

General Safety Guide

for Career and Technical Education



General Safety

Disclaimer

This *Safety Guide for Career and Technical Education* is intended to be a reference for career and technical education (CTE) teachers in the State of Utah. The Utah State Board of Education (USBE) CTE department and Utah Safety Committee have carefully considered applicable industry practices in the development of this *Guide*.

The information contained in this *Guide* is for general guidance for the provision of safety instruction, practices, and procedures. The application and effectiveness of safety rules, regulations, and laws can vary widely based on specific facts involved. Accordingly, the information in this *Guide* is provided as a general safety reference. As such, this *Guide* should not be used as a substitute for consultation with professional, legal, or other competent advisers.

There are links and references in this *Guide* that associate to other websites and materials written or maintained by third parties over whom the Utah Safety Committee has no control. While the Utah Safety Committee has made every attempt to ensure the linked or referenced information contained in this *Guide* has been obtained from reliable sources, the Utah Safety Committee makes no representations as to the accuracy or any other aspect of information contained in third-party websites or materials.

Introduction

The Safety Guide for Career and Technical Education was adopted in part from Virginia Department of Education CTE department (https://www.doe.virginia.gov/instruction/career_technical/cte-safety-best-practice-guide.docx) and adjusted to meet the needs for the state of Utah CTE programs. The Guide is intended to provide examples of best practice for use by school division administrators and career and technical education teachers.

Local education Agencies (LEAs) within the state of Utah may have established their own safety rules and guidelines. Teachers and administrators should consult with their school division's risk management department and follow their respective procedures and policies. This *Guide* should create an awareness of the risks, responsibilities, and resources available to safely manage and educate students in the CTE classroom.

The *Guide* is not intended to be complete or all-inclusive. Rather, it is intended to draw attention to the necessity for safety instruction in every aspect of CTE and to provide the teacher with resources for improving safety instruction.

The purpose of this *Guide* is to eliminate or reduce the occurrence of accidents in CTE labs and the workplace by:

- making CTE teachers aware of dangers and risks to themselves, students, and visitors;
- providing CTE teachers with knowledge that supports safety in the classroom, lab, and workplace;
- providing recommendations to promote safe environments for learning or working; and
- providing resources to encourage CTE teachers to incorporate safety awareness or safety training in their curriculum and daily instructional practices.

Risk Management

Creativity and innovation are encouraged in the CTE classroom and lab but not at the expense of safety. Teachers should follow the safety recommendations provided by the equipment manufacturers. CTE courses in which students or instructors create new items and machines for use in the classroom/lab (robotics, auto, drones, ect.) should consult with

the LEA CTE administrators and LEA risk management before allowing the use of such technologies in the classroom or lab.

Laws and Regulations

Awareness of the laws and regulations that govern relevant industries is important for the CTE teacher. These can be federal, state, or local laws, policies, or standards set by organizations or entities with jurisdiction over public schools.

Federal, State, and Local Laws and Regulations

The following excerpt from the National Institute for Occupational Safety and Health (NIOSH), a division of the Centers for Disease Control and Prevention (CDC) (<https://www.cdc.gov/niosh/docs/2004-101/chap1.html>), helps make sense of governmental regulations:

In dealing with regulations, it is important to know the levels of government, the enforcement agencies, their vocabulary, whom or what they protect, and what they regulate before one can understand the regulations.

Regulations are created by federal, state, and local governments. States, counties, and municipalities must comply with all federal regulations. Counties and municipalities must comply with all state regulations, and so on. In most cases, states, counties, and municipalities may add to existing higher-level regulations or may issue new regulations in areas where no higher-level regulations exist. Additionally, in the absence of specific laws or local policies, the profession sets the standard of care expected. One may find, therefore, differing regulations as one moves from one area to another.

Federal, state, and local agencies or governing bodies have the power to issue and enforce regulations. These groups include the Utah Occupational Safety and Health (UOSH), state agencies, county boards of health, municipal boards of health, or town councils.

Federal statutes or acts are passed by Congress and become part of the U.S. Code. Regulations may then be issued and enforced by a designated agency charged with that responsibility. Federal regulations are first issued in the *Federal Register*. After a public comment period, final federal regulations are compiled in the *Code of Federal Regulations* (CFR) and can be cited by title, part, and section. Thus, 29 CFR 1910.120 refers to Title 29, Part 1910, section 120.

The laws are designed to protect private sector employees, public employees (federal, state, county, and municipal employees, including public school teachers), private and public school students, the general public, and the environment. Each agency has jurisdictional responsibilities for promulgating and enforcing regulations to protect these groups. In addition, each agency has defined areas of hazards that it regulates.

Occupational Safety and Health – OSHA, NIOSH, and UOSH

The Occupational Safety and Health Act of 1970 mandated the creation of two agencies dedicated to health and safety in the workplace, OSHA and NIOSH. OSHA, under the U.S. Department of Labor (DOL), is in charge of creating and enforcing regulations, while NIOSH, under the CDC, which in turn is under the U.S. Department of Health and Human Services (HHS), is a research and education institution. OSHA and NIOSH work closely together. NIOSH publishes research, recommendations, and other resources related to safety, but all regulatory enforcement falls under OSHA. OSHA also provides resources for young workers on its website (<https://www.osha.gov/youngworkers/resources.html>).

OSHA issues standards in the *Federal Register* that are compiled in the CFR, including the following:

- 29 CFR 1910 for General Industry Standards (<https://www.osha.gov/laws-regs/regulations/standardnumber/1910>)
- 29 CFR 1926 for Construction Standards (https://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_part_number=1926&p_to_level=1)
- 29 CFR 1928 for Agricultural Standards (<https://www.osha.gov/laws-regs/regulations/standardnumber/1928>)

Utah is one of 26 states that have OSHA-approved state plans. Utah's Labor Commission administers the Utah Division of Occupational Safety and Health (UOSH) program. The role of the UOSH program is to enforce safety and health regulations for general industry, construction, agricultural, state and local government, and maritime employers in Utah. It mirrors the federal program in many areas but has adopted some different statutes, regulations, policies, and procedures to address unique characteristics of the state of Utah. The overview, coverage and standards can be found on the OSHA website (<https://www.osha.gov/stateplans/ut>) and on the Utah Labor Commission website (<https://laborcommission.utah.gov/divisions/uosh/>).

Child Labor

The Wage and Hour Division under the DOL enforces the child labor standards of the Fair Labor Standards Act (<https://www.dol.gov/whd/childlabor.htm>). In addition, the federal government's website, *Youth Rules!* (<https://www.youthrules.gov/index.htm>), includes information for teens, educators, and parents.

Fire Safety

State and local fire prevention codes dictate many fire safety practices. Consult with the LEA fire marshal or Utah state fire marshal for more information. Refer to the Utah Fire Prevention and Safety Act (<https://firemarshal.utah.gov/laws-rules/>) for more information about the laws and rules pertaining to fire safety.

Additionally, the following guidelines support fire safety:

- Maintain a neat and orderly environment so that potential hazards, such as fabric close to a heat source, are visible and can be remedied.
- Plan at least two escape routes in case of fire.
- Adequate numbers of multipurpose ABC fire extinguishers must be strategically placed. These must be checked and serviced regularly. Special-hazard extinguishers may be necessary, depending on the hazards present in the lab.
- Use only approved containers for the storage and disposal of flammable chemicals.
- Exercise care with both flammable and combustible materials. Flammable materials ignite more easily than combustible materials. Examples of flammable materials are gasoline, acetone, and lacquer thinner. Examples of combustible materials are kerosene, fuel oil, mineral spirits, and brake fluids. Many liquids produce vapors that are heavier than air and can accumulate in low points, lying in wait for a stray spark. Many are readily oxidized, or release heat, so rags or waste coated with them can catch fire spontaneously. Nearly all flammable and combustible liquids will burn violently.

Work-based Learning

USBE has created a Work-Based Learning Guide detailing the work-based learning experiences in Utah and the guidelines for their implementation. This and related information may be accessed on the Work-Based Learning web page on the USBE website. (<https://www.schools.utah.gov/cte/wbl/manual?mid=3155&tid=0>)

Career and Technical Student Organizations

Career and technical student organizations (CTSOs) often conduct activities in which safety is an important priority. To understand various bylaws governing each individual CTSO, please refer to the USBE website (<https://www.schools.utah.gov/cte/ctso?mid=3070&tid=0>).

General Safety

This section provides an overview of safety practices applicable to any CTE course. While this section is not exhaustive, it aims to bring important aspects of and considerations for safety to the attention of the CTE teacher. For further information and resources on school safety, refer to information USBE website (<https://schools.utah.gov/cte/resources/safety>).

Hazard Assessment and Regular Inspection

Conducting an annual, formal, thorough hazard assessment is the first step in determining what safety precautions and equipment are necessary in a CTE facility, classroom, or lab. The CTE teacher is responsible for conducting a hazard assessment in his/her classroom or lab.

All equipment and facilities used in CTE courses must be inspected regularly in accordance with the specific recommendations of each manufacturer and applicable laws and regulations. Each LEA must establish a system of regular inspection, reporting, and replacement of faulty equipment. In addition, CTE teachers and students must visually inspect all tools and equipment before using them to ensure they are in good working condition. Never use tools that are out of order or that have missing parts. The teacher must ensure proper maintenance of all equipment in the facility. This includes ensuring that items such as electrical receptacles are grounded and circuits are rated to handle the draw of the machines attached to them.

Communicating with Parents and Guardians

Parents of students in CTE courses sign a safety contract/disclosure at the beginning of each course. Its purpose is to:

- inform the parent/guardian of the student's participation in lab activities;
- outline the safety instruction and procedures followed by the teacher and the LEA;
- obtain from the parent/guardian relevant information regarding any health problems having a bearing on the student's ability to participate in classroom or lab activities; and
- list the contact information of the parent/guardian and the physician in case of emergency.

Classroom Management

Administration and Training

- Safety is a component of CTE Program Approval. LEAs should regularly review facilities for safety, monitor teacher compliance with LEA safety standards, and provide training where necessary.
- LEAs are responsible for evaluating the skill level and safety knowledge of all new teachers.
- CTE directors, administrators, principals, counselors, coordinators, and teachers must be reasonable and prudent in seeing that class enrollments are not excessive. Reasonable class loads are determined by the size of the facility, student workspace requirements, and the ability of the teacher to adequately supervise various activities. Sensible class loads contribute to a safe work environment.
- The CTE teacher must have administrative support for each policy statement. This support will endorse the importance of student safety in the classroom and shop area.
- LEAs must provide safety training for all CTE teachers and provide safety assessments to assure teacher qualifications.

Teacher

- CTE teachers must provide appropriate supervision of students in the classroom, shop, or lab areas.
- CTE teachers must be particularly alert and provide supervision when students are using machinery and tools. **Students may not work in a shop, lab, or construction site if the teacher is not present. Absolutely no exceptions!**
- CTE classes must be supervised and taught by teachers who have received appropriate, district-specific or LEA safety training and subject endorsement prior to teaching the course.
- CTE teachers cannot delegate their supervisory responsibility to a student, student aid, teacher's assistant (TA), unlicensed paraprofessional, or adult volunteer.
- Each CTE teacher must provide and implement a comprehensive and workable safety program. This program will include, but not be limited to:
 - General safety rules
 - Hand tool safety and demo
 - Machine tool safety and demo
 - Eye safety
 - Personal Protective equipment.
 - Testing on all tools and machinery to be used
 - Safety tests maintained until a student is 21 years old
 - Accident report investigations
- Safety should be taught and reviewed on a continual basis throughout the year.
- CTE teachers must always set a proper safety example for students to follow.
- All individuals must use safety glasses, related personal protective equipment, and machine guards in all lab areas.
- CTE teachers must maintain an organized, clean, and uncluttered classroom, lab, and work environment.
- CTE teachers must conduct an annual equipment and safety evaluation.
- CTE teachers are responsible for seeing that equipment in a shop or lab is kept in safe operating condition. The teacher must correct all known hazards and defective conditions through individual action, maintenance work orders, or a written request to the appropriate school or district administrator. Defective equipment should be tagged, and the electrical power disconnected or locked out to prevent use.

- CTE teachers should be familiar with basic first aid (first-aid certification is recommended). Teachers must follow approved school procedures in case of an accident, complete a written accident report and maintain accident records as required.
- CTE teachers must maintain order and control in the classroom, lab, or shop facility. Teachers must be aware of students who do not conduct themselves in a safe manner and administer immediate corrective action, including removal from shop areas if necessary.
- CTE teachers must take and pass an LEA safety assessment to determine qualification.
- In the event of an emergency, CTE teachers must obtain “coverage” by another faculty member prior to leaving the classroom or lab. Students must discontinue the use of tools and equipment until the regular CTE teacher returns.
- Students must never be left unattended in any CTE classroom, shop or lab. Before leaving the classroom, shop, or lab, the CTE teacher must assure all students have exited the facility. The facility must be locked/secured when unattended by the teacher.
- CTE teachers should refrain from using personally owned or personally modified equipment. Safety guards should be purchased from commercial vendors.
- CTE teachers should refrain from bringing and using personal tools in the shop. Students should never be allowed to use tools which are owned by the teacher.

Facility

- All machines must be equipped with guards that meet or exceed industrial OSHA standards and those guards must be maintained.
- All CTE shop and lab facilities must be equipped with an eye wash station that is activated weekly and inspected monthly.
- All CTE shop and lab facilities that generate fine particulates must be equipped with appropriate dust removal, air filtration and fume ventilation.
- All CTE shop and lab facilities that use flammable(s) and hazardous materials must be equipped with an approved flammable storage cabinet.
- Safety Data Sheets (SDS) must be maintained and visibly posted for all chemicals and hazardous materials used in the facility.
- It is recommended that all CTE shop and lab facilities be wired with an emergency shutoff switch controlling all power tools and equipment.
- Establish machine safety zones and adequate passage space within the facility. See Utah Administrative Code R392-200-9.2(H)(VI)
- Eye protection requirements should be posted at each entrance of every CTE shop or lab facility. Sanitary eye protection should be available at the main entrance.
- All CTE shop and lab facilities must be equipped with adequate lighting.

Student Responsibility

- Parent/guardian consent forms must be completed and signed by the student and a parent or guardian prior to participation in the CTE program. (This is often included as part of the course disclosure statement.)
- A student is not allowed to use any machine until he/she has received safety instruction, scored 100% on the safety test/tests, and the teacher is satisfied the student can use the equipment safely.
- Each student must sign a document stating that he/she has received safety instruction and agrees to follow the safety rules for each piece of equipment used.

- The CTE teacher oversees the shop or lab facility, grants permission to work, and directs which machines can be used. A student may not work in the shop unless he/she has permission from the instructor.
- Every student and visitor must wear appropriate eye protection in any CTE shop/lab/job site area where hand tools, power-driven tools, or machinery is being operated. Safety Glasses must meet ANSI Z-87.1- 2015 standards.
- Every student must wear personal protective equipment where appropriate (face shield, hearing protection, respirator, welding helmet, gloves, etc.).
- Students must report all injuries to the teacher.
- Students must respect a machine operator's workspace.
- Distractions must be eliminated to the degree possible. A student's full attention, ability to focus on work, and awareness of surroundings are critically important safety factors.

Student Teachers (Associate Teacher License)

Student Teachers receive a temporary Utah Student Teacher/Intern License, which authorizes them to teach under the supervision of a Cooperating Teacher. The Cooperating Teacher evaluates the Student Teacher's performance and assumes responsibility for student safety. The Student Teacher should be able to pass the safety tests required of the students. At some point in the student teaching experience, it is appropriate to grant the Student Teacher full control of the class, without the Cooperating Teacher's presence.

Substitute Teachers

If a substitute teacher is present, the school administration must provide a class meeting place away from dangerous equipment. If the class must meet in the shop area, all tools and equipment with the potential to cause serious injury should be secured to prevent their use. The teacher must provide an appropriate lesson plan for the substitute or have emergency lesson plans on file with the school administration. **Under no circumstances should students be allowed to use tools, equipment or machinery when an unqualified (unendorsed) substitute teacher is in charge of the class!**

Safety Precautions

This section surveys various safety precautions for the CTE classroom. This list is by no means exhaustive; more detailed guidance for each program area is available in this *Guide*. Completing a hazard assessment allows the CTE teacher to determine what safety precautions need to be taken. The guidelines outlined in this section are meant to direct the attention of the CTE teacher to best practices and available resources to ensure safety in the CTE classroom.

Equipment and Facilities Maintenance

Ensure that all equipment is operated in accordance with the manufacturer's specifications. Give particular attention to storage and maintenance. Never use tools that are out of order or that are missing parts.

Proper Signs and Labels

Proper signs and labels are crucial to ensuring safety in any CTE class. Follow these general guidelines:

- Read the labels when using any materials, especially hazardous substances.
- Use signs to indicate hazardous areas. Signs must specify the particular kind of PPE to be used in each area.
- Prominently post emergency procedures and telephone numbers (e.g., fire department, school nurse) in the room.
- Floor and safety lines must be used to mark areas around lab tools and equipment to provide maximum safety and reduce the chance of accidents. A safety zone is a safe, non-congested work area. The area is often marked with yellow or white lines. A nonskid surface can be provided to give firm footing to the operator of a tool or machine.
- Color coding uses a particular color to indicate the level of risk associated with particular tools or areas. The color-coding system must be standard throughout the school. Most equipment color suggestions would follow the basic [American National Standards Institute \(ANSI\) color system](#), as follows:
 - **Red—danger**
 - **Orange—warning**
 - **Yellow—caution**
 - **Green—safety**
 - **Blue—information**
 - **Black-and-white stripes or White – traffic areas**
 - **Black-and-yellow diagonal stripes – safety zones**
 - **Gray – work areas**

Safety Data Sheets

Every lab is required to have a readily accessible file containing safety data sheets (SDS), usually supplied by the manufacturer, for all hazardous chemicals and materials used in the facility. Teachers and students may refer to free online SDS resources from MSDSonline, from velocityEHS (<https://www.msdsonline.com/msds-search/>).

Storage

Proper storage of materials within the CTE lab helps prevent hazards and accidents. The following provides general guidelines:

- Label and carefully store all materials and substances in a CTE lab. Store hazardous materials according to Standard Fire Prevention Code (SFPC) and local fire codes.
- Store materials in orderly, stable stacks. Separate combustible materials from heaters or heating devices by distance or by shielding to prevent ignition.
- Do not store materials in exits or enclosures for stairways and ramps, boiler rooms, mechanical rooms, or electrical equipment rooms.
- Pay careful attention to which materials are incompatible and must not be stored together. A list of incompatible hazardous materials is available on the California State University, Fullerton, website (<http://rmehs.fullerton.edu/environmentalmanagement/HazardousMaterialsManagement/IncompatibleHazardousMaterials.php>).

Personal Protective Equipment

The PPE required for each course/task varies depending on the needs of the job/task and is based on a hazard assessment. Refer to the applicable program area section of this *Guide* and course safety instructions for details. Never use broken, distorted, or ill-fitting PPE.

The following are the general types of PPE:

- Eye protection (e.g., safety eyewear, goggles)
- Protective outer clothing (e.g., aprons, lab gowns)
- Respiratory protection (e.g., facemasks, N95 or greater respirators)
- Hand protection (e.g., gloves)
- Hearing protection (e.g., ear plugs)
- Head protection
- Foot protection

Bloodborne Pathogens

Exposure to blood and other body fluids occur across many occupations. Healthcare workers, emergency-response and public-safety personnel, and other workers can be exposed to blood through needlesticks and other sharps injuries, through mucous membranes, and by skin exposure. CTE classrooms and labs carry a similar risk. The pathogens of primary concern are the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV). Schools must take advantage of available engineering controls and work practices to prevent exposure to blood and other body fluids.

The following resources will be helpful to the CTE teacher:

- OSHA Fact Sheet: OSHA's Bloodborne Pathogens Standard (https://www.osha.gov/OshDoc/data_BloodborneFacts/bbfact01.pdf) provides information on what OSHA's Bloodborne Pathogens Standard means for employees.
- Health and safety training video (<https://www.youtube.com/watch?v=auMdZ33E9e8>)
- OSHA: Bloodborne Pathogens and Needlestick Prevention (<https://www.osha.gov/SLTC/bloodbornepathogens/index.html>) provides information on OSHA standards, hazard recognition, and post-exposure evaluation.
- NIOSH: Information for Employers Complying with OSHA's Bloodborne Pathogens Standard (<https://www.cdc.gov/niosh/docs/2009-111/>) summarizes the major provisions of the Bloodborne Pathogens standard and provides links to resources for employers.
- CDC: Healthcare-associated Infections (HAIs)— Tools for Protecting Healthcare Personnel (<https://www.cdc.gov/hai/prevent/ppe.html>) promotes patient safety and increases the safety of the healthcare-work environment through improved use of PPE by healthcare personnel.
- CDC: Biosafety in Microbiological and Biomedical Laboratories (BMBL), 5th Edition (<https://www.cdc.gov/biosafety/publications/bmb15/>) provides guidance for lab workers and the public on the practice of biosafety—the discipline addressing the safe handling and containment of infectious microorganisms and hazardous biological materials.

Electrical Safety

All electrical wiring must be in compliance with the National Electrical Code (NEC).

Additionally, the following guidelines help ensure electrical safety:

- Never bypass safety interlocks (i.e., circuit breakers, fuses).
- It is recommended that all labs should have master shut-off valves/switches. Any new construction/remodel needs to follow current code in regard to shut-off valves/switches.
- Do not overload electrical outlets. All outlets within 5 feet of sinks and serving delicate electrical equipment must be fitted with ground-fault interrupters.
- Use surge protectors where sensitive electrical equipment is being used, in geographic areas where thunderstorm activity is a regular phenomenon, and where electrical spikes and drops are common.
- Only use extension cords sized for the equipment and its power and only for temporary service. Additionally, follow these guidelines regarding the use of extension cords:
 - Place extension cords out of traffic areas or enclose them in electrical cord ducting strips to prevent tripping, and do not fasten extension cords to a wall; affix them to structures; extend them through walls, ceilings, or floors; or place them under doors or floor coverings.
 - Maintain extension cords in good condition without splices, deterioration, or damage. Do not subject extension cords to environmental damage or physical impact.
 - Plug extension cords directly into an approved receptacle, power tap, or multiplug adapter and—except for approved multiplug extension cords—extension cords must serve only one portable appliance.
 - Ground extension cords when they are serving grounded portable appliances.
- Do not perform maintenance or repair on any electrical equipment unless as part of the approved curriculum or under the supervision of a qualified individual.
- Ensure that lab equipment is listed and approved for its intended use (i.e., do not use equipment listed for household use in a lab setting).
- Do not use multiplug adapters, such as cube adapters, unfused plug strips or any other device not complying with NFPA 70.
- Relocatable power taps must be of the polarized or grounded type, equipped with overcurrent protection, and must be listed in accordance with UL 1363. Additionally, relocatable power taps must be directly connected to a permanently installed receptacle. Do not extend relocatable power tap cords through walls, ceilings, floors, under doors or floor coverings, or subject them to environmental or physical damage.

Waste Disposal

Separate and dispose of all waste according to established procedures; additionally, follow these guidelines for safe waste disposal:

- Provide for the cleaning of equipment and facilities after each use. Provide regular custodial service in addition to end-of-class cleanup, including storage and daily removal of all sawdust, metal cuttings, rags, and other waste material.
- Recycle or reuse materials whenever possible and safe.
- Each lab should have a clearly marked container exclusively for the disposal of broken glass and other sharp objects.
- Maintain floors free of oil, water, and foreign material.
- Prohibit the use of compressed air to clean clothing, equipment, and work areas.

- Do not dispose of solid materials down the sink drain unless the sink is specifically designed for that purpose (e.g., sink trap). Dilute any liquid chemicals that are safe for classroom sink disposal before pouring them into drains. Consult the appropriate SDS for additional guidance.

Avoiding Heat Stress

Working in hot environments and doing heavy physical work can affect the body's cooling system and lead to heat stress. Heat stress can result in serious accidents. For more information about occupational heat exposure, visit the OSHA website (<https://www.osha.gov/SLTC/heatstress/>).

Factors that affect the risk of heat stress include:

- physical condition;
- weather conditions, especially temperature and humidity;
- environmental conditions (e.g., direct sun, air movement);
- the physical demands of the work being done; or
- the type and quantity of clothing worn.

Noise Control

Exposure to noise can cause significant and irreversible hearing damage. Appropriate hearing protection must be provided in high-noise settings (i.e., 85 decibels or higher).

Ergonomics

Work-related musculoskeletal disorders (WMSDs) can happen if ergonomic principles are not followed. These disorders may also be called repetitive-strain injuries, cumulative-trauma disorders, or overuse injuries, and are soft-tissue injuries which occur gradually. Causes of WMSDs are heavy, frequent, or awkward lifting; pushing, pulling, or carrying loads; working in awkward postures; and hand-intensive work. Risk of injury depends on the duration, frequency, and intensity of exposure. Follow these recommendations to avoid WMSDs:

- Maintain a neutral posture as much as possible. Keep the shoulders relaxed, the low back supported, elbows at sides, wrists straight, and feet supported when sitting. When standing, align the ears, shoulders, hips, knees, and ankles. Position work to be able to reduce the frequency of bending, kneeling, or squatting. Raise and/or tilt work. Use a stool to raise ground-level work, use tools with longer handles, and alternate between bending, kneeling, sitting, and squatting. Reduce the length of reach by keeping items as close as possible to your body and removing obstacles. Attempt to spread out the work during the day. Take frequent stretch pauses, change hands or motions, and rotate tasks with others as possible.
- Use proper lifting procedure (e.g., use the legs, keep materials close to the body) and use mechanical assistance where possible. Use proper muscle groups and distribute the workload. Use both hands to pick up heavier objects. Avoid lifting heavy objects alone. Do not lift heavy loads above shoulder level. Use ladders and devices designed for stepping when obtaining access to areas outside the normal reach. Limit overhead storage to infrequently used items.
- Push rather than pull when possible.
- Use low-vibration tools if available, use anti-vibration gloves, and keep hands warm.

Emergencies and First Aid

Emergencies can arise anywhere in the school environment. Procedures for dealing with these events must be developed and approved by the LEAs before the start of the school year.

Emergency Equipment

Each CTE lab must be equipped with emergency equipment corresponding to the hazards present in that particular environment. This may include the following:

- First-aid kit: wound care - band aides, gauze, tape, nitrile gloves
- Eyewash stations: provide continuously flowing solution to flush the eye in case of contact with chemicals (Consult ANSI Z358.1 for details on placement and maintenance.) Eyewash stations need to be cleaned and tested weekly.
- Showers
- Chemical-spill containment plan

General Guidelines in the Event of Student Accidents

It is the responsibility of the CTE teacher to know what to do and not do in case of an accident. The first few seconds or minutes following a student's injury are the most critical. Please refer to the applicable LEA policy to determine the appropriate measures to follow.

Additionally, follow these guidelines:

- Require students to report all accidents to the teacher, regardless of the nature or severity (follow the LEAs policy regarding accident reporting).
- Keep a record of any accident resulting in injury, regardless of its nature or severity. Retain one copy for the teacher's permanent file until the injured student reaches age 21 or graduates.
- Analyze the accident to determine the root cause and effect.
- Review and record safety practices, procedures, classroom instruction, and student evaluation to prevent accidents.
- Recommend corrective measures as appropriate. Retain a copy of the communication and any subsequent action taken.
- Follow up in the classroom with discussion and instruction regarding any safe practices that were violated and that contributed to the accident.

Follow these procedures for accidents that were narrowly avoided, as well as accidents without injury, to ensure that any unsafe conditions are identified and eliminated from the lab environment.

Teaching Safety

A critical piece of ensuring safety in the CTE classroom is teaching good safety practices to CTE students. NIOSH has published *Youth@Work—Talking Safety*, (<https://www.cdc.gov/niosh/talkingsafety/teaching.html>) a curriculum that helps educate young people about the basics of job safety and health. A resource from Virginia where they have customized this curriculum that includes six main and five supplemental lesson plans designed for 45-minute class periods, a companion slideshow presentation for each lesson, a companion video, and activities and supplementary materials for each lesson. The curriculum is free to download and use and can be accessed from the NIOSH website (<https://www.cdc.gov/niosh/talkingsafety/states/va/2015-161/default.html>).