bed before starting.
2. Operate printer with enclosure closed and ventilation system running.
3. Never reach inside the printer while operating.
4. Do not touch extruder nozzles; clean nozzles using needle-nose pliers.
5. Consult Safety Data Sheets (SDSs) for plastic resin/filament safety.

Personal Protective Equipment

- Safety glasses / goggles
- Heat-resistant gloves
- Lab coat

Possible Risk Factor

- Severe contact burns from extruder nozzles (>200°C) and heated bed
- Mechanical pinch points from moving gantries and belts
- Inhalation of toxic fumes and volatile organic compounds (VOCs)

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

INTERNET USE

General Conditions

1. Students must be trained on the safe and proper use of the Internet before operating.
2. Students must demonstrate knowledge of safe and secure procedures outlined in the Internet Use Policy.

Personal Protective Equipment

- Knowledge of school and school board Internet Use Policy
- Never releasing personal information online
- Avoidance of insecure or questionable websites
- Respect for self and others & awareness of digital security issues

Possible Risk Factor

- Threats to personal safety/security & loss of privacy
- Threats to emotional security
- Malware/virus infection & corruption of school network systems

- ***The student has been trained on this equipment and procedure.***
- ***The student understands the required personal protective equipment to operate this equipment and perform this procedure.***
- ***The student is aware of the possible risk factors.***

Student signature _____

Teachers signature _____

Date of training _____

AT ALL TIMES- IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR

ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

SHOP READY STUDENT SELF EVALUATION FORM

ARE YOU SHOP READY?

Scope and Responsibilities

This self-evaluation checklist is designed to align with the Ontario technology curriculum and the Occupational Health and Safety Act (OHSA), ensuring that students are prepared and capable of working safely in a technology classroom environment.

SAFETY IS A PRIORITY! DO NOT use any machine unless you have received instruction in its safe use and operation, and have been given permission by your teacher.

Pre-Check Requirements

1. **Mindset and General Knowledge**
   - ☐ I understand the importance of safety in the technology classroom. Health and Safety rules have been established and need to be followed to maintain the health and safety for me and everyone else in my class
   - ☐ I have completed a general safety orientation session on the board's Health & Safety rules
   - ☐ I have completed training on general shop safety for my class/workshop/kitchen/salon
   - ☐ I know my own limitations and I will not use equipment that I have not been trained on
   - ☐ I know that if I am unsure of an operation or process, I am to stop and ask the teacher for help.
2. **Personal Protective Equipment (PPE)**
   - ☐ I have my own CSA-approved safety glasses
   - ☐ I have appropriate hearing protection
   - ☐ I have appropriate footwear (ie: closed-toe, CSA-approved safety boots, anti-skid)
   - ☐ I must wear appropriate PPE based on the task, project, or operation (ie: welding)
   - ☐ I understand the requirement for appropriate clothing (including no loose clothing, no jewelry, draw strings removed, tucked in, or tied, donning a shop/lab coat or apron, etc.)
   - ☐ I understand the requirement to have long hair tied back and confined close to the head.
3. **Understanding Safety Rules**
   - ☐ I have been instructed in Health & Safety and understand the significance of operating from a safety mindset
   - ☐ I have received training and have passed a Technology Health & Safety Rules test
   - ☐ I have signed the board's Technology Health & Safety Rules
   - ☐ I can identify safety signs and effectively communicate their meanings
   - ☐ I know the location and proper use of emergency stops on equipment
   - ☐ I know the location of emergency exits and where I am to meet my teacher
   - ☐ I am aware of the location of first aid kits and fire extinguishers

This self-evaluation checklist is designed to align with the Ontario Technological Education curriculum and the Ontario Occupational Health and Safety Act (OHSA), ensuring that students are prepared and capable of working safely in a technology classroom environment. The checklist is for your consideration and should not be treated as legal advice on any subject matter. For more detailed guidelines and resources, refer to the relevant sections of the OHSA and your board's policies and regulations. IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR or SUPERVISOR.

OCTE | ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

Teacher Shop Readiness Checklist

Technological Education Teacher Shop Readiness Checklist

Name: _____

Subject/Area: _____

Classroom: _____

Date: _____

This checklist is offered to help teachers systematically ensure they are meeting all necessary safety requirements and creating a safe learning environment for their students. It is encouraged that you review this checklist with your Curriculum Chair, Department Head, and/or Administrator.

Responsibilities and Policy Review

- ☐ Have you reviewed your responsibilities under the Education Act?
- ☐ Have you reviewed your rights and responsibilities under the Occupational Health and Safety Act?
- ☐ Have you reviewed your school board's health and safety policy and/or Technological Education safety guidelines?
- ☐ Have you reviewed your school board's policies and procedures related to student health and safety within your technology area?
  - Sabrina's Law, 2005
  - Ryan's Law (Ensuring Asthma Friendly Schools), 2015
  - Rowan's Law (Concussion Safety), 2018
  - Prevalent medical conditions (anaphylaxis, asthma, diabetes, epilepsy)
  - Excursions and Field Trips
- ☐ Have you reviewed relevant provincial guidelines and standards for student health and safety?
- ☐ Have you reviewed the Technological Education curriculum and have aligned your teaching and instruction to meet the curriculum expectations?
- ☐ Have you reviewed any additional mandatory requirements for high-risk mitigation activities (e.g., field trips, workplaces, hot work)?
- ☐ Have you reviewed Growing Success, 2010, and have implemented sound assessment, evaluation, and reporting practices?

Safety Information and Planning

- ☐ Have you instructed your students in Health and Safety and the Occupational Health and Safety Act?
- ☐ Have you included recommendations from coroner inquests in your planning to help reinforce safe practices and safeguard your students
- ☐ Have you planned activities/assignments with health & safety as a primary consideration?
- ☐ Have you informed students and parents of risks involved in activities?
- ☐ Do you have a plan in case of an emergency specific to your subject and classroom?
- ☐ Have you taken all reasonable precautions to prevent health and safety accidents and injuries?
- ☐ Are you prepared to act quickly in case of an emergency?

Teacher Knowledge and Skills

- ☐ Do you have the knowledge required to use the materials and tools safely and competently in your area of technological education?
- ☐ Do you have the practical skills and experience needed to perform tasks safely?

Student Preparedness

- ☐ Have students been made aware that health and safety is everyone's responsibility?
- ☐ Have students received training and have passed a Technology Health & Safety test?
- ☐ Have you ensured that students have the knowledge and skills needed for safe participation in all learning activities?
- ☐ Can students confidently demonstrate knowledge, safe operating procedures and the use of the equipment, facilities, materials, tools, and processes required for class?

Student Safety Practices

- ☐ Do students have the required knowledge to follow established Health & Safety procedures?
- ☐ Do students know how to identify safety concerns and the process to report them to you?
- ☐ Do students have the ability to identify safety signage and effectively communicate their meanings?
- ☐ Do students have the knowledge required to implement appropriate safety procedures?
- ☐ Do students know the potential consequences of not carefully following your instructions and example?
- ☐ Do students know the location and proper use of emergency stops?
- ☐ Do students know the location of fire pull stations, fire exits, and fire extinguishers?
- ☐ Do students know the importance of focusing on the task at hand, eliminating distractions?
- ☐ Do students know the importance of consistently showing care and concern for their health and safety and that of others?
- ☐ Have students been trained and developed to respect themselves, their peers, the teacher, the school/facility, tools, and equipment provided for their education?

Sample: Record of Safety Training

Student: Class:

Over the course of the semester or term(s) you will receive direct instruction in the safe and appropriate use of all the equipment, tools, materials, and facilities required to complete your classroom activities. Instruction consists of a combination of demonstration and written and verbal instruction. A satisfactory mark on a safety quiz following the instruction demonstrates the acquisition of sufficient knowledge to use and access the relevant equipment and materials. Your ongoing demonstration of safe practice is assessed in the project marking. Your teacher will put the date and sign-off beside each topic in acknowledgement of your attendance at the discussion or demonstration.

STUDENTS MAY NOT USE ANY EQUIPMENT, TOOL, OR FACILITY UNTIL:

- Their training has been signed off by the teacher.
- They have received a satisfactory mark on the related safety quiz.

Topic	*Date*	*Teacher's Signature*
Computer Resources and the Internet		
• *Acceptable Use Policy* • *Safety on the Internet* • *Computer Ergonomics*		
Patient or Client Care		
• *Safe use of chemical treatments* • *Use of personal protective equipment (PPE) for patient/client* • *Safe and proper handling of patient or client*		
Facility Care		
• *Proper cleaning and setup procedures* • *Maintaining safe working environment* • *Use of personal protective equipment (PPE) for self* • *Proper sanitation and sterilization procedures* • *Safe and proper disposal of consumables and hazardous materials*		

APPENDIX A

APPENDIX A: HEALTH AND SAFETY RESOURCES

Workplace Safety and Insurance Board
http://www.wsib.ca
Legislated by the Ontario government and responsible for administering the Workplace Safety and Insurance Act (WSIA). Governed by a Board of Directors made up of representatives of workers, employers and others.
Under the Resources tab, this website provides information on how WSIB makes decisions, by reviewing the Operational policy manual, Employer Classification Manual, and Adjudication support documents. You'll also find useful forms and fact sheets on a variety of topics, including benefit payments, and rights and responsibilities.

- Fact Sheets are also available:
- Fact Sheets for Workers
- Fact Sheets for Prevention
- WSIB Fact Sheets

Canadian Centre for Occupational Health and Safety
http://www.ccohs.ca/resources

The Free Resources section is a collection of websites, databases, and other online resources suggested and reviewed by CCOHS. Many of the websites are designed and maintained by CCOHS, while some of the resources are provided by external, third-party providers.
Purpose

- Promote the importance of workplace health and safety in Canada
- Identify current and reliable health and safety information
- Create and maintain an accessible, convenient, and easy-to-use resource to anyone who needs it
- Provide access to information from a variety of sources including federal, provincial, and territorial governments, agencies, and non-profit organizations

Target Audience
The Free Resources are useful to workers, employers, managers and supervisors, joint health and safety committees, workplace health and safety professionals, and students.

HEALTH CANADA
http://www.hc-sc.gc.ca

Health Canada is the Federal department responsible for helping Canadians maintain and improve their health, while respecting individual choices and circumstances.
Health Canada administers many pieces of legislation and develops and enforces regulations under this legislation that have a direct impact on the health and safety of Canadians. The Department consults with the Canadian public, industry, non-governmental organizations (NGOs) and other interested parties in the development of these laws. Health Canada also prepares guidelines in order to help interpret and clarify legislation and regulations.
Of particular interest would be regulations such as the Hazardous Product Act, Controlled Products Regulations, Environmental and Workplace Health.

Public Health Ontario
Web Address: https://www.publichealthontario.ca/

PHO provides scientific and technical advice and support to clients working in government, public health, health care, and related sectors.

Regulated Health Professions - links to all professional colleges and legislationhttps://www.ontario.ca/page/regulated-health-professions

HEALTH & SAFETY ONTARIO (HSO)
https://www.labour.gov.on.ca/english/hs/#:~:text=Safe%20At%20Work%20Ontario%20is,Occupational%20Health%20and%20Safety%20Act.

Ontario is already a great place to do business, live and work. Making our province, and indeed our country, the healthiest and safest place to work in the world is a prize worth winning.

Ontario's Prevention System is made up of the Ministry of Labour (MOL), Workplace Safety and Insurance Board (WSIB), Workers Health & Safety Centre, Occupational Health Clinics for Ontario Workers Inc. and 12 Health and Safety Associations (HSAs).
Health & Safety Ontario (HSO) is the result of a bold move to reorganize the independent efforts of 12 health and safety associations into four streamlined organizations to better serve more than 236,000 Ontario businesses.
HSO is comprised of:

- Workplace Safety & Prevention Services
- Public Services Health & Safety Association
- Workplace Safety North
- Infrastructure Health & Safety Association.

ONTARIO BUILDING CODE
http://www.mah.gov.on.ca/Page7393.aspx
The Ontario Building Code's website has information on qualification and registration, available training, dispute resolution, news on recent code developments and more. The Ontario Building Code is administered by the Building and Development Branch of the Ministry of Municipal Affairs and Housing.

CANADIAN STANDARDS ASSOCIATION (CSA)
http://www.csagroup.org
Standards contribute to safer homes, workplaces and public spaces. They address issues related to sustainability and the environment. And they encourage the adoption of new technologies and best practices that enhance trade and help make industry more competitive in the global marketplace. Standards help advance today, while anticipating tomorrow.

CANADIAN SOCIETY OF SAFETY ENGINEERING (CSSSE)
http://www.csse.org/

The Canadian Society of Safety Engineering (CSSE) is the leading health, safety and environmental organization for professionals in Canada. They work with industry, governmental agencies, and other safety organizations to promote a greater awareness of health, safety, and environmental issues in workplaces

and communities across the nation and around the world. Our vision is "An Advocate for Safety in Every Workplace".

CSSE's mission is to be the resource for professional development, knowledge and information exchange to our members, and the Canadian public.

PROFESSIONAL ASSOCIATIONS

Professional Associations can be a great health and safety resource relating to discipline specific occupational health and safety. The following Tech Design related associations provide resources on professional practice relating to health and safety.

Professional Engineers of Ontario (PEO) - www.peo.on.ca/
Architectural Association of Ontario (OAA) - www.oaa.on.ca/
Ontario Certified Engineering Technicians and Technologist (OACETT) www.oacett.org/
Association of Registered Interior Designers of Ontario (ARIDO) - www.arido.ca/

Ministry of Labour, Immigration, Training and Skill Development
Web address: http://www.labour.gov.on.ca/english/

For news and information about Ontario's health and safety and employment legislation, the Ministry of Labour, Immigration, Training and Skill Development's website is an excellent place to visit. It provides current information on both employment standards and health and safety legislation, recent fines, alerts, etc. and allows you to ask a question that will be answered by Ministry staff. To directly access information for students, use the web address: http://www.labour.gov.on.ca/english/es/pubs/factsheets/fs_young.php
This section of the Ministry of Labour, Immigration, Training and Skill Development website ensures that students are aware of their rights and obligations and their employer's rights and obligations under the Occupational Health and Safety Act and the Employment Standards Act. It includes: young worker safety education information; information for working students – know your rights and obligations; information for new workers and students working in Ontario; fact sheets for employees; your guide to the Employment Standards Act; and links to related websites.

Take Our Kids to Work – Teacher's Guide; Workplace Guide
The Learning Partnership
Resources Available to Help Keep Students Safe on Take Our Kids to Work™ Day | Canadian Centre for Occupational Health and Safety

Ontario School Boards Insurance Exchange
http://www.osbie.on.ca
The primary goals of the Exchange are to insure member school boards against losses, and to promote safe school practices. The Ontario school "Risk Management at a Glance" material is intended to provide guidance and direction in the major risk management areas facing school administrators, principals, vice-principals, teachers and all other school staff on a daily basis.

Although this reference material is not intended to replace school board policies and procedures, it is intended to supplement the risk management considerations, which should go into making the decisions on the most common day-to-day school activities. The design of this publication is to promote the display of this document in a calendar-like format in every classroom to facilitate ready "Risk Management at a Glance". Every employee who may be called upon to make a decision about the permitting of or the organizing of any activity listed can use this.

Risk Management – OSBIE

For any activities not listed in this material, it is recommended that you contact your board office, or refer to the policies and procedures as stated by your school board.

School Workers Health and Safety Guide

Canadian Centre for Occupational Health and Safety
Web address: http://www.ccohs.ca

This information-packed coil-bound pocket book covers school safety topics such as emergency preparedness, classroom safety, arts and crafts, industrial technology, maintenance and custodial practices, sanitation and infection control, sports and activities, work environment, ergonomics, personal protective equipment and health and safety legislation. There are good ideas and work practices that can add to your existing safety programs.
Cost: The price is reasonable and covers printing and distribution costs. Check current cost and delivery information in the publications section of the web site.

APPENDIX B

APPENDIX B: OTHER OCTE RESOURCES

Overview: Sample of OCTE safetyNET

A sample of a blank safetyNET template provided by the Ontario Council for Technology Education as well as their Materials and Resources sheet has been provided here as an additional resource for computer technology teachers. Completing it once for a risky project can take teachers through a pre-project planning process, a review of the materials in their shops, the suppliers and processes they use, and encourage documentation of their safety training for themselves, their students, and classrooms. It collects safety information in one place for their own use, and respects their experience, pedagogy, and professionalism. It's a crucial step in standardizing safety training in your technology program at your school, and can assist in collegial communication in your department.

Please note that the online updated version is available at www.octe.ca, however any teacher that considers and documents their answers to the questions will have created an important document for their personal professional practice. It's also available in fillable.pdf format and is also available in French from OCTE.

Establishing A Safety Binder

The goal is a safety binder that teachers keep in their rooms as evidence of due diligence taken towards safety in the classroom.

Assembled safety binders often include teacher/room/board specific:

- safetyNET Template
- •Project Specific Safety Resources
- •SDS Sheets
- •Student Safety Training Tracking Sheets
- •Permission Forms Copies
- •Class Lists
- •Equipment Maintenance/Manuals
- •Training Quiz Samples
- •Teacher Training Documentation Copies
- •Emergency Procedures Docs
- •Board Repair Contacts
- Room Safety / PPE Location Map

.

Starting Your safetyNET

TMJ Subject Area: Tech department heads can provide leadership asking teachers to consider the following questions to choose a focus for completing their own safetyNET.

- What are the riskiest projects I do in my classroom? (List them here.)
- What ones of these use the riskiest materials?
- Which ones of these use the highest risk-associated equipment?
- Which ones of these include recycled, found, repurposed, or donated materials?
- Which one of these is the hardest to train and track the students for safety?
- Reflecting on this listing, which project do you think you may want to do a safetyNET on?
- What resources of mine would make it easier - instructive for another teacher to try this project?
- What would be the best "safety lens" advice I could give to another teacher from my experience?

safetyNET Lesson Plan

safetyNET STEP 1: Tell Us About You

First Name: _____
Last Name: _____
E-mail Address: _____
Ontario School Board: _____
School: _____

Community

- ☐ Urban
- ☐ Suburban
- ☐ Rural

Number of Students:

Student Work is Completed (individually, pairs, groups, mixed methods)

Mixed Methods

☐

I agree to the Terms and Conditions and have read the Teacher Guidelines.

safetyNET STEP 2: Describe Your Lesson

Classroom Management Pre-Planning

1. Provide a descriptive **title** for your learning activity.

2. Choose the **length** that best describes your lesson.

- ☐ Full semester
- ☐ Multiple weeks
- ☐ One week
- ☐ One period

3. Choose the **Ontario course code (e.g.)**.

TEJ - Computer Engineering

4. Provide **learning goals** of the activity.

Names of Resource Files Included: (Please format as .pdf where possible.)

5. Generally describe your **classroom lab setup** with main equipment and areas.

6. There is a link here to your subject area's **full** Overall and Specific required **Ministry Expectations**. Click here for **safety expectations summarized for each tech course code**. These will create a pop-up window for copying and pasting into the field below. Copy and paste some safety expectations your lesson will cover.

7. There may also be **local by-laws** or **staff guidelines** applicable to your school community in general that affect how you teach your subject area for health and safety. Being in an urban or rural environment can offer unique challenges to a technological education program. Your department or school may also have a health and safety manual you can attach as a file later. Include any details or best practices here on what you refer to.

8. Coming from industry and experience as a technological educator, there is **prior teacher knowledge** that you would recommend for your classroom, focused on health and safety. Include information on recommended certifications for your subject area.

9. Many teachers use these as a basis of training for **prior student knowledge**. Check off which ones you use currently. A pop-up window is available through these links.

- ☐ Passport to Safety
- ☐ Introduction to WHMIS2015

10. Prior to specific project work, describe your **general introductory unit on health and safety** in your classroom.

11. Check off what **Personal Protective Equipment** may be applicable in your classroom in general for health and safety.

- ☐ safety glasses (shatterproof - may need side guards)
- ☐ coveralls / lab coat / apron (protective clothing)
- ☐ gloves (latex and standard)
- ☐ gloves (chemical resistant)
- ☐ welding gloves and face shield
- ☐ dust mask (breathing protection)
- ☐ respirator (breathing protection)
- ☐ appropriate footwear (may imply steel-toed work boots or closed toe and heel shoes)
- ☐ hair net
- ☐ hair tied back
- ☐ hearing protection - ear plugs
- ☐ removing jewelry and fashion accessories

- ☐ hard hat
- ☐ safety harness
- ☐ reflective vest
- ☐ no electronic devices

12. Describe your student safety training assessment strategies. Click here for a pop-up to review the **Growing Success** document that defines assessment *for learning and as learning*.

13. Some technological classroom areas are more complex and need layout planning, maintenance, and special resources available, especially when sharing rooms. Detail **general housekeeping, organization standards** and student clean-up procedures from your experience.

14. Detail **safe storage facilities** in your classroom for course specific materials.

15. Explain any **special learning considerations** and best practices for your classroom focused on safety. Are there left-handed students in your class? You may naturally include accommodations and modifications. Showcase special approaches or methods you use for exceptional students, multiple-intelligences, differentiated instruction, ESL, gifted, or physically-challenged students.

16. Include information on your safety procedures for **disposal of waste materials**. This could include food scraps, hairstyling chemicals, dust collection, combustible wipes, or waste oil.

17. **Company's coming!** Educational Assistants, volunteers, student teachers, and classroom guests with administrators are in your classroom. Provide your experience on elements of safety training that need to be communicated to these participants for your subject area such as wearing safety glasses, maintaining distance from machines, or how to communicate an emergency or issue to the teacher.

18. **Emergency procedures** to pre-plan in general for your technological education classroom depends on your subject area. There may be steps for students, steps for administration, for assisting teachers, or directions for emergency assistance arriving at school. Detail how you cover these in your classroom. Include fire exits, extinguishers, first aid station, eye wash station, and electrical shut-off switches (panic buttons). Possibly detail AED location (if available) and first aid trained staff member locations for your records.

19. Does your Board have a **technological project approval process**?

- ○ Yes
- ○ No
- ○ Unknown

20. Select (all that apply) that complete **equipment inspections** in your board.

- ☐ Teacher
- ☐ Department Head
- ☐ Board Instructional / Subject Area Leader
- ☐ Board Facilities Teams
- ☐ Independent Contractors
- ☐ Ministry of Labour

21. Select **Federal and Provincial Safety Legislation and Policies, Government Departments, and Associations** which may be applicable to your subject area. Click on any of them to open up a pop-up window to reference their website. Consider adding any resources you find to your lesson.

- ☐ Health Canada
- ☐ Ministry of Labour
- ☐ Ontario Workplace Safety and Insurance Act
- ☐ Food Safety and Quality Act
- ☐ Ontario Health Protection and Promotion Act
- ☐ Ontario Highway Traffic Act
- ☐ Ontario Fire Code
- ☐ Ontario Building Code
- ☐ Workplace Hazardous Materials Information System (WHMIS2015)
- ☐ Workplace Safety and Insurance Board (WSIB)
- ☐ Occupational Health and Safety Act (OSHA)
- ☐ Apprenticeship and Certification Act (ACA)
- ☐ Canadian Standards Association (CSA)
- ☐ Canadian Society of Safety Engineering (CSSE)
- ☐ Ontario Service Safety Alliance (Hospitality and Tourism) (OSSA)
- ☐ Canadian Centre for Occupational Health and Safety (CCOSH)
- ☐ Construction Health and Safety Association of Ontario (CSAO)
- ☐ Ontario School Boards Insurance Exchange (OSBIE)
- ☐ Industrial Accident Prevention Association (IAPA)
- ☐ Transportation Health and Safety Association of Ontario (THSAO)
- ☐ Health Care Health & Safety Association of Ontario (HCHSA)

That's the end of general classroom management info. You can copy and paste the content from this section to any project you submit to the safetyNET.

That's So Cool! When Do We Start?

22. Check off **planning** tasks you complete for this lesson.

- ☐ examine materials list (new, used, recycled materials)
- ☐ review tool use plan (power and hand tools)
- ☐ consider special preparation of recycled materials for this project.
- ☐ review hazardous materials use – WHMIS2015, SDS (attach files later)
- ☐ safety check on specific equipment
- ☐ review chemical and fire safety procedures
- ☐ prepare tools
- ☐ count or measure materials, evaluate efficiencies
- ☐ check 'past due' dates on supplies
- ☐ check student-accessible material supply areas are safe
- ☐ re-do a safety demonstration
- ☐ confirm all students completed training diagnostic assessment
- ☐ confirm web resources and handouts are current
- ☐ reconsider assessment and evaluation strategies
- ☐ plan direct supervision time for difficult or high-risk production steps
- ☐ plan direct supervision for flammable / toxic / corrosive materials handling
- ☐ plan safe storage of in-progress student projects
- ☐ plan cut off times for lab cleanup to begin
- ☐ plan waste disposal, recycling
- ☐ plan debrief on safety risk experiences with students
- ☐ detail notes for teacher sharing classroom/lab

23. Detailed **instructional strategies** and **assessment strategies** for focusing on safety during this learning activity. Consider any IEP considerations applicable in your classroom.

24. Define the **materials and equipment** used for this learning activity. You can use the blank form that's provided and save it to make it your own. The layout helps you collect details showing the materials and equipment. It also provides space for equipment maintenance schedules, disposal of waste materials, training tracking, shielding or guarding details.

25. Include any **best practices** or tips, tricks, and advice in your experience of completing this learning activity. Focus your answer on how you document safety training, and share information about your shop with other tech teachers. That's an OCTE lab **safetyNET!**

26. Provide a **short description** of your project that can go with a reference image for the database. (Max 256 characters.)

safetyNET STEP 3: Add Files and Videos

Please attach a **project image** for us to display with your short description in the database. Please upload any **supporting documents** including safety components, lesson materials, assessment tools, digital resources, images, or videos. To bring your lesson to life, include **online videos URL link** files on the lesson plan page. Add as many as you like.

Do you have a **safety feature map** of your classroom you can share? Attach it here!
Find the **Safety Data Sheet (SDS)** for any of your materials clicking and searching here. Save it and add it to your digital resources to attach with your lesson.

safetyNET STEP 4: Tag Your Lesson

Add your own descriptive tag(s) to help users search for content like yours. Print your lesson to document your safetyNET for your classroom. Submit your safetyNET lesson. Plan to update lesson content or add digital resources later with your user login. Think about adding another lesson! Remember, most of your general classroom info is already in. You can 'Save As' and 'Modify' to submit a new lesson with new resources!

OCTE LAB SAFETY NET – MATERIALS, PHYSICAL RESOURCES PLANNING SHEET

Teachers can copy and add rows to this blank form to address specific project needs and include it in their safety binder.

PROJECT / LEARNING ACTIVITY TITLE:
COURSE CODE AND TITLE:
VERSION PREPARED DATE:
SUBMITTED BY:
CONTACT:

MATERIALS LIST

MATERIAL	QUANTITY	DESCRIPTION	SOURCE	WHMIS2015 SDS ATTACHED	SAFE STORAGE	WASTE DISPOSAL
			[ ] new, purchased [ ] new, donated from community, industry [ ] recycled from	[ ] Y [ ] N		

			inside school [ ] recycled from outside school PREPARATION REQUIRED FOR USE: DETAILS:			

PHYSICAL RESOURCES USED

EQUIPMENT, TOOL, MACHINE	SUBJECT – SPECIFIC NEEDS	INSPECTED FOR SAFETY FEATURES	STUDENT TRAINING PLAN IDENTIFIED	MAINTENANCE SCHEDULE
NOTE: TEACHER EXPERIENCE AND SAFETY PROFICIENCY IS ASSUMED. DETAIL EQUIPMENT: MANUAL APPLICABLE / AVAILABLE (LOCATION):	MACHINE GUARDING AND SHIELDING APPLICABLE [ ] YES [ ] NO [ ] N/A EMERGENCY STOP / PANIC BUTTON APPLICABLE [ ] YES [ ] NO [ ] N/A LOCK-OUT TAG APPLICABLE [ ] YES [ ] NO [ ] N/A OTHER (SUBJECT-SPECIFIC) [ ] YES [ ] NO [ ] N/A	[ ] Teacher DATE: _____ [ ] Board DATE: _____	DETAIL STEPS: Student attended teacher safety instructions, lessons, demonstration (notes recorded) Student passed oral or written assessment (test) Student demonstrated safe setup and operation of equipment to teacher Student prepared and delivered power point presentations on all class tools and machines Student granted permission to use equipment SIGNAGE: safety sign posted RESOURCES: safety lesson tool safety video tool powerpoint presentation manual FREQUENCY OF RETRAINING ADVISED: Students should be re-trained every semester Safety passports expire at the end of every semester	DAILY: WEEKLY: MONTHLY: ANNUALLY: CONTACT FOR REPAIR:

OCTE STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) developed by OCTE are available for key equipment commonly utilized in TMJ Manufacturing facilities. These documents establish baseline operational guidelines for the designated machinery. To ensure immediate reference, these SOPs can be mounted directly on the corresponding equipment or compiled in a central safety binder. Access the comprehensive suite of OCTE Manufacturing SOPs at: OCTE Safety Resources.

The Ontario Council for Technology Education wishes to acknowledge the contribution of the individuals that participated in the development and refinement of this SAFEdoc.

References

21st Century Competencies: Foundation Document for Discussion. Phase 1: Towards Defining 21st Century Competencies for Ontario, Winter 2016 Edition, 2016
http://www.edugains.ca/resources21CL/About21stCentury/21CL_21stCenturyCompetencies.pdf
Skilled Trades Ontario https://www.skilledtradesontario.ca
Course Codes for Emphasis courses in the Revised Curriculum: Technological Education, Grades 11 and 12, 2009
http://www.edu.gov.on.ca/eng/curriculum/secondary/techedemphasiscourses.pdf
Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools, First Edition, Covering Grades 1 to 12, 2010
www.edu.gov.on.ca/eng/policyfunding/growSuccess.pdf
Learning for All – A Guide to Effective Assessment and Instruction for All Students, Kindergarten to Grade 12,
https://www.dcp.edu.gov.on.ca/en/

Resources

Skilled Trades Ontario
https://www.skilledtradesontario.ca/about-trades/trades-information/
Red SEAL – Sceau Rouge, 2018
http://www.red-seal.ca/trades/tr.1d.2s_l.3st-eng.html
Start an Apprenticeship in Ontario
https://www.ontario.ca/page/start-apprenticeship
Skilled Trades Identified in Ontario, Skilled Trades Ontario
https://www.skilledtradesontario.ca/about-trades/trades-information/
The Differentiated Instruction Scrapbook
http://www.edugains.ca/resourcesDI/EducatorsPackages/DIEducatorsPackage2010/2010DIScrapbook.pdf

The Ontario Curriculum Technology and the Skilled Trades Grade 9 and 10
https://www.dcp.edu.gov.on.ca/en/curriculum/technological-education
The Ontario Curriculum, Grades 11 and 12: Technological Education, 2009 (revised)
http://www.edu.gov.on.ca/eng/curriculum/secondary/2009teched1112curr.pdf
Ministry News
https://news.ontario.ca/en/release/1000078/ontario-to-modernize-and-streamline-apprenticeship-training