OCTE | ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

**SAFE ACTIVITY FOUNDATIONS
IN EDUCATION DOCUMENT**

Revision May 2013, Revision July 2022

TEJ2O	Computer Engineering Technology: Open
TEJ3E/M/U/C	Computer Engineering Technology: Open
TEJ4E/M/U/C	Computer Engineering Technology: TEJ3 Prerequisite

TEI3M	Computer Engineering Technology: Interfacing
TEL3M	Computer Engineering Technology: Electronics
TEN3M	Computer Engineering Technology: Networking
TER3M	Computer Engineering Technology: Robotics and Control System
TEC3E	Computer Technology: Computer Repair
TET3E	Computer Technology: Information Technology Support
TEW3E	Computer Technology: Network Support
TEI4M	Computer Engineering Technology: Interfacing
TEL4M	Computer Engineering Technology: Electronics
TEN4M	Computer Engineering Technology: Networking
TER4M	Computer Engineering Technology: Robotics and Control System
TEC4E	Computer Technology: Computer Repair
TET4E	Computer Technology: Information Technology Support
TEW4E	Computer Technology: Network Support

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Safe Activity Foundations in Education Document

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Disclaimer

This material was designed to assist teachers to implement the Ontario Curriculum – Technological Education (revised Grade 10 -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 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

Safe Activity Foundation in Education: Computer Technology

This *SAFEdoc* was designed to provide safety data sheets, 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.

 In 2013 another resource called the SafetyNET was created by OCTE with many subject-specific exemplars of exciting student projects that incorporate varying levels of safety risk. Please review exemplar TEJ SafetyNET resource documents created 'by teachers for teachers' with experienced tips and customization options for your course projects.

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 (CON)	Technological Design (DESIGN)
Green Industries (GREEN)	Transportation (TRANS)
Hairstyling and Aesthetics (H&A)	Exploring Technologies (EXPL)
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 Computer Engineering teacher may need to utilize construction and manufacturing equipment or communications technology production equipment, and therefore may need to refer to the CON or COM 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 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) and to reinforce specific safety procedures and rules each day before initiating new procedures or using equipment. For example, before students use a band saw, 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.

See Appendix A for related safety resources, such as Live Safe, Work Smart; the Young Workers Awareness Program, the Ministry of Labour and other organizations dedicated to safe practices.

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, Grades 9 and 10 (page 28); Grade 11 and 12 (page 33)]

Health and safety are 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 (WHMIS)
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 (Ontario Ministry of Labour, Training and Skills Development) and related resources
Workplace Safety and Insurance Board (WSIB) – website (Workplace Safety and Insurance Board) and related resources
Workplace Safety and Prevention Services (WSPS) – website (Workplace Safety and Prevention Services and related resources
Canadian Centre for Occupational Health and Safety (CCOHS) – website (Canadian Centre for Occupational Health and Safety) and related resources
Ontario Ministry of Health – website (Ontario Ministry of Health) and related resources
Appropriate Safe Workplace Associations (SWAs) and clinics, such as:
the Infrastructure Health & Safety Association of Ontario (IHSAO) – website (Infrastructure Health & Safety Association of Ontario)
the Workers Health & Safety Centre (WHSC) – website (Workers Health & Safety Centre)
the Occupational Health Clinics for Ontario Workers (OHCOW) – website (Occupational Health Clinics for Ontario Workers)

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:
Occupational Health and Safety Act, Regulations 857

Delegating the Responsibilities for Safety

As well, 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 management, 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:
- Establish and maintain a written Board safety policy and program
- Emphasize and enforce the safety policy and procedures
- Ensure that each Teacher has been satisfactorily trained on the use of equipment within the classroom
- 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
- Be aware of current legal issues about liability for classroom accidents; ensure that such is part of in-service sessions for staff
- Assist and encourage the teacher to correct and avoid situations that could result in liability to the Teacher and the school
- Provide for proper safety equipment in all technology areas
- Hold staff accountable for safety practices in their respective areas
- Analyze accident records in order to determine the most frequent causes of accidents and the more severe types of accidents
- Take corrective measures to change accident-causing conditions
- Ensure that staff health and safety training and information is current
- Make safety literature, posters, and safety promotional material available to all persons associated with the technology program
- Set up a program for the safety orientation for new staff
- Ensure that all Occasional Teachers working in the Technology areas are informed about and understand the standard accident and emergency procedures
- Not permit 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
- Ensure that the use of space has not changed unless changes have been designed by a qualified architect or engineer
- 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
- Ensure that individuals are designated to be responsible for safety in the Technology Department

- Limit after-hours access to the Technological Education facilities and equipment to qualified personnel
- Ensure Teachers in Technology areas under Temporary Letter of Approval (TLA) letter are clear about their safety responsibilities.

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:
- Ensure that each Technology area has a floor plan posted in a strategic place to show the locations of items such as:

   Fire extinguishers
   School Defibrillator
   Posted emergency phone numbers
   Fire blankets
   Emergency power stop buttons
   Emergency kit
   Eyewash station(s)
   Emergency exits
   Special shut-off valves (gas, etc.)
   Nearest fire pull station
   PPE Supplies

- Ensure that a first-aid kit is available in each Technology area.
- Ensure there is Personal Protective Equipment (PPE) available for Technology staff.
- Ensure implementation and understanding of the safety policies and procedures. This includes developing specific departmental safety procedures or rules for specific areas.
- Ensure a designated Teacher is responsible for specific areas of safety in his or her specific areas
- Inform the Principal when the physical condition or other factors in the classroom may detrimentally affect safe instruction
- When a program is disbanded, ensure equipment is locked-out and room is not accessible (rekeyed)
- Inform the Principal, in writing, of any known or potential safety hazard
- Encourage the use of safety posters, literature, and audiovisual aids
- Advise the Technological Education staff to ensure that all student projects are able to be completed with safety guards in place. Keep safety guard and anti-kickback devices in position, if possible. Use approved alternate safety devices where appropriate.
- Advise Teachers to ensure that safety guards are placed back immediately when process is finished
- Where applicable, ensure that there is an appropriate spill kit and spill procedure present
- Develop, implement, and post a standard accident emergency procedure in each Technology area.
- Ensure that current inventories of Material Safety Data Sheets (MSDSs) are maintained
- Ensure that no unapproved or unsafe equipment, materials, or procedures are used in the area. Equipment should be purchased through Board-approved vendors.

- 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
- 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
- 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
- Encourage the Technology staff to receive first-aid training
- Ensure that all accidents and incidents are recorded and reported on the appropriate forms
- Conduct, along with the Health and Safety representative where appropriate, a follow-up analysis of all accidents and incidents
- Notify the Chief Custodian, Facility Services of any special needs or deficiencies in the area
- 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:
- Teachers must be aware of their Board Safety Documents that outline safety procedures for machinery, tools, equipment, and procedures by completing advised Board Training.
- 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.
- 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:
- 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.
- 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:
- The knowledge necessary to use the materials, tools, and procedures involved in science and technology safely
- The skills needed to perform tasks efficiently and safely
- *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.
- Teachers of Technological Education courses must carefully maintain records of student attendance and records of safety instruction given.

Any teacher of TEJ must have:
- Knowledge on electricity and circuits to realize the potential dangers of electrical energy
- Knowledge of fundamental laws (e. g., Ohm's law, Kirchhoff's laws)
- Knowledge about insulators and conductors' property
- Knowledge about electronic components, which can store electrical charge even if the circuit is not powered (e. g. capacitors)

- Knowledge of effects of electrical current on the human body
- Knowledge on pedagogy to manage classroom discipline to avoid unsafe behaviour and careless acts.

Additional workshops on safety specific to different units of the course are also recommended: Electricity, robotics, powered tools, hand tools (wire cutters and cable crimpers), cutting with cutting boards, soldering irons, working with chemicals (e. g. batteries, thread lock adhesive)

- Teachers are expected to be able to provide documentation:
- That the student was present on the date each safety lesson was taught (dated lesson plans, attendance records clear and unambiguous)
- 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)
- That indicates student understanding of the safety lesson (e.g., completed evaluation tool, student notes)
- Of how students are reminded of safe practice throughout the course (e.g., notation in teacher daybook)
- 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
- 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)
- 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
- 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
- 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:
- Maintain a well-organized and uncluttered workspace
- Follow established safety procedures
- Identify possible safety concerns and bring this to the attention of the teacher
- Suggest and implement appropriate safety procedures
- Carefully follow the instructions and example of the Teacher
- Consistently show care and concern for their own safety and that of others

Board Facilities

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.
Report the results of the inspection to the Principal and to the Head of Technological Studies
If work is planned in a Technology area, ensure the Teachers are informed and check for special hazards which may be present.
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.
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

- Be aware of the hazards in the Technological Education areas.
- Know the hazard warning signs and symbols and proper safety precautions.
- Do not handle unfamiliar materials.
- Do not handle or move chemicals in the shop.
- In the event of an emergency or concern, know the individuals who should be contacted and how to reach them.
- Know the proper handling and disposal of materials before disposing.
- 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.
- 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

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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

Based on the Ontario curriculum this resource contains safety lessons for technology subjects.

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Classroom Safety Resources
These resources identify safety policies and procedures that ensure the safety of people in schools.

e.g. WHMIS 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.

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Equipment and Hazard - Specific Safety Rules
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.

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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.

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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 or links that are associated with Computer Engineering 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
New Health Canada procedures for hand washing require hand washing to last 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) 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 on a daily basis. 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)
- WHMIS binders, symbols and SDS sheets readily available
- Manuals for the operation of various types of machinery, tools or equipment including clear and precise instructions for use

- Safety posters around major equipment and work areas
- Floor layout/map that clearly identifies the location of items such as fire extinguishers, eye wash stations, first aid kits

● Safety Expectations

There are standard TEJ and ICS courses currently offered at many Ontario schools at College and University levels (E/U/C/M) as well as Open course levels (2020). Please note that the following additional Ontario Ministry-defined Emphasis courses for Computer Technology require more in-depth course outline examination for safety expectation wordings.

TEI3M	Computer Engineering Technology: Interfacing
TEL3M	Computer Engineering Technology: Electronics
TEN3M	Computer Engineering Technology: Networking
TER3M	Computer Engineering Technology: Robotics and Control System
TEC3E	Computer Technology: Computer Repair
TET3E	Computer Technology: Information Technology Support
TEW3E	Computer Technology: Network Support
TEI4M	Computer Engineering Technology: Interfacing
TEL4M	Computer Engineering Technology: Electronics
TEN4M	Computer Engineering Technology: Networking
TER4M	Computer Engineering Technology: Robotics and Control System
TEC4E	Computer Technology: Computer Repair
TET4E	Computer Technology: Information Technology Support
TEW4E	Computer Technology: Network Support

The following are examples of safety related expectations from The Ontario Curriculum 2009 Revised) - Technological Education for the TEJ course.

TEJ 2O COMPUTER ENGINEERING TECHNOLOGY

Grade 10, Open

C. TECHNOLOGY, THE ENVIRONMENT, AND SOCIETY
C1. Technology and the Environment
C1.1 identify harmful effects of computer use on the environment (e.g., resources used and wastes created during production; disposal of old computers in landfill);

C2. Technology and Society
C2.2 describe how computers are used in various occupations (e.g., engineering calculations, architectural drawings, customer tracking and business data collection, navigation of airplanes and ships), and what work in these occupations would be like without computers.

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES
D1. Health and Safety
D1.2 identify issues related to Internet safety and personal identity security (e.g., protection of information stored on computers or transmitted over a network, identity theft, cyberstalking, cyberbullying, privacy policies).

D2.Ethics and Security
D2.1 demonstrate an understanding of the importance of ethical computer use (e.g., the social cost of

hacking, lost and corrupt data, and plagiarism);

D3. Career Opportunities
D3.3 identify groups and programs that are available to support students who are interested in pursuing non-traditional career choices in computer technology (e.g., mentoring programs, virtual networking/support groups, specialized postsecondary programs, relevant trade/industry associations);

TEJ 3M COMPUTER ENGINEERING TECHNOLOGY
Grade 11, University College Preparation

C. TECHNOLOGY, THE ENVIRONMENT, AND SOCIETY
C1. Technology and the Environment
C1.1 describe the effects of computer and electronic technology on the environment (e.g., accumulation of electronic waste, including lead and other toxic materials used in computers; release of ozone destroying chemicals used to wash soldering flux from circuit boards; energy consumed by computers left in standby mode; fuel consumption and air pollution reduced by computerized traffic-control systems);

C2. Technology and Society
C2.2 describe some of the drawbacks of computer and electronic technology for society (e.g., loss of privacy, infringement of intellectual property rights through unlicensed copying and electronic distribution, a more sedentary lifestyle, spam, telemarketing, Internet gambling addictions).

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES
D1. Health and Safety
D1.1 comply with relevant industry practices, standards, and related legislation to ensure workplace safety (e.g., standards and regulations specified in the Workplace Hazardous Materials Information System [WHMIS] and the Electrical Safety Code; grounding and enclosure standards for electrical circuits; ergonomically sound workplace arrangements and practices);
D1.2 describe and use appropriate equipment, techniques, and strategies to avoid health and safety problems associated with computer use (e.g., back injuries from improper lifting of heavy equipment, repetitive strain injuries, eye strain);
D3. Career Opportunities
D3.5 demonstrate an understanding of and apply the work habits that are important for success in the computer technology industry, as identified in the Ontario Skills Passport (e.g., working safely, teamwork, reliability, organization, working independently, initiative, self-advocacy).

TEJ 3E COMPUTER ENGINEERING TECHNOLOGY
Grade 11, Workplace Preparation

C. TECHNOLOGY, THE ENVIRONMENT, AND SOCIETY
C1. Technology and the Environment
C1.1 describe the effects of computer technology on the environment (e.g., accumulation of electronic waste, use of lead and other toxic materials in computers, use of ozone-destroying chemicals to wash soldering flux from circuit boards, energy consumed by computers left in standby mode, energy saved by use of programmable thermostats);
C1.2 outline how community partners and government agencies apply the reduce/reuse/recycle concept to computer technology.

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES
D1. Health and Safety
D1.1   use appropriate equipment, techniques, and strategies to avoid health and safety problems when assembling, using, and maintaining computer systems (e.g., repetitive strain injuries, eye strain, electrical shock).

TEJ 4M COMPUTER ENGINEERING TECHNOLOGY
Grade 12, University College Preparation

C. TECHNOLOGY, THE ENVIRONMENT, AND SOCIETY
C1. Technology and the Environment
C1.1 assess the effects of computers and electronics technology on the environment (e.g., hazardous materials contained in computer components, use of energy and other resource, fuel consumption and air pollution reduced by computerized traffic control systems);

C2. Technology and Society
C2.2 assess the drawbacks of computer and electronics technology for society (e.g., Internet gambling addictions, more sedentary lifestyle, spam, telemarketing, loss of privacy, infringement of intellectual property rights through unlicensed copying and electronic distribution).

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES
D1. Health and Safety
D1.1 explain the importance of following industry health and safety standards and practices (e.g., standards and regulations specified in the Workplace Hazardous Materials Information System [WHMIS] and the Electrical Safety Code; practices such as electrical grounding and precautionary measures when working with live circuits and devices that store electrical energy; ergonomically sound workplace arrangements and practices);
D1.2 evaluate and use appropriate techniques to avoid health and safety problems (e.g., repetitive strain injuries, eye strain, electrical shock, burns from soldering tools) when assembling, using, and maintaining computer systems;

D3. Career Opportunities
D3.4 demonstrate an understanding of and apply the work habits that are important for success in the computer technology industry, as identified in the Ontario Skills Passport (e.g., working safely, teamwork, reliability, organization, working independently, initiative, self-advocacy).

TEJ 4E COMPUTER ENGINEERING TECHNOLOGY
Grade 12, Workplace Preparation

C. TECHNOLOGY, THE ENVIRONMENT, AND SOCIETY
C1. Technology and the Environment
C1.1 assess the effects of computer and electronics technology on the environment (e.g., hazardous materials contained in computer components, use of energy and other resources, fuel consumption and air pollution reduced by computerized traffic control systems);
C1.2 outline and apply strategies to recycle or reuse computers and computer components (e.g., develop a local recycle/reuse program, create an in-school public awareness campaign).

D. PROFESSIONAL PRACTICE AND CAREER OPPORTUNITIES
D1. Health and Safety
D1.1   explain the importance of following industry health and safety standards and practices (e.g., standards and regulations specified in the Workplace Hazardous Materials Information System [WHMIS], the Electrical Safety Code, and the Occupational Health and Safety Act, and by the Workplace Safety and Insurance Board [WSIB]; ergonomically sound workplace arrangements and practices).
D3. Career Opportunities
D3.4 demonstrate an understanding of and apply the work habits that are important for success in the computer technology industry, as identified in the Ontario Skills Passport (e.g., working safely, teamwork, reliability, organization, working independently, initiative, self-advocacy).

Acceptable Use Guidelines

Purpose of Acceptable Use Guidelines

Everyone using the Board's computing and information technology facilities and resources are required to know and abide by the Acceptable Use Guidelines. These guidelines define the responsibilities for the safe and acceptable use of the Board's computing and information technology facilities and resources.

NOTE: The Board makes no warranties of any kind, cannot be held responsible for accuracy or quality of information, and will not be responsible for any damages suffered through use of the Board's computer and information technology facilities and resources. Use of any information obtained from the Internet is at the user's own risk.

Use of the Facility and Resources

Use of the computer and information technology facilities and resources of the Board are governed by all relevant federal (e.g. Copyright), provincial (e.g. Education Act), Board (e.g. Policies and Procedures) and local school (e.g. School Code of Behaviour) laws and regulations. Use of the Board computing and information technology facilities and resources by either staff or students for illegal, political, or commercial purposes is strictly prohibited. Each user must ensure they know and are able and willing to comply with these laws and regulations.

Personal Safety

Users will not post personal information about themselves or others. Personal contact information includes: full name, address, and telephone number.
Users agree not to meet in person with someone they have met on-line.
Users will immediately disclose to supervising teachers or other appropriate school employees any messages they receive that are inappropriate, request personal information, or make them feel uncomfortable.

Illegal Activities

Users will not attempt to gain unauthorized access to the school system or to any other computer system using the Board's network. Users will not log into another user's account nor will they attempt to access the personal data of others.
Users will not deliberately attempt to disrupt the computer system(s) in any way whatsoever.
Users will not make use of the Board's equipment or network systems to engage in any illegal activities.

Security

Users are responsible for the use of their individual account and should take all reasonable precautions to prevent others from being able to use their account. Under no conditions should a user provide his/her password to another person.

Users will immediately notify the system administrator if they have identified a possible security problem.

Users will not intentionally search out security problems or experiment with security or operating systems unless under direct supervision of the Board's system administrators.

Users will avoid the inadvertent spread of computer viruses by using virus protection procedures when downloading files.

It is recommended that all personal files be checked for viruses prior to use on the Board's computer systems.

Intentionally harming, destroying or damaging data, software, hardware or security systems is prohibited.

Attaching non-Board equipment (laptops, handhelds, peripheral devices) to the Board's network is prohibited without express permission of the Board's network administration or agents.

Inappropriate Communications

Restrictions against inappropriate communications apply to public messages, private messages, and materials posted on web pages.

Users will not use obscene, profane, lewd, vulgar, rude, inflammatory, racist, anti-religious, threatening or disrespectful means of communication.

Users will not post information that, if acted upon, could cause damage or danger of disruption to the system.

Users will not engage in personal attacks, including prejudicial or discriminatory attacks.

Users will not harass other persons. If a user is told by a person to stop sending them messages, they must stop immediately.

Users will not knowingly or recklessly post false or defamatory information about a person or organization.

Links from Board sites to non-Board sites must be periodically checked for appropriateness and adherence to the Acceptable Use Guidelines

Guestbooks, message boards and other public domain methods of communications must not appear on Board sites.

Respect for Privacy and Copyright

Users will not broadcast a message that was sent to them privately without permission of the person who sent them the message.

Users will not post private information about another person.

Signed release forms must be on file for any individuals identified on networked sites.

Signed forms must be obtained from parents or guardians for all students under the age of majority. No individual should be identifiable without express permission of the individual or their guardians.

All postings under Board supervision must abide by all relevant copyright laws and regulations.

Consequences of Misuse

If a user violates any of the above conditions of use, one or more of the following consequences may ensue:

- Suspension or cancellation of access privileges
- Payments for damages and repairs
- Discipline under other relevant Board policies; such as suspension or expulsion
- Civil or criminal liability under other relevant laws

Details are available at https://edu.gov.on.ca – 'Growing Success'

Student Acceptable Use Policy

This Student Acceptable Use Policy Document (SAUP) ensures that electronic communications resources are used in a manner that is efficient, professional, and will not jeopardize the network resources of this facility and organization. We are committed to giving our students access to the widest possible variety of learning opportunities. The global Internet network will provide you with access to a wide range of information and allow you to communicate with people worldwide. Use of the Internet for educational projects will assist in preparing you for life and work in the 21st century. In order to use this resource wisely and safely, you will need to demonstrate that you understand, and will practice, the proper and ethical use of this technology at all times.

Personal Responsibility

All students are expected to use the Internet in a responsible manner, consistent with the educational purposes for which it was intended. Responsible, ethical use of the Internet includes the following:
respect for the rights of others
respect for the right of privacy in the use of e-mail accounts and communications media
ethical use of electronic information
adherence to rules governing the use of computers including Internet or computer use policies established by your school and school board
adherence to codes of conduct, such as Board policies, the Ontario Human Rights Code, Copyright Act, the Criminal Code of Canada and other laws

Netiquette: The Rules of Internet Use

A. Personal Safety
I will not reveal personal information about myself or other people without checking with my teacher first. (Personal information includes your full name, home address, telephone number, e-mail address, etc.). I will not reveal such information even if I believe that I am communicating with another student.
I will not agree to telephone or meet with someone I have 'met' online.
I will promptly report to my teacher any message I receive that is inappropriate or makes me feel uncomfortable.
I will not assume that a message I send to someone else will be confidential.

B. Inappropriate Activities
I understand that inappropriate or unacceptable uses include, but are not limited to, the following:
Communicating over the Internet without instructor permission
Using obscene, threatening, harassing, racist, anti-religious, or any disrespectful language,
Posting information that may cause damage or endanger persons or property,
Posting false or defamatory information about a person or an organization,
Reporting a private message without the permission of the sender,
Using the school's Internet access for commercial purposes.

Copyright Infringement and Plagiarism

I will respect the rights of copyright owners by not using works of others without permission. I will not copy images, text, graphics, or other materials, unless the source provides permission. If I am not sure, I will ask my teacher.

Plagiarism is taking the work ideas, writings or images of others and presenting them as if they were yours. If you make use of information from the Internet for projects, assignments or essays, you must acknowledge the source of the information either in a footnote or bibliography. Significant copying of information, images, and ideas requires express permissions from authors and/or owners of the original materials.

Access to Controversial Materials

I will not use the Internet to access or send material that is profane, indecent, or obscene, that advocates illegal acts, or that advocates violence or discrimination towards other people. If I mistakenly access inappropriate information, I will immediately tell my teacher to protect myself against a claim that I have intentionally violated the Acceptable Use Policy.

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: Parent/Guardian Full Name:

Student Signature: Parent/Guardian Signature:

Date: Date:

CET 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]

Wear gloves, safety eyewear, aprons, masks, and other PPE as per instructed.
Ensure students are protected before performing operations that can be dangerous. Ensure teacher supervision is at an appropriate level and the operation is approved to be conducted by the teacher.

Lift Support and Movement

Move heavy objects only with teacher approval.
Use assistance to lift items over 23 kilograms (51 pounds) or 2 meters (six feet) in length
Secure and support heavy or long objects on approved shelves.

Equipment

Operate equipment only after receiving proper instruction and permission from the teacher.
Never leave equipment unattended.
Do not attempt to repair any electrical connections, ask your instructor for a course of action e.g., remove from service, lockout, etc.

Storage and Handling of Chemical Substances

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

Student Conduct Agreement Form

I, _____ agree to:

Ensure a safe workplace

Inform teachers of all injuries, damaged equipment and potentially dangerous situations.

Make sure I know all fire exits and power shutdown switches and how to use them during emergency situations.

Not compromise the safety of others through horseplay or aggressive action.

Only use equipment when properly trained, always with any necessary personal protective equipment, and when I fully understand all related safety issues

Ask for assistance from the teacher when I am unsure of the proper procedures or health and safety issues

Inform teachers whether you are left-handed or right-handed as it may affect your use of tools – inform the teacher if you feel your height or mobility in relation to use of a piece of equipment is an issue requiring adjustment of the workspace.

Prescribed and Non-prescribed Medications

Report any use of prescription medications and inform teachers of any possible side effects of the medication [e.g. penicillin, phenobarbital]

Report any use of non-prescription medication and any possible side effects of the medication [e.g. Reactine, Benadryl, cough syrups]

Never enter a shop or lab carrying, or under the influence of illegal substances

Alert teachers to any special allergic reactions or needs for epi-pen, or any other health concerns that may affect your performance of classroom tasks in terms of safety.

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: _____

Parent Signature _____

Date: _____

Section 2: Safety Information Sheets

This section contains Safety Information Sheets (listed in alphabetical order) that can be used as:

- Student handouts

- Safety posters (that 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.

Our recommendation is to take a photo or use a web image of specific equipment that exists in your classroom to put on the back of these sheets if you are distributing them to students, offering a chance for additional student labeling and arrow drawing to highlight specifics of your local equipment, materials or tools.

Please see the Appendix C for the SafetyNET Resource to assist in reviewing your classroom for other items. You can include this document in the Safety Binder it recommends as well.

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 TEJ OCTElab SafetyNET resource documents for experienced teacher tips and customization options for your course projects.

Audio Devices

Electrical devices use and retain potentially lethal voltages. Do not touch equipment or cables that have come in contact with fluids. Do not handle audio recording equipment with wet hands or feet.

Switch off the power before connecting or disconnecting power cables to audio equipment.

Inspect all audio cables and power connections for frayed wires, broken wires, worn or loose plugs. Report any problems to your instructor immediately.

Because long exposure to very loud sound can cause permanent and irreversible damage to your hearing, take great care when using any audio equipment. Hearing damage can come on gradually and therefore can go unnoticed until the condition is acute and the situation irreversible.

Lower speaker/headphone and microphone levels when connecting and disconnecting the connector(s). This will prevent sudden loud pops or buzzing.

Make sure the output level of headphones are in the decibel range of normal conversation i.e. 50-60 db.

Secure and balance microphone stands and booms to avoid dangerous situations

Report any problems associated with audio equipment to your instructor immediately.

To prevent fire, do not place electrical equipment close to combustible materials.

Store all audio equipment in the appropriate places.

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

Biohazards

When working with people always be aware of biohazards. In TEJ, students must be aware of the chemical makeup of components that are part of information technology systems and possible contamination through small cuts on hands or other open wounds. They must also be aware of the possibility for pinch points and cuts to occur, exposing others to blood contamination through shared tools and workspaces after an injury. Wearing of appropriate protective devices, keeping work areas clean and sanitized, and knowing proper procedures can minimize or reduce risks associated with biological hazards.

Wear proper Personal Protective Equipment PPE as directed at all times (e.g., safety eyewear, masks, gloves, aprons, etc.)

Properly clean all areas as required.

Wash your hands for at least twenty (20) seconds.

Handle sharp objects with extreme care.

Store all equipment, tools and materials in approved containers ONLY.

Dispose of biological material in approved containers ONLY.

Clean any spills and remove any contaminated materials immediately.

Call attention to any potential contamination or dangerous conditions to your supervisor and/or instructor immediately.

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

Breadboard Safety

All electrical/electronic circuits are to be considered live until you prove otherwise

Ensure you disconnect breadboard power before connecting or disconnecting components on the breadboard.

Ensure you disconnect any computer interface cables before connecting or disconnecting components on the breadboard.

Turn off the power immediately if any component or part of the circuit becomes overheated or when there is a burning plastic smell.

Do not wear loose or baggy clothing or jewelry when working with breadboards and circuits. Tie back dangling, long hair.

Never work on an electrical circuit that is live. If you are not sure, verify with the teacher and test the circuit with a circuit tester.

When using any circuit tester or meter to check for the presence of electrical power test the meter on a known live circuit first to ensure that it is working. (a fault, broken lead or blown fuse could develop in the meter or tester at any time).

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

Cable Use

Electrical devices use and retain potentially lethal voltages. Do not touch equipment or cables that have been exposed to fluids.

When working with cords and cables, grasp the connectors, do not pull on the cable.

Avoid stepping on cables.

To avoid accidental damage to equipment and personnel, secure cables to the floor with safety covers or by taping them.

Regularly inspect all cables for damage and wear. Replace worn or damaged cables. Report all cabling problems to your instructor immediately.

Make sure all cables are labeled for use with specific pieces of equipment.

Store all cables in areas designated by your instructor.

Prevent accidents and cable damage by allowing sufficient cable length for all planned equipment movement. Use the appropriate clamps to secure cables to various kinds of mounts (tripods, microphone stands, lighting stands, etc.).

When disconnecting cables from equipment, fit a protective cap over each end to prevent moisture and dirt from damaging the sockets.

Use caution when attaching and disconnecting cables with plugs that house small pin connections.

To prevent internal damage to cables and equipment, avoid knots, and exaggerated tight twists and bends to cables when operating your equipment.

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

Chemical Handling

Many operations in computer engineering involve different types of chemicals such as circuit board etcher or small components made of different toxic metals, as well as inks, solvents and cleaners to photographic processing and PCB production chemicals. Make sure you know how to handle these chemicals: their use, as well as storage and disposal procedures.

Before handling any chemicals, ensure you understand the safe handling procedures as outlined on container labels, WHMIS data sheets, designated instructions or posted classroom procedures as appropriate. If you are unsure, see your instructor before proceeding.

Place any chemicals in approved, labeled containers ONLY.

DO NOT mix chemicals without prior knowledge of the consequences.

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.

Ensure that there is adequate ventilation when using chemical substances.

Do not use any chemical for any other purpose other than what it is designed for.

Use appropriate PPE (personal protection equipment) at all times when handling chemicals. PPE includes eye protection, skin protection, gloves, aprons or coveralls, foot protection, as required under safe operating procedures.

Take note of expiry dates and storage requirements of chemicals. Do not use chemicals beyond their expiration.

<div align="center">AT ALL TIMES-IF IN DOUBT, STOP! ASK YOUR INSTRUCTOR</div>

Cameras and Tripods

It is a usual occurrence for computer engineering courses to integrate video production, audio podcasts and other multimedia to support interactive, differentiated instruction for students. It's important that students are aware of appropriate media equipment handling.

Inspect all power connections for worn or loose plugs.

Switch off the power before connecting or disconnecting cameras.

Do not handle equipment with wet hands or feet.

Inspect all handles and shoulder straps for secure installation before use.

Always use a neck strap to prevent the camera from falling.

Always use the lens cap to protect the lens of the camera.

Do not use cameras near water or in rainy/moist situations.

Do not place cameras on unstable carts, stands, tripods, or brackets.

When mounting a camera to a tripod, use only approved mounts and adapters. Do not leave cameras and tripods unattended outside the production area.

Avoid quick stops, excessive force, and uneven surfaces when using a camera mounted on a tripod.

Use only the manufacturer's approved power adapter and battery type for each camera. Inappropriate power sources can cause serious shocks to users, and permanent damage to the equipment. Never insert objects of any kind into openings on the camera; they may touch dangerous voltage points or short out parts that could result in a fire or electrical shock.

Do not attempt internal maintenance on equipment without permission.

Avoid sudden changes in temperature when using cameras; condensation may form on the lens and internal parts resulting in an unsafe malfunction of the equipment.

Inspect controls, locks, and mounts on all tripods to ensure operator and equipment safety. Keep all equipment clean and stored in its appropriate case.

See your instructor for proper battery handling procedures (i.e. recharging, storage, disposal).

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

Computer and Electrical Devices

Use all computer equipment with care. Electrical devices use and retain potentially lethal voltages.

Do not touch equipment that has come in contact with fluids. Risk of electric shock is greater in areas that are wet or damp. Do not operate any electrical equipment or computers in wet or damp areas.

Ensure you unplug the computer when working inside the computer with the chassis cover off.

When working with cords and cables, grasp the plastic insulation around the plug.

To protect equipment from accidental damage, do not place coats, backpacks, food, or beverages on or near computer tables.

Respect the rights of others who use the computer room by keeping it tidy and accepting responsibility for equipment used, including protection from theft, damage, or misuse.

Inspect any tools, power cords, and electrical fittings for damage or wear prior to each use. Use cords or equipment that is rated for the level of amperage or wattage that you are using. Do not use outlets or cords that have exposed wiring. Report any damage to your teacher and repair or replace damaged equipment immediately.

Make sure extension cords cannot present a tripping hazard.

Be aware that unusually warm or hot outlets may be a sign that unsafe wiring conditions exists. Unplug any cords to these outlets and do not use until your instructor has checked the wiring.

Know where the circuit breakers are located in case of an emergency.

Do not touch a person or electrical apparatus in the event of an electrical accident. Always disconnect the electrical current first.

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:

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

All extension cords should be provided with three pronged plugs.

Eliminate overloading outlets with multiple adaptors or power strips.

Ensure easy access to outlet for quick disconnection of power if needed.

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

Ensure outlets are spread out evenly around the classroom to provide adequate space for every group of students.

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

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

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

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

Store all electrical equipment in areas designated by your instructor.

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

Electrical Current Safety

Current	Reaction
Below 1 mA	Not perceptible
1 mA	Faint tingle
5 mA	Slight shock (Not painful)
6-25 mA	Painful shock, loss of muscle control
9-30 mA	Individual cannot let go
50-150 mA	Respiratory arrest
1,000-4,300 mA	Rhythmic pumping (Action of heart ceases)
10,000 mA	Cardiac arrest-burns

If you see someone who is "frozen" on a conductor:

Shut off the circuit immediately and call your teacher for help.

Use non-conducting materials to push or pull the victim away from contact with an energized conductor.

Do not contact the victim with your bare hands or any conductive material.

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

Ergonomics and Hardware

Ensure you have a comfortable layout of computer equipment and notebooks or texts.

Surfaces should be kept neat to avoid accidental bumping of equipment or blocking ventilation.

The best monitor position is 55cm to 66cm (22 to 26 inches) from yourself and at a height level with your eyes.

Sit straight up and place feet flat on the floor. Keep thighs parallel to the floor and do not cross legs.

Where possible, use small area lights rather than bright overall lighting. Do not place lights directly behind or in front of you. You can also reduce screen glare by using a filter attached to the monitor.

In the case of those who wear eyeglasses, use tinted lenses recommended for computer users.

For keyboarding, position the body so that it is centred on the G and H keys. Place the elbows slightly away from the sides in a relaxed position. Keep the wrists straight and in position just above the keyboard. Ensure that the keyboard is at a height enabling the lower arms to form a 70- to 90-degree angle with the upper body.

Relieve long periods of computer use with breaks involving stretching and movement. Do not spend longer than 2.5 hours without taking a 15-minute break from computer use.

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

Facility Emergency Procedures

Make sure you know the location of all fire alarms, emergency exits, and emergency power stop buttons.

Make sure you review all emergency and alarm fire procedures with the class and indicate to on-call, or substitute teachers where the fire evacuation route is located.

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

Location of Emergency Exits and Fire Alarms:

Locations of Emergency Stops:

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

Fall Protection

Studies of accidents in the information technology industry show that most injuries are caused by falls. This is especially applicable for network and cable installers. Observing a few simple rules will help to avoid most accidents of this type.

The points below give guidelines for preventing falls.

Walk; do not run.

Keep 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.

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

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

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.

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

Ensure you have proper ladder training, 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 Alarm Procedure

Don't panic.

Leave the building as soon as possible following the fire exit plan for your location.

Make sure that you don't create obstacles for other people to leave the building (lock a door, block a hallway, etc.)

Ensure the road or other areas which could be used by emergency personnel is clear.

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

Fire Extinguishers

Know your fire safety plan.
If you see a fire, call for attention: get everyone out, pull the fire alarm.
Do not let students put out the fire.
Stay calm.
If using a fire extinguisher:
PULL THE PIN, AIM LOW AT BASE OF THE FIRE
SQUEEZE HANDLE, SWEEP SLOWLY AT BASE OF FIRE.
Stay low to avoid heat and smoke.
Have the fire department check to make sure the fire is out.
Ventilate when the fire is completely out.
Avoid the use of loose Lithium Ion batteries in the TEL / TEJ class curriculum. Lithium batteries are a fire hazard if mishandled.
Learn and know the types of fire extinguishers (see below): For computer engineering courses it is important to check for C type in the classroom.

CLASS A water	A	Ordinary Combustibles: paper, cloth, wood, rubber, many plastics.
CLASS B CO_2	B	Flammable Liquids: oil, grease, gasoline, some paints, solvents etc.
CLASS C dry chemical	C	Electrical: wiring, fuse boxes, electrical equipment etc.
CLASS D special liquid or powder	D	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 in what to do in cases of emergencies.

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 current is removed.

Do not give the victim water.

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

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

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

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

Confirm you have reviewed your classroom specific emergency response poster that may have more information: the steps to notify the office, permitted use of a cell phone in class, providing the school address, where the nearest phone is located, lock down procedures, Automatic External Defibrillator location, First Aid Trained First Responders, and emergency fire exits.

Confirm you are aware of classmates or staff that may have extreme allergies, medical conditions, or physical limitations, and how to respond in an emergency.

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.
First aid kits are to be reviewed twice per term.

Suggested list (add items specific to your needs) Possible List of first-aid kit contents

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	

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

General Housekeeping

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

Storage areas should be kept neat and clean.

Storage areas should not block walkways and work spaces.

Heavier items should be stored on secure lower shelves.

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.

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.

If you spill or drop any fluid on the floor, clean it, or use absorbent materials. You are responsible for prevention of injuries.

Never block fire exits, fire pull alarms, doorways, aisles, the fuse panel, and electrical breakers or machine switches for any reason at any time.

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

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

Internet Use

Follow your teacher/instructor information on the guidelines/policy as established by your school board.

Do not download and install any program from the Internet without the permission of your instructor.

Do not make anyone's personal information available on the Internet, either through chatrooms, email, or the completion of forms and questionnaires.

Use school computer equipment only for approved educational purposes. The following are NOT legitimate uses:

Downloading and installing unapproved software;

Using computers for any activity that is rude, racist, profane, criminal, harassing, or offensive to others;

Damaging or destroying computer hardware.

Copying software illegally or using unapproved software

Copying without permission the intellectual or creative property of others

Creating or spreading computer viruses

Gaining unauthorized access to files belonging to another student or teacher

Changing or interfering with the operating environment of a computer, including accessing or changing any elements of the operating or networking systems, or any other network that can be accessed through the LAN, WAN, or Internet.

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

Ladder Safety

Many tasks relating to computer engineering and emphasis courses may require ladder use.

Review your current school / board policy on student and staff use of ladders and restrictions. If students are permitted to use ladders within board restrictions, ensure correct non-conductive type is used.

If students use ladders, they must be supervised and have a 'buddy' steadying the ladder. Instructors and/or teachers must have ladder training.

Follow your instructor's and the ladder manufacturer's instructions when using ladders at all times.

Do not use ladders that have loose rungs, cracked or split side rails, missing rubber foot pads, or are otherwise visibly damaged.

Keep ladder rungs clean and free of grease; remove buildup of material such as dirt or mud.

Open the stepladder spreaders and shelf fully before climbing.

Allow only one person on the ladder at a time.

Do not carry items in your hands while climbing up or down a ladder.

Face the ladder when climbing up or down it. Maintain a three-point contact by keeping both hands and one foot or both feet and one hand on the ladder at all times when climbing up or down the ladder.

When performing work from a ladder, face the ladder and do not lean backward or sideways from the ladder.

Do not stand on tables, chairs, boxes or other improvised climbing devices to reach high places; use a ladder.

Check the stability of the ladder before you step on it.

Ensure that all ladder feet are on a firm, level and non-slippery surface.

Do not stand on a ladder that wobbles, or that leans to the left or right of center.

Do not stand on the top two rungs of any ladder.

Do not move a ladder while someone is on it.

Avoid pushing or pulling stepladders from the side.

Repeated sideways movement can make ladders wobbly since they are weaker or less stable in those directions.

Do not place ladders on unstable bases such as barrels, boxes, loose bricks, pails, or concrete blocks.

Use a stepladder that is about 1m (3 ft) shorter than the highest point you have to reach. This gives a wider, more stable base and places the shelf at a convenient working height.

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 information technology, lifting heavy loads incorrectly often causes strains. Once your back has been strained or weakened, it can easily be injured again. Components and parts in computer engineering may be stored in bins on shelves so it is important to be aware of lifting risks.

Ask caretaking or building maintenance supervisors to lift heavy objects. They are properly trained and have the related lifting equipment as well.

Do not lift over 51 Lbs. (23 kg)

If the object is too heavy or cannot be handled safely due to its size/shape do not attempt to lift it.

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.

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.

Heavy articles should be stored on the bottom shelves.

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

Virus Safety Plan

The provincial government has asked all employers to create a plan that significantly reduces the transmission of viruses between people. The current example of this is the coronavirus 2019 (COVID-19) pandemic of 2020.

Ensure the shop or classroom has been wiped down and proper virus preventative cleaning has taken place. This is referred to as cleansed.

Do not enter a room that has not been cleansed.

Caretaking will let you know the room or shop is safe.

Watch your hands for 20 seconds before leaving class and do not touch your face

Wear a mask and a safety visor.

Use hand sanitation equipment that is provided by the school properly and diligently.

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

Power Tools (1)

It is common for computer engineering courses to integrate soldering, circuit board construction, electrical cabling work, manufacturing and construction relating to robotics and control system / summative prototypes.

Wear Personal Protective Equipment (PPE) such as safety glasses, safety goggles, face shields, gloves and proper clothing as appropriate.

Do not operate any power tool that you have not been trailed on.

Do not operate power tools without the instructor's permission and supervision.

Do not wear loose clothing or jewelry when operating power tools.
Long hair must be tied back.

Follow the manufacturer's instructions for changing tool accessories.

Keep guards in place.

Follow lockout/tag-out procedures if the tool requires maintenance.

Know the purpose of each tool you use, and use each for the specific task it was designed to do.

If required, always use two hands on the tool when operating. Clamp workpiece to a solid surface; do not attempt to hold a workpiece with hand or foot.

Unless it's designed for it, never use a portable electric tool where there are flammable vapors or gases present.

Electrical cords must be in good condition. Report any broken, frayed, damaged or bare cords. Keep cords away from heat, oil, and sharp edges

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)

If the tool is equipped with a three-prong plug, it should be plugged into a three-hold electrical receptacle. Never remove the third prong.

Never use power tools in damp or wet locations or if the worker is perspiring. Moisture helps electricity flow more easily through the body.

Rubber gloves and footwear are recommended when working outdoors in damp conditions.

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.

Unplug tools before replacing any broken, dull or damaged bits or blades.

Be careful not to overreach. Keep your balance and proper footing when working with power tools.

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. Ensure the power cable is not in your way.

When you place the power tool down ensure it does not rotate back towards you. The blade/bit may cut you.

Keep floor around work area clean.

Be sure the power switch for a portable tool is "off" before plugging it in.

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

Recycling

Do not throw batteries in the garbage. Ask your teacher or main office where old batteries are collected.
Do not throw out printer toner cartridges. Ask your teacher or main office where these are collected.

Fluorescent bulbs contain poisonous mercury gas. Only authorized personnel – caretaking should handle them.

Old light bulbs and monitors can explode with rough handling and release toxins. Be aware of risks and handle old equipment for recycling properly.

Metal and plastic pieces are often sharp when disposed. Ensure when putting in the garbage that they are wrapped in other materials to avoid danger to peers and maintenance workers. Ensure hands are washed to avoid small sharp debris entering clothing, skin, hair, or eyes.

Use the provided recycling bins for plastics, glass and paper.

Electronic waste is properly disposed by your school board. Follow the procedures that have been laid out by your school board. .

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

Repairing Computers

As you prepare for work inside your computer, follow these important procedures to minimize injury and promote safe practices:

Turn off power. It is imperative that you always remember to turn the power off before servicing any piece of electrical or electronic equipment. Do not open the computer case until you are absolutely sure no power is present. If you see any indicator lights (LED's) on, it is a sign that power has not been completely disabled. There are several makes of power supply units that use a switch on the back to shut off the power. If this is the case, be sure to set this switch to the "OFF" position. Unplug for Added Safety. As an added precaution, unplugging the computer unit from its power source will absolutely ensure that power is now turned off.

Smoke and Burning Smells. If you detect smoke or a burning smell originating from your computer you must: a. Stop what you're doing immediately. b. Unplug the computer from its power source. c. Call your instructor/supervisor immediately. d. Wait at least 5 minutes for parts to cool before you continue any repairs. A part that has been damaged from overheating should be replaced. Do not attempt to repair a part that has caused either smoke or smell or both. This holds especially true if the part in question happens to be the power supply.

Remove Hand Jewelry. Hand jewelry will often act as a conductor and can be an easy way for you to receive an electric shock. This holds especially true if the part you contact is the power supply.

Get Grounded. Grounding yourself by contacting the chassis/frame of the computer is an excellent safety procedure. This will prevent you from destroying components in your system that are susceptible to static charge. A grounding strap is an ideal piece of equipment and should be worn if it is available.

Some computers have jumper switches. Do not use a pencil to change the switch settings. The graphite from the pencil may short the switch.

Do Not Contact Capacitors. Become familiar with capacitors in the system capable of delivering extreme electrical shocks. Capacitors in a computer can store electric charge even after power has been removed from the computer. It is a good practice to wait for up to 5 minutes after removing power from the computer before working on the unit.

Never discharge a capacitor with a screwdriver or any metal object.

Do Not Service the Non-Serviceable.

Some equipment carries a label that reads "No serviceable components inside". This label means exactly what is says. Do not try to circumvent this warning under any circumstance. There are at times parts of a computer system that are not meant to be repaired. This warning is for everyone, including professional computer repair persons. This warning will usually appear on power supply units but can also be found on monitors, hard drives, optical drives and other dangerous or highly sensitive pieces of equipment.

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

Robotics

1. Robot safety relates to the size of the robot's work area, its speed, and human proximity.

2. Robot work areas should be safeguarded depending on size, type and manufacturer's specifications for safeguarding. Perimeter guarding can include a) Hard Guarding – ie. tape, cage, fencing, safety latching or b) Light Guarding ie. optical perimeters as fail stop.

3. Do not operate any robotic equipment without proper training and personal protection equipment as outlined by the manufacturer. The use of Safety Glasses is highly recommended for most robotic applications.

4. If a robot appears stationary, do not assume it is not going to move.

5. If a robot is engaged in repetitive movements, do not assume it will continue to do so.

6. Always maintain a position that is clear of the robot work area.

7. Never engage a robot that is in movement.

8. Do not activate power to a robot unless you are completely aware of the current set of movements the robot will be expected to complete.

9. Notify an instructor immediately if you witness unexpected movements, or if you feel any part of the equipment has failed.

10. Check all safeguards prior to operating the robot and immediately report to your instructor if any safeguards are out of place.

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

Soldering Safety

Ensure adequate ventilation. Solder may contain lead. DO NOT breathe fumes from soldering or de-soldering operations.

Ensure you have a proper solder fume extractor in your work area.

Clamp work securely while performing soldering or desoldering. Use a vice or other approved clamping systems to keep your hands free to work.

Use heat sinks to protect circuit components. Do not apply excessive heat or apply heat for excessive lengths of time.

Beware of hot soldering irons and components. Make sure others are aware of hot tools. Switch off and/or unplug soldering tools when not in use. Allow to cool before storing.

Use appropriate PPE (personal protection equipment) at all times when soldering or desoldering. PPE includes eye protection, (use at all times), skin protection, and heat protection, as required under safe operating procedures.

Keep area clean around workplace at all times.

When working with used circuit boards, make sure desolder or solder area is clean and free of dust or grease before applying heat.

Do not use acid core solder paste.

Be aware of the location of your soldering iron or pencil while it is hot, or cooling. Make sure you place the hot iron in an appropriate holder to prevent heat or fire damage.

When soldering wire connections, make sure the wires are tightly connected. Use appropriate covering like heat shrink tubing or twist-on connectors to protect the splice. Do not use wires with melted insulation or exposed conductors.

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

Tool Safety

Wear safety glasses at all times when using hand and/or power tools.

Prescription glasses are not all safety approved. Wear large safety glasses over them.

Do not continue to work if your safety glasses become fogged; stop work and clean the glasses until the lenses are clear and defogged.

Use tied off containers to keep tools from falling off of scaffolds and other elevated work platforms.

Transport hand tools only in tool boxes or tool belts. Do not carry tools in your clothing.

Warn your instructor of any worn, damaged or defective tools. Do not use them until repaired. Do not use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose. Do not perform "make-shift" repairs to tools.

When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person.

When using knives, shears or other cutting tools, cut in a direction away from your body.

Tell your instructor when cutting tools and/or wire strippers become dull.

Do not carry tools in your hand when you are climbing; carry tools in tool belts.

Do not throw tools from one location to another, from one person to another, or from scaffolds or other elevated platforms.

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

WHMIS 2015 REGULATIONS

● The acronym WHMIS stands for *Workplace Hazardous Materials Information System*

● 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.

● 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.

● SDS stands for *Safety Data Sheets*

● SDS is a printout on paper that identifies how to handle, store, use, health effects if exposed, emergency procedures, and protective measures

● 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.

● The SDSs must be readily available to the workers who are exposed to the hazardous product, and to the health and safety committee or representative.

● A label will be required to be updated when the supplier becomes aware of any "significant new data". According to the regulation, the definition of significant new data is:

● "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." (Source: *Canada Gazette*, Part II, Hazardous Products Regulations, Section 5.12 (1))

● 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

WHMIS 2015 LABELS

Supplier labels must be attached to the controlled product container which has detailed information about the product. Legislation states that 10 kg or more of a controlled product or hazardous material from a supplier must contain the following information:

- The hatched border that was required under WHMIS 1988 is not required under WHMIS 2015. However, it is also not forbidden to use the hatched border, so you may see it on a WHMIS 2015 label.

- Labels must be in English and French. They may be bilingual (as one label) or be presented as two labels (one each in English and French).

- The pictogram, signal word, and hazard statement are to be grouped together,

- To be clearly and prominently displayed on the container,

- To be easy to read (e.g., you can see it easily without using any item except corrective glasses), and

- To be in contrast with other information on the product or container.

- 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.

- **Product identifier** – the brand name, chemical name, common name, generic name, or trade name of the hazardous product.

- **Initial supplier identifier** – the name, address, and telephone number of either the Canadian manufacturer or the Canadian importer*.

- **Pictogram(s)** – hazard symbol within a red "square set on one of its points".

- **Signal word** – a word used to alert the reader to a potential hazard and to indicate the severity of the hazard.

- **Hazard statement(s)** – standardized phrases which describe the nature of the hazard posed by a hazardous product.

- **Precautionary statement(s)** – standardized phrases that describe

measures to be taken to minimize or prevent adverse effects resulting from exposure to a hazardous product or resulting from improper handling or storage of a hazardous product.

● **Supplemental label information** – some supplemental label information is required based on the classification of the product. For example, the label for a mixture containing ingredients with unknown toxicity in amounts higher than or equal to 1% must include a statement indicating the percent of the ingredient or ingredients with unknown toxicity. Labels may also include supplementary information about precautionary actions, hazards not yet included in the GHS, physical state, or route of exposure. This information must not contradict or detract from the standardized information.

In addition to this and if the container has more than 100 milliliters the following information must be on the label:

● Risk time factors

● Precautionary measures while using or being exposed to the product/chemical

● First aid measures to address immediate injuries and not progressive illnesses

Workplace labels must be identified on a container that is not from the supplier, and must contain the following information:

● Product name (matching the SDS product name).

● Safe handling precautions may include pictograms or other supplier label information.

● A reference to the SDS (if available).

● First aid measures

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

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

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

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

WHMIS Pictograms Website

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.

WHMIS 2015 Pictograms

The **flame** pictogram is used for the following classes and categories:
- Flammable gases (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 gases (Category 1)
- Self-heating substances and mixtures (Category 1 and 2)
- Substances and mixtures which, in contact with water, emit flammable gases (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)

WHMIS 2015 Pictograms

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)

WHMIS 2015 Pictograms

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** pictograms 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)

WHMIS 2015 Pictograms

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**

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

SDS SAFETY LABELS

GENERIC SAFETY DATA SHEETS FOR PERSONAL ENHANCEMENT PRODUCTS PROTECTED BY TRADE SECRET LAWS (SDS)

MATERIAL IDENTIFICATION

_____

TRADE NAME/MATERIAL NAME   PRODUCT USE

_____

OTHER NAMES:

_____

MANUFACTURER'S/SUPPLIER'S NAME:

_____

ADDRESS:

_____

EMERGENCY TELEPHONE:

_____

FIRST AID PROCEDURE

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

Section 3: Safety Assignments and Tests

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 test or assignment results and/or passports (next section) as verification of each student's understanding of safe concepts and practices.

Note: These tests and assignments are not directly correlated with the CET Safety Data Sheets. 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, 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 TEJ OCTElab SafetyNET resource documents for experienced teacher tips and customization options for your course projects.

Safety Assignment # 1 – Computer Lab
Room Inventory and Safety Identification

Use a ruler/straightedge to draw a <u>neat</u> 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(s)	
Fire extinguishers	
Fire alarm	
First aid kit	
Power shut-off or emergency "stop" buttons	
Work benches	
Electrical outlets	
Electronics repair area	
Soldering fume handling equipment / exhaust fans	
Sink area	
Eye wash station	
Waste disposal containers	
Work surfaces	
Computer work areas	
Equipment and tool cleaning areas	
Cleaning chemicals storage	
Consumable supplies storage	
Gloves storage	
Apron storage	
Safety glasses storage	
Project storage	
Traffic areas	
Cable storage	
Robotics / Electronics Small Parts Storage	
Cutting surfaces / Clamp areas	
Lockdown procedure information	
Emergency Office signaling (P/A switch or phone)	
Other	

Safety Assignment # 2 – Computer Lab General Safety

In groups of two, analyze the machine/equipment/issue you have been assigned and provide a detailed description of the safety for that system. Information may be found in a variety of places including textbooks, the Internet, equipment manuals, or from local suppliers. A five to ten minute group presentation will be made to the class in which your group will describe the topic and the importance of safety in a technological environment.

Group 1   Electricity and Electronics Safety

Group 2   Working with Metal, Pinches, Parts, Sharps

Group 3   Computer Hardware Safety

Group 4   Network Safety and Security

Group 5   Internet Privacy

Group 6   Soldering Safety

Group 7   Hand and Power Tool Safety

Group 8   Chemicals, Solvents, and Fluids

Group 9   Dealing with Cuts, Punctures, Eye Injury, Burns, Strains

Group 10   Fire Safety

Group 11   Collegial Professionalism – cleaning up for next class.

Group 12   PPE Safety

Safety Assignment # 3 – Perform a Safety Audit

Once a month, a group of you will be assigned to perform a safety audit of the studio and/or lab. 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:

First aid kit content status

Status of safety equipment,

Status of fire protection equipment,

Status of cleaning supplies and equipment,

Status of storage areas,

Status of tools and equipment,

Status of computer equipment / inventory / evaluate for recycling, electronics disposal,

Status of PPE supplies (Hand sanitizer, Masks, Face Masks)

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.

OCTE | ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

Computer Engineering Technology 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			
Vinyl/Latex/Rubber Gloves			
Work Areas			
Safety glasses/goggles			
Parts storage facilities			

WHMIS and SDS Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /10

Section 1: Definitions
Define WMHIS and SDS.

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

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

3. In Canada a suppliers WHMIS label must be written in:
a) French   b) English
b) Chinese   d) both Official Languages

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

5. A Safety Data Sheet should be:
a) kept on file forever   b) read and then thrown out
c) photo copied for all workers   d) stored in a binder and/or online for 3 years

Answer Key:
Section 1
1. Workplace Hazardous Material Information System, Material Safety Data Sheets
2. To inform employees of hazardous materials.
Section 2: Multiple Choice: 1. c 2. c 3. d 4. b 5. d

Materials Definitions Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /11

Match each word with its correct definition.

Acids/Bases	____	any material that burns easily
Body fluids	____	chemical compounds containing carbon, hydrogen and often times oxygen bonded together (e.g., turpentine, fats and oils, sugars, starches, some fertilizers).
Chemicals	____	materials that become toxic or could possibly endanger species and the quality of the environment when released.
Combustibles	____	chemicals that release hydrogen or hydroxide ions when mixed with water, becoming corrosive. May be strong (e.g., hydrochloric acid, sodium hydroxide, lye) or weak (e.g., acetic acid, vinegar, baking soda).
Hand tools	____	shiny, dense, malleable elements that can be toxic if ingested, inhaled in powder or vapor form, or taken in through the skin (e.g., mercury).
Hazardous waste	____	materials that dissolve other chemicals (e.g., water, fat, organic)
Metals	____	materials that are or may become harmful if taken into the body or released into the environment.
MSDS	____	any liquid produced by the body of humans or other animals; includes saliva, blood and urine.
Organic compounds	____	non-motorized implements used to do work in the laboratory.
Solvents	____	materials that may produce reactions leading to corrosion, noxious fumes, or other negative effects when used inappropriately in the classroom.
Toxins	____	contains information about chemicals purchased from a science supply vendor; lists all of the properties and possible hazards of the chemical.

Answer Key:
1. d 2. H 3. J 4. A 5. I 6. C 7. E 8. K 9. B 10. g

Safe Uses of Computer Resources and the Internet Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /5

A. Circle the correct choice.

If a website offers you a chance to win a prize if you complete a questionnaire, what should you do?
Fill out the survey with the correct information so that you can win the prize
Write in your correct phone number so you can be contacted but make up answers to the rest of the questions
Do not complete the questionnaire because do not know what use will be made of personal details.

Software is your property if you possess it on disk.
True
False

3.   Which of the following is not one of the recommendations for the physical setup of computer equipment?
Place the monitor 55cm to 66cm (22 to 26 inches) from the user and at a height to form an angle with the user's eyes of 0 degrees.
Sit straight up and place feet flat on the floor. Keep thighs parallel to the floor and do not cross legs.
Where possible, place small area lights directly behind or in front of the user.

B. Provide point-form answers.

What are some physical hazards and potential problems associated with careless use of computer equipment? Identify four.

Provide three reasons why you are not allowed to download or install any software on any school computer.

What is Identity theft?

Describe two step verification?

Safety in the Computer Lab Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /25

Indicate by writing T or F if the following statements are True or False.

Electrical devices can retain potentially lethal voltages.   T

Do not touch equipment or cables that have been exposed to fluids.   T

Report all cabling problems to your instructor after class.   F

After disconnecting cables from equipment, it is not necessary to fit a protective cap over each end to prevent moisture and dirt from damaging the sockets.   F

It is OK to bend cables tightly to fit equipment.   F

Inspect all power connections for worn or loose plugs every time you use them.   T

Switch off the power before connecting or disconnecting power cables.   T

Do not use wooden or fiberglass ladders when working with electricity.   F

Carry your cell phones at all times.   F

Always wear protective work gloves when handling high voltage equipment.   T

It is OK to touch power source internal parts with bare hands.   F

To prevent fire, do not place electrical equipment close to combustible materials. T

Feel free to eat and drink in the computer lab.   F

It's ok to consider adapting pieces by grinding them to fit the robot without teacher supervision if you're in a hurry.   F

While working from a ladder, leaning out to reach a lighting instrument is an acceptable practice.   F

All power supplies hung on a ceiling suspension system must be fitted and operate properly.   T

Old computer monitors are dangerous if their screens are broken so care should be taken in

handling them.   T

Inspect all tool carts, tools and materials for safe storage every day.   T

Do not use cameras near water or in rainy/moist situations. T

If a piece of equipment is not working, open it up and see if you can fix it. F

It is OK to handle equipment with wet hands or feet even if the equipment is plugged in. F

Dispose of used batteries in the garbage.   F

It is OK to listen to loud music if it is only for a short period of time. F

Hearing damage can come on gradually and therefore can go unnoticed. T

Horseplay is allowed in the computer lab.   F

The output level on student headphones should be in the decibel range of normal conversation 50-60 dB.   T

Secure heavy computer parts bins on lower shelves to avoid dangerous situations.   T

Do not handle equipment with wet hands or feet even if the equipment is unplugged.   T

Electricity Safety Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /16

True/False Questions
1. T /F____ The amount of electricity used in solderless breadboards (max voltage 5V) can cause a heart attack?

2. T /F____ The function of a fuse or circuit breaker is to interrupt the flow of electricity if the circuit becomes "overloaded"?

3. T /F____ The purpose of the "third wire" - green, on a three-pronged plug is to "ground" leaking or stray electricity?

4. T /F____ A person usually offers the most resistance to electricity?

5. T /F____ When you unplug a tool, you should pull the electrical cord?

6. T /F____ You should never leave a running machine unattended, however, you can leave powered breadboard unattended because there is no moving parts there?

7. T /F____ You do not need to wear eye protection when using a powered breadboards.

Multiple choice questions
8. Which of the following problems can faulty electrical equipment cause?
A. Shock.
B. Fire.
C. Explosion.
D. All of the above.

9. Which statement is TRUE about low voltage circuits (5 - 9 V)
A. At low voltages (5-9V), the major risk is the risk of burns from high current short circuits.
B. Electrical circuits with low voltages (5-9V) cannot cause short circuits, because the voltage is too low.
C. Even low voltages (5-9V) circuit can supply 20 amps of current ,that is why there is a major risk for human to get heart attack or shock.
D. All of the above.
10. The ratings for four typical domestic appliance fuses are given below. Which is the safest fuse to use for an appliance with a normal operating current of 2A?
A. 13A
B. 3A
C. 8A
D. 5A

11. Which statement is TRUE about mains electricity in our classroom?
A. The voltage is a little bigger than a battery
B. Wet skin has a bigger resistance than dry skin
C. The current flow is usually similar to triple batteries in a torch
D. A fuse should melt if a significantly higher than normal current flows through it.

12. Which of the following statements is NOT correct?
A. Electricity always travels to ground.
B. Electricity tries to travel to ground.
C. Electricity takes the path of least resistance.
D. Electricity travels in a complete circuit.

13. A current even as low as _____ can be felt by the body.
A. 1 Amp
B. 6 Volts
C. 1 milli Amp
D. 6 Ohms

14. Which part of the human body offers the most resistance to electricity?
1. Fingers
2. Toes
3. Wet skin
4. Thick and/or dry skin

15. The greater the body's resistance to electricity, the _____ amount of harm to the person.
A. Less
B. Greater
C. Resistance has no effect on electricity
D. Equal

16. Which of the following are electrical hazards?
A. Flammable materials near electrical equipment and/or static electricity
B. Damaged insulation on wires, broken plugs, and overheated appliances
C. Overloaded circuits
D. All of the above are electrical hazards.
E. Only A and B are electrical hazards.
F. Only B and C are electrical hazards.

Answer Key:
1. F   2. T   3. T   4. F   5. F   6. F   7. T   8. D   9. A   10. B   11. D   12. A   13. C   14. 4   15. A
16. DEF

Test: Equipment and Facilities

Name: _____

Date Completed: _____

Teacher Signoff: _____ /15

Briefly describe the safety, security and privacy considerations for the proper use of the following equipment:

Computers and Peripherals
PCs for internet access, word processing, and database software
Multimedia production workstations
Digital editing workstations
Scanners
Laser printers
Colour printers
Cell Phones

Equipment and Electronics
Control Systems
Extension cables and power bars
Ladders
Tools (wrenches, screwdrivers, etc.)
Video Capture Capability (analog and digital)
CD/DVD Writers

Publishing
Copyrights
Plagiarism
Software rights licensing and open source
OPEN Source
The GNU General Public License

PPE Safety Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /20

The following are True or False questions. Write T for True or F for False for each question.

PPE stands for Private Protection Equipment.

You must wear a face mask or face shield in class

There is no need to wash your hands in class

If you have a fever you should have a glass of water and return to class.

You should report any headaches to the teacher immediately.

Rub and scratch your face if necessary.

What is a normal temperature reading?

Social distancing is defined as staying 1 meter apart.

If you have an upset stomach or vomit you should report to your family doctor.

General Safety Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /20

The following are True or False questions. Write T for True or F for False for each question.

If you are uncertain about something in the lab, it is okay to ask a peer.

All injuries must be reported to the teacher immediately.

Lab equipment needs to be cleaned only at the end of the period each day.

It is okay to bring a drink into the lab as long as none of the equipment is running

Carrying a tool in your pocket is okay as long as you don't remove it from the class.

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

It is okay to use a 'flat' screwdriver to undo a 'cross' screw.

The first aid kit can be stored in the school main office so no one steals the contents.

A class "D" fire extinguisher is a must in a communications shop.

Once you've received your equipment passport you may use the equipment any time without permission.

Minor injuries need not be reported.

If a machine does not work, report it to the instructor.

At all times, if you are in doubt of how to use equipment, ask someone who is licensed (student passport), check manuals, or ask your teacher.

All guards must be in place and properly working before using the equipment.

As long as no one is using the equipment after you, leave it running until you need it again.

Safety equipment like PPE are necessary only when power is on.

A safety zone is an area where shop rules do not apply.

Long hair must be tied back before using any power tool.

Before working in any shop, or lab, you should know where the emergency exits are.

Any adjustments to a machine must be made with the power off.

Answer Key
1. F	2. T	3. F	4. F	5. F
6. F	7. F	8. F	9. F	10. F
11. T	12. T	13. F	14. T	15. F
16. F	17. F	18. T	19. T	20. T

General Safety Rules Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /12

Write the rule that relates to the following statements:

Using the proper tool for the job.

How to carry tools.

Safety Glasses

Electrical cords and plugs.

Portable tools when not in use.

Securing your work.

Safety guards.

Moving parts on equipment.

How many persons operate machines at one time? What do partners do?

Make sure it is completely stopped before leaving.

Broken or damaged tools.

PPE safety.

Software downloads

Acceptable use of school computers

Hand Tools Quiz

Name: _____

Date Completed: _____

Teacher Signoff: _____ /10

Hand tools in _____condition is responsible for many injuries.

After use, _____and return the tool to its proper place.

All _____should be removed before beginning work.

_____ are the cause of many accidents. Use only sharp tools that are in good condition.

Always push a chisel _____from yourself.

Wash your hands as you _____ the shop, or lab, and _____ you leave.

Keep _____ hands on the chisel, unless striking it with a mallet.

Use the _____tool for the job.

Always use a file with a _____. Protect your hand from serious injury.

Wear _____whenever you use striking tools.

Never _____behind a person swinging a hammer.

WORD BANK:

eye protection, both, blunt cutting tools, enter, handle, stand, poor, clean, away, jewelry, leave, proper

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Student Safety Procedure Checklist: Soldering

Student Name: _____

	Date of Demonstration and Teacher's Comments		

Procedure	Wiring / Cables	Circuit Board	Other
Student prepared physical environment prior to using station.			
Student used fume extractor when soldering.			
Student wore PPE and used safety specifics for each procedure.			
Students proficiently demonstrated appropriate use of tools and equipment and fume extractor.			
Student demonstrated health and safety awareness throughout procedure.			
Student safely cleaned workspace and stored supplies, tools, equipment and project in progress or ready for marking.			

Section 4: Safety Passports

This section contains Safety Passports, which provide a means to track individual student safety knowledge and skills. These Safety Passports 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).

Culminating Activity: Students can strongly confirm their understanding with a culminating safety activity, provided here as an example.

Additional Options: Some other examples have been provided as checklist forms.

NOTE:

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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 machine or material with an instructor's permission. (Note: Lower levels can be upgraded to higher levels with further instruction, practice and proof of competence. <u>All students</u> must have Instructor's permission before using any equipment.)						
Project Tool Related				Project Material Related			
Equipment	Rate	Sign	Date	Material	Rate	Sign	Date
Internal computer hardware							
Monitors							
Extension cords, power bars							
OS system setup							
Software application installation							
Internet policy use							
Hand tools							
Static electricity handling							
Soldering and desoldering							

Form 1: Computer Engineering 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 initialed 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, remove 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.

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 initials this as complete. IMPORTANT NOTE: A copy of the test should be kept by the teacher.

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.

Once the student has completed #1, 2 and 3, the teacher signs the final column of 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.

These tests must be repeated every year for students in subsequent grades in all Technology program. For example; a grade 10 safety tests do not grant you a "by" from grade 11.

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).

Form 2: Record of Safety Training for Computer Engineering Class

Student: _____

Class/Course: _____

Over the course of the semester or term(s) you will receive direct instruction in the safe and appropriate use of the 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:
his or her training has been signed off by the teacher
he or she has received a satisfactory mark on the related safety quiz.

Topic	Date	Teacher's Signature
Computer Resources and the Internet		
Acceptable Use Policy File and Data Management Hardware Care and Access Safety on the Internet Computer Ergonomics		
Computer Engineering Project Care – Working with Tools, Materials, Electricity, Communications Equipment		
Hand Tools Personal Protective Equipment Handling Electronic Media Working with Electricity The Working Environment Working from Heights (Ladders) Safe Use of Chemicals Safe use and proper handling of equipment and materials, supplies, workstations Use of personal protective equipment (PPE) Camera Operation and Storage Battery Care Using a Tripod Connecting Monitors Communications Equipment Still Imaging Devices Microphone Use and Storage Cables		
Facility Care		
Proper cleaning and setup procedures		

Maintaining safe working environment Proper room cleanup and organizational procedures Proper use of green screen Safe and proper disposal of consumables and hazardous materials		

Form 3: Teacher Overview Sheet for Individual Student Tracking.

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

COMPUTER ENGINEERING - SHSM

EQUIPMENT SAFETY GUIDELINES

CULMINATING ACTIVITY

Each piece of equipment we use in the lab 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 computer engineering students. You must include the following information on all safety information sheets:

Name of equipment / repair process / project
Function of equipment
Safety guidelines
Correct operating procedures

You are developing important mandatory material that will be used by all computer engineering 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 computer engineering program. If you have any questions at any time, please ask!

Equipment / Repair Process / Project: Due Date:

Checklist for TEJ Safety Training – Computer Technology

Student Name: _____ Semester: _____

Completed:	Date:	Details:
		Completed Student Handout – Parent / Guardian and Student Reviewed, Read, Signed, Email Emergency # is listed.
		Completed Computer Station Ergonomics Assignment, Passport Checked
		Proper Lifting Technique - Reviewed Video, Completed Practical, Did Quiz, Passport Checked
		Ladder Use Awareness – Reviewed Video, Completed Practical, Did Quiz, Passport Checked
		Soldering – Reviewed Video, Completed Safe Soldering training, Did Quiz, Passport Checked
		Hand Tools – Reviewed Video, Completed Safe Hand Tools Quiz, Passport Checked
		Power Drill – Reviewed Safe Drill Techniques, Did Quiz, Passport Checked
		Dremel Tool – Reviewed Safe Dremel Techniques, Did Quiz, Passport Checked
		Students uses all aspects of PPE when required.
		Student is aware of fire drill, lockdown, and emergency/injury/first aid procedures for our classroom. Student is aware of location of safety equipment in the classroom.
		Student is aware of guidelines for using recycled materials in class projects, and understands parts use guidelines, equipment sign-out procedures, and situations to question the need for additional safety equipment (PPE, etc.)
		Student understands the need for a 'common sense' professional approach when completing in class electronics / construction / assembly / disassembly work. Student is aware of project content standards.
		Student has acknowledged lab rules and safety behaviours for working with equipment, completed TEJ Safety quiz, and has a classroom safety buddy. My safety buddy is: _____

Student Signature and Date: _____

Parent / Guardian Signature and Date: _____

Teacher Signature and Date: _____

[EQUIPMENT/PROCEDURE] PASSPORT
General Conditions:
Personal Protective Equipment:
Possible Risk Factors:
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: _____ Print Name: _____ Teacher Signature: _____ Date of Training: _____

AUDIO SAFETY PASSPORT

General Conditions

Loud sounds can cause permanent hearing difficulties or damage. Students must be trained on the safe use of audio equipment before they may begin using it. The student must demonstrate to the teacher proficiency and safe work procedures, which must be followed before usage.

Personal Protective Equipment

Hearing protection
Headphones

Possible Risk Factors

Hearing damage or loss
Electrical shock

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

CABLES PASSPORT

General Conditions

Cables can be a major cause of tripping hazards. Improper use and storage may cause physical damage, causing electrical shock hazards. Students must be trained on the safe use of cables before they may begin using them. The student must demonstrate to the teacher proficiency and safe work procedures.

Personal Protective Equipment

Safety glasses as appropriate
Safety footwear
Work gloves

Possible Risk Factor

Tripping, slips and falls
Strain injuries carrying and moving cables
Electrical shock hazards
Cuts and abrasions

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

CAMERA AND TRIPODS PASSPORT

General Conditions

Students must be trained on the safe and proper use of cameras and tripods before they may begin using them. The student must demonstrate safe procedures.

Personal Protective Equipment

Proper footwear

Possible Risk Factor

Tripping hazards
Entanglement [hands and hair]
Cuts and Abrasions
Eye injuries
Electrical power hazards

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

ELECTRICITY PASSPORT

General Conditions

Electrical current in the outlets in this facility has enough power to cause death by electrocution. Know and understand all electrical safety operations and procedures before using the electrical equipment in the facility.

Personal Protective Equipment

Appropriate footwear
Safety Headgear
Safety eyewear
Ground straps
Protective gloves if necessary

Possible Risk Factors

Electrocution, shock, and burns
Falls from ladder due to contact with electricity

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

ERGONOMICS PASSPORT
General Conditions Improper posture, equipment placement, and repetitive use of equipment may cause injuries and pain. Students must be trained on the safe and proper use of tools, communications equipment and computer peripherals before they may begin using them. The student must demonstrate the ability to use the equipment safely.
Personal Protection Proper posture Proper equipment placement Change in sitting arrangements, etc. to avoid repetitive stress injuries
Possible Risk Factors Spine and back injuries Hand Injuries Eye strain
The student has been trained on this equipment. The student understands the required personal protective equipment to operate this equipment. The student is aware of the possible risk factors Student Signature: _____ Print Name: _____ Teacher Signature: _____ Date of Training: _____

HAND AND POWER TOOLS

FOR COMPUTER ENGINEERING PASSPORT

General Conditions

Students must be trained on the safe use of Hand and Power Tools before they may begin working with them for robotics and computer engineering tasks. The student must demonstrate to the teacher safe work procedures. For example, screwdrivers, drills, wire cutter/crimpers.

Personal Protective Equipment

Safety glasses
Coveralls
Safety footwear
Safety Gloves if necessary.

Possible Risk Factors

Eye injury
Projectiles
Hand injuries
Cuts and abrasions
Entanglement
Electrocution

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

INTERNET USE PASSPORT

General Conditions

Students must be trained on the safe and proper use of the Internet before they may begin using it. The student must demonstrate to the teacher, knowledge of safe and secure procedures as outlined in the Internet Use Policy Document. This is specific to the board and school procedures and teachers are able to update specifics as technology capabilities change.

Personal Protection

Knowledge of school and school board Internet Use Policy
Never releasing personal information
Avoidance of insecure and questionable sites
Use only board approved Green sites. Ask your instructor.
Respect for self and others
Awareness of security issues in communications technology

Possible Risk Factors

Threats to personal safety and/or security, loss of privacy
Loss of finances.
Threats to emotional security
Spread of damaging computer viruses
Damage to computer operating and networking systems

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

LADDER (HEIGHTS) PASSPORT

General Conditions

Dangers in using ladders to raise students and staff to working heights include falls, slips, tripping, and related electrical hazards. Students must be trained on the safe use of ladders to raise themselves to working heights. The student must demonstrate to the teacher the safe work procedures. Each school / board may have additional points or restrictions to be aware of and must be enforced strictly.

Personal Protective Equipment

Proper footwear
Safety belts, harnesses as appropriate

Possible Risk Factors

Slips and falls
Strain injuries
Impact injuries

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

ROBOTICS PASSPORT

General Conditions

Safety is an important aspect in robotic and automation systems. Students must be aware of the safety guidelines that have been developed in the use of robotic and automation systems. The student must demonstrate to the teacher a thorough understanding of these guidelines.

Personal Protective Equipment

Masks or Face shields (if required)
Safety Glasses
Gloves (If required)
Safety Footwear (If required)

Possible Risk Factors

Eye injury
Projectiles
Hand injuries
Cuts, abrasions and bruising
Entanglement
Impact Injuries

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

SOLDERING PASSPORT

General Conditions

Students must be trained on the safe use of soldering equipment before they may begin using them in computer engineering. The student must demonstrate to the teacher the safe work procedures to be followed.

Personal Protective Equipment

Safety glasses
Ventilation equipment or masks
Proper footwear

Possible Risk Factors

Burns
Hand injuries
Cuts and Abrasions
Eye injuries
Equipment fire
Burned line cords

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

Student Signature: _____

Print Name: _____

Teacher Signature: _____

Date of Training: _____

WASTE DISPOSAL PASSPORT
General Conditions Students must be trained in the proper disposal of all consumables and waste materials relating to the computer engineering classroom including personal hygiene and room maintenance. Sweeping of sharps and electronics remainders, cleaning of desks and workstations, organization and return of tool carts and equipment carts must be done per prescribed steps.
Personal Protective Equipment Vinyl/Latex/Polymer Gloves Non-Slip Soled Enclosed Shoes Eye protection Face mask or face shield Lab Coat/Apron if applicable
Possible Risk Factor Skin Irritation (chemicals / toxic materials / metals) Fungal/Parasite/Bacterial/Viral Infection Punctures, inhalation of fumes and toxins, spills of chemicals, ingestion of chemicals
The student has been trained on this equipment and procedures. The student understands the required personal protective equipment to operate this equipment and perform these procedures. The student is aware of the possible risk factors.   Student Signature: _____ Print Name: _____ Teacher Signature: _____ Date of Training: _____

Computer Engineering
Additional Lab Rules and Expectations

In order to function safely in a professional work setting, the following rules must be adhered to:

1. Respect for the teacher and fellow students is an absolute must! The classroom operates on a "team" basis. We must get along and respect each other in order for the classroom to function successfully. Therefore, bullying of any nature will be dealt with immediately and consequences will follow.

2. "Horseplay" will not be tolerated at any time in the classroom. This includes any disruptive behaviour that may be dangerous.

3. Cell phones and electronic equipment of any kind (mp3's, ipods, games, etc.) are not permitted in the classroom except for teacher-defined and approved tasks.

4. If you need to leave the classroom for any reason you must ask permission to do so.

5. Coats, bags and purses belong in your locker. We cannot be responsible for any lost or stolen personal items that are not permitted in the classroom.

Knapsacks must not be stored under lab benches.

You must wash your hands after handling parts.

You must wear a face mask or face shield.

7. Computer materials and supplies will be given to the students for use at the discretion of the teacher. Taking equipment, electronics supplies other than that is considered stealing and will be dealt with accordingly.

I,_____ have read these guidelines. I understand and will abide by them at all times while in the classroom.

Print Student Name: _____

Student's Signature: _____   Date: _____

Parent's Signature: _____   Date: _____

Entered in Safety Tracking By Teacher: Date: _____

Section 5: Emphasis Course Resources

TEI3M	Computer Engineering Technology: Interfacing
TEL3M	Computer Engineering Technology: Electronics
TEN3M	Computer Engineering Technology: Networking
TER3M	Computer Engineering Technology: Robotics and Control System
TEC3E	Computer Technology: Computer Repair
TET3E	Computer Technology: Information Technology Support
TEW3E	Computer Technology: Network Support
TEI4M	Computer Engineering Technology: Interfacing
TEL4M	Computer Engineering Technology: Electronics
TEN4M	Computer Engineering Technology: Networking
TER4M	Computer Engineering Technology: Robotics and Control System
TEC4E	Computer Technology: Computer Repair
TET4E	Computer Technology: Information Technology Support
TEW4E	Computer Technology: Network Support

This section has been provided to help administration and teachers consider the safety issues in these specific emphasis course areas.

TEI Computer Engineering Technology: Interfacing
Classrooms may typically incorporate a small to medium size computer lab, computers (stand-alone), electronic breadboards, power supplies, various cabling and test equipment. Projects can vary from simple interfaces to electronic breadboards to interfacing to larger equipment (ie. gaming modules, robotics, PLC's etc). Safety concerns would include electrical safety and classroom organization. Consideration should be given to clutter that can accumulate if projects vary in application and size. Electrical requirements in a typical classroom are higher than average. Avoid overloading circuits. Organizing cabling situations would make lab desktops a safer environment as well.

TEL Computer Engineering Technology: Electronics

A typical classroom may include desktop equipment such as DC power supplies, signal generators, oscilloscopes, meters, probes and soldering equipment. There are some labs that still make use of circuit board etching. This is no longer a recommended practice at the secondary school level. These labs often include dangerous chemicals and the need for proper identification (SDS) and WHMIS training would be of high importance. Electrical requirements would exceed that of an average classroom. Avoid overloading circuits. Solder stations should be equipped with some type of smoke-eater. Many secondary and post-secondary institutions have opted for the use of lead-free solder. There should be adequate equipment and part storage. Safety concerns would include electrical safety, safe soldering techniques, cluttered lab bench tops, extremely hot surfaces or components and safe use of all equipment. A recommended practice is the use of safety passports where relevant.

TEN Computer Engineering Technology: Networking

A typical classroom may include a small to medium size computer lab. The room may be equipped with microcomputers, minicomputers, switches, routers, racks, cabling and test equipment. Electrical requirements in a typical classroom are higher than average. Avoid overloading circuits. Safety concerns would include electrical safety, lifting and safe moving of equipment, cutting cables, stripping wires, crimping connectors and working in confined areas.

TER   Computer Engineering Technology: Robotics and Control Systems

Lab areas designated for this emphasis course can vary depending on the size and types of robots being used. For larger robots' adequate space will be required as well as the need to properly identify or guard robot work areas. Robot systems with wheels such as LEGO, or VEX robots should be restricted to a designated area. Students will be expected to use various hand tools.   A recommended practice is the use of safety passports, especially with larger robot systems. Safety concerns would include electrical safety, being struck by robot, getting caught in a robot joint or chain drive, tripping and falls, heated systems, physical strain. Robot maintenance may include use of oils or cleaning equipment which will require Material Safety Data Sheets.

TEC   Computer Engineering Technology: Computer Repair

A typical classroom for computer repair may include computer systems as well as an assortment of computer parts (i.e. daughter boards, power supplies, drives etc.). Electrical requirements in a typical classroom are higher than average. An above average number of receptacle outlets are important and sometimes this is compensated by use of power bars. Avoid overloading circuits. Safety concerns would include electrical safety, extremely hot surfaces/components, moving parts (fans), compressed air, proper use of hand tools, small power tools such as power drill. Some cleaning solutions will require proper Material Safety Data Sheets.

TET   Computer Engineering Technology: Information Technology Support
A typical classroom will include a computer network, a rack with switches and routers. The room may include O/S resources as well as a software library. Safety concerns would include computer workstation ergonomics, lifting and safe moving of equipment, cutting cables, stripping wires, crimping connectors and working in confined areas.

TEW   Computer Engineering Technology: Network Support
A typical classroom may include computer networks(s), rack(s) with switches and routers and test equipment. Safety concerns would include computer workstation ergonomics, lifting and safe moving of equipment, cutting cables, stripping wires, crimping connectors and working in confined areas.

Appendix A: Health and Safety Resources

Ontario Ministry of Labour

Web address: Ministry of Labour, Immigration, Training and Skills Development
For news and information about Ontario's health and safety and employment legislation, the Ministry of Labour 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
Help finding youth or student jobs

This section of the Ministry of Labour 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.

Workplace Safety and Insurance Board

Web Address: Workplace Safety and Insurance Board
Summary: Contains information for both employers and employees about workplace safety. Includes advice on prevention, important news releases, policies and other work-related information.

Ontario School Boards Insurance Exchange

Web Address: Ontario School Boards Insurance Exchange
Summary: 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.

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.

Electrical Safety Authority of Ontario

Web Address: Electrical Safety Authority of Ontario

Summary: Contains information for both employers and employees about workplace safety. Includes information on electrical safety hazards at home, Ontario Electrical Safety Code, workshop links and more.

Health and Safety Ontario

Web Address Health and Safety Ontario
Summary: Contains information for employers, employees, teachers and students regarding top hazards in our province. Includes statistical information related to jobs, equipment, types of hazards etc. Further there is excellent machine safety information

Canadian Centre for Occupational Health and Safety (CCOSH)

Web Address: Canadian Centre for Occupational Health and Safety (CCOSH)
Another website has excellent general information and a special section called Young Workers' Zone. The Young Worker's Zone provides health and safety information on various types of workplaces – great for TAP and Career Studies exercises.

CANOSH – Canada's National Occupational Safety and Health Website – Young Workers

Web Address:
https://www.ccohs.ca/youngworkers/
Summary: A list of links to a series of occupational safety and health (OSH) resources for young workers and/or individuals who are new to the workforce.

North American Occupational Safety and Health (NAOSH) Young Worker Links
The National Institute for Occupational Safety and Health
Summary: Includes links to occupational safety and health related websites, as well as other youth resources.

Take Our Kids to Work – Teacher's Guide; Workplace Guide
The Learning Partnership
Take our kids to work day
These resources have been custom designed to help teachers and workplaces prepare for Take Your Kid to Work day. The new booklets have an excellent section on activities to help prepare the students for a safe learning day.

School Workers Health and Safety Guide
Canadian Centre for Occupational Health and Safety
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.
Web address: http://www.ccohs.ca

Appendix B: Subject Specific CET Resources

Relevant Videos or Podcasts Available – See Web links or Order Information for the following CET Related Resources

In general, for TEJ and related emphasis courses

Video Link	Description
Introduction to Breadboard (Protoboards), Part 1 of 2	Introduction to Breadboard (Protoboards), Part 1 of 2
Introduction to Breadboard (Protoboards), Part 2 of 2	Introduction to Breadboard (Protoboards), Part 2 of 2
10 Shocking Facts about Electrical Safety.	10 Shocking Facts about Electrical Safety The Electrical Safety Authority of Ontario
Computing Health and Safety	Computing Health and Safety
Safe Human Robot Interaction	ABB Robotics - Safe Human Robot Interaction
Discovery Channel Safety Video for FIRST Robotics.	Discovery Channel Safety Video for First Robotics
Computer ESD	Computer Repair Safety

Other Emphasis Course Resources

TEC	COMPUTER ENGINEERING TECHNOLOGY: COMPUTER REPAIR
	Risks in computer repair are avoided simply by ensuring that not only is the power turned off, the equipment is unplugged from the power receptacle as well. After this the instructor will basically cover safe-handling procedures. A basic safe-handling procedure is included in the safety data sheets section of this document called Repairing Computers.

TEL	COMPUTER ENGINEERING TECHNOLOGY: ELECTRONICS
	Electronic currents are typically small, however, as little as 0.1A of current can be fatal. An excellent resource which can be incorporated into a lesson, note or handout for students is available from many college and university web sites and is termed "The Fatal Current". The resource is excerpted and shown below and a link to this resource from a physics site can be found here: Why Current is Fatal. .

The material is non-proprietary and is available for use. A relatable demonstration for students involves the use of an ohmmeter and your skin (or student volunteer). Once students have an understanding of the relationship between voltage, current and resistance (Ohm's Law) in an electric circuit, this demonstration will enable students to gain a better understanding of body shock potential. Measure your body resistance from index finger on one hand to the index finger on the other. Record this figure. Now squeeze your finger and thumb on the probes and notice the drop in body resistance which in turn would lead to an increased current flow. This phenomenon is similar to the "cannot let go" state of an electric shock. As muscle fibers become tense, they offer lower resistance to current flow. Again, measure body resistance from fingertip to fingertip, now mildly wet the fingertips and measure resistance once again.

In this course much of the skill set and especially lessons related to health and safety can be effectively delivered by use of demonstration. Allow students the opportunity to watch the instructor create a circuit board, solder a connection, de-solder, connect power rails to a circuit, test, troubleshoot etc. The course is steeped in a lot of electrical and electronic theory that can be reinforced through demonstrations. |

Permitted Excerpt from:

[Why Current is Fatal.](#)

The Fatal Current
Strange as it may seem, most fatal electric shocks happen to people who should know better. Here are some electro-medical facts that should make you think twice before taking that last chance.

It's The Current That Kills
Offhand it would seem that a shock of 10,000 volts would be more deadly than 100 volts. But this is not so! Individuals have been electrocuted by appliances using ordinary house currents of 110 volts and by electrical apparatus in industry using as little as 42 volts direct current. The real measure of shock's intensity lies in the amount of current (amperes) forced through the body, and not the voltage. Any electrical device used on a house wiring circuit can, under certain conditions, transmit a fatal current.

While any amount of current over 10 milliamps (0.01 amps) is capable of producing painful to severe shock, currents between 100 and 200 mA (0.1 to 0.2 amps) are lethal. Currents above 200 milliamps (0.2 amps), while producing severe burns and unconsciousness, do not usually cause death if the victim is given immediate attention. Resuscitation, consisting of artificial respiration, will usually revive the victim.
From a practical viewpoint, after a person is knocked out by an electrical shock it is impossible to tell how much current has passed through the vital organs of his body. Artificial respiration must be applied immediately if breathing has stopped.

The Physiological Effects of Electric Shock
The chart shows the physiological effects of various currents. Note that voltage is not a consideration. Although it takes voltage to make current flow, the amount of shock-current will vary, depending on the body resistance between the points of contact.
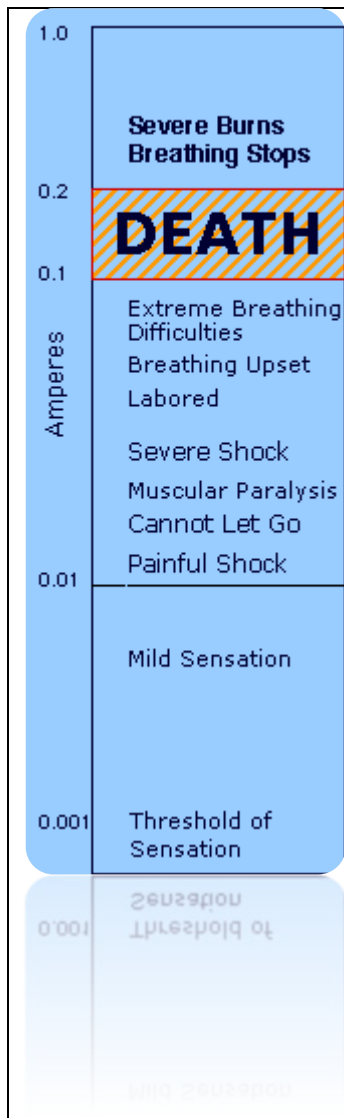
As shown in the chart, shock is relatively more severe as the current rises. For currents above 10 milliamps, muscular contractions are so strong that the victim cannot let go of the wire that is shocking him. At values as low as 20 milliamps, breathing becomes labored, finally ceasing completely even at values below 75 milliamps.

As the current approaches 100 milliamps, ventricular fibrillation of the heart occurs – an uncoordinated twitching of the walls of the heart's ventricles which results in death.

Above 200 milliamps, the muscular contractions are so severe that the heart is forcibly clamped during the shock. This clamping protects the heart from going into ventricular fibrillation, and the victim's chances for survival are good.

Danger - Low Voltage

It is common knowledge that victims of high-voltage shock usually respond to artificial respiration more readily than the victims of low-voltage shock. The reason may be the merciful clamping of the heart, owing to the high current densities associated with high voltages. However, lest these details be misinterpreted, the only reasonable conclusion that can be drawn is that 75 volts are just as lethal as 750 volts.

The actual resistance of the body varies depending upon the points of contact and the skin condition (moist or dry). Between the ears, for example, the internal resistance (less the skin resistance) is only 100 ohms, while from hand to foot is closer to 500 ohms. The skin resistance may vary from 1000 ohms for wet skin to over 500,000 ohms for dry skin.

TEN	COMPUTER ENGINEERING TECHNOLOGY: NETWORKING
	An excellent resource for networking is available from the CISCO networking academy. CISCO has worked with secondary institutions and provides training in order to have your school recognized as a local academy. A local academy can enroll students in CISCO Networking accreditation courses. CISCO can provide you with an extensive library of resources and support tools. CISCO equipment can be purchased at educational pricing levels. CISCO rudimentary courses cover safe practices and the electrical theory associated with these practices. More information can be found at Cisco Search online when you go to this home page.

TER	COMPUTER ENGINEERING TECHNOLOGY: ROBOTICS AND CONTROL SYSTEMS
	There are several resources available for anyone interested in delivering this emphasis area. Students can readily learn the aspects of robotics and safety as related to the use of robotics through programs such a LEGO robotics, VEX robotics, FIRST Robotics and Skills Ontario Robotic competitions. All of these programs come with extensive safety documents. A robotics safety manual, computer animation and links outlining first robotics are all available at: First Robotics Safety

If you are interested in First Robotics Canada, go to First Robotics Canada for more information, including a substantial list of sponsors for the event. |

Appendix C: OCTE SafteyNET Blank Template

Overview

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.octelab.com, 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
MSDS 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

CET 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?
Are Students using PPE and is this recorded?
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 kids for safety on?
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 for another teacher from my experience?

Then try it out!

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.

| TEJ - Computer Engineering ▾ |

4. Provide learning goals of the activity according to the Ministry of Education documents.

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 WHMIS

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 chemical, 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 depend 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 (WHMIS)

☐   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 - WHMIS, MSDS (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. Detail 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.

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.

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 features map of your classroom you can share? Attach it to your assignment!
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!

OCTElab SafetyNET – 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	WHMIS MSDS ATTACHED	SAFE STORAGE	WASTE DISPOSAL
			[ ] new, purchased [ ] new, donated from community, industry [ ] recycled from inside school [ ] recycled from outside school PREPARATION REQUIRED FOR USE: DETAILS:	[ ] Y [ ] N		

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 power point 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:

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

Canadian Centre for Occupational Health and Safety https://www.ccohs.ca/products/

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/

Ministry of Labour, Immigration, Training and Skills Development https://www.labour.gov.on.ca/

Some web content related to employment standards and workplace health and safety may be temporarily unavailable as we move it to this website.This website is currently in the process of being updated as of July 27, 2022.

Ontario School Boards Insurance Exchange http://www.osbie.on.ca

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, Grades 9 and 10: Technological Education, 2009 (revised)
http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf

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