

GENERAL SAFETY PRACTICES

BODY MECHANICS

1. Use proper muscle groups and distribute the workload.
2. Both hands are used to pick up heavier objects.
3. Lifting heavy objects alone is avoided. Help is requested.
4. Pushing is preferred to pulling.
5. Leg muscles are used to lift heavy objects rather than back muscles.
6. Bending and unnecessary twisting of the body for any length of time is avoided.
7. Work is done at the proper level.
8. Two people carry long pieces of materials.
9. Do not lift heavy loads above shoulder level.

PERSONAL PROTECTION

1. Confine long hair so that it is not exposed to machinery and does not interfere with vision.
2. Require the wearing of safety goggles, glasses, or other eye protection when there is a danger of eye injury.
3. Provide respirators for use where harmful dusts or fumes exist (see WISHA rules). ** Respirator use requires appropriate certification, fit testing, and supervision to insure that there is proper fit, training, and inspection are all taking place.
4. Determine the physical defects and limitations of all students so that they will not be assigned tasks detrimental to their health or physical condition.
5. Prohibit the wearing of loose clothing in the laboratory and shop areas.
6. Require students to remove rings and other jewelry while working in the laboratory and shop areas.
7. Where noise levels are excessive over long periods of time, ear protection should be worn.
8. Protective apparel, including safety shoes, aprons, shields, and gloves, are worn properly as required by the nature of the task.
9. Provisions are made for cleaning and sterilizing respirators, masks, and goggles.
10. Head protection is worn in all areas where there is danger of falling and/or flying objects.

FACILITY CONDITION

1. Aisles, machines, benches, and other equipment are arranged to conform to good safety practices.
2. Stairways, aisles, and floors are maintained, clean, dry, and unobstructed with no protruding objects.
3. Walls, windows, and ceilings are clean, maintained in good repair, and free of protrusions.
4. Illumination is safe, sufficient, and well placed.
5. Ventilation and temperature controls are proper for conditions.
6. Fire extinguishers and other necessary fire equipment are properly selected, adequately supplied, properly located, inspected, and periodically recharged as required.
7. Exits are properly identified and illuminated.
8. Lockers and drawers are clean, free of hazards, and doors kept closed.
9. Personnel know the procedures for notification of fire and evaluation of premises.
10. Laboratories and workplaces are free from excessive dust, smoke, and airborne toxic materials.
11. Utility lines and shutoffs are properly identified.
12. Stairways, floor openings, and overhead storage areas are properly guarded with rails and toe boards and have the proper clearances.

HOUSEKEEPING PRACTICES

1. Provide for the storage and daily removal of all sawdust, metal cuttings, rags, and other waste materials.
2. Provide properly marked boxes, bins, or containers for various kinds of scrap stock and rags.
3. Utilize sturdy racks and bins for material storage, arranged to keep material from falling on students and to avoid injuries from protruding objects.
4. Employ a standard procedure to keep floors free of oil, water, and foreign material.
5. Provide for the cleaning of equipment and facilities after each use.
6. Provide regular custodial service in addition to end of class cleanup.
7. Prohibit the use of compressed air to clean clothing, equipment, and work areas.
8. Keep walkways and work areas free of all obstructions.
9. Floor surfaces must be maintained in a "nonskid" condition.
10. Tools and materials are stored orderly and safely.
11. File cabinets and other tall cabinets are required to be anchored.

EQUIPMENT

1. All equipment should be operated in accordance with specifications as stated in the owner's manual.
2. Machines and apparatus are arranged so that operators are protected from hazards of other machines or passing individuals.
3. Point of operation zones are properly identified and guarded.
4. Permanent enclosure guards properly protect pulleys, gears, and belts.
5. Guards are removed only for repair purposes and then replaced immediately.
6. Equipment control switches for each machine are easily available to the operator.
7. Machines are turned off when the instructor is out of the room and/or if the machine is unattended.
8. Proper cleaning equipment is used (avoid air for cleaning purposes).
9. Nonskid areas are maintained around dangerous equipment.
10. A preventive maintenance program is established for all equipment.
11. Machines are guarded to comply with WISHA code.
12. Cutting tools are kept sharp, clean, and in safe working order.
13. All hoisting devices are maintained in a safe operating condition and specified load ratings are easily identified.
14. Machines that are defective or being repaired are clearly marked and made inoperable by locking out the machine power switch.
15. Machines and apparatus are marked with proper color code.
16. Equipment cords and adapters are maintained in a safe working condition.
17. Adjustment and repair of any machine is restricted to experienced persons.
18. Ladders are maintained and stored properly.
19. Machines designated for fixed location are securely anchored.

RECORDKEEPING

1. Always keep an adequate record of accidents and report it through proper channels in your district.
2. An analysis of accidents is made for the purpose of corrective action.

HAND TOOLS

1. Instruct students to select the right tools for each job.
2. Establish regular tool inspection procedures to ensure tools are maintained in safe condition.
3. Instruct students in the correct use of tools for each job.
4. Provide proper storage facilities.
5. Do not lay tools on operating machinery or equipment.
6. Keep tools out of aisles and working spaces where they may become tripping hazards.
7. Do not put sharp objects or tools in pockets. This could result in cuts or being stabbed.

SCAFFOLDS

1. The footing or anchorage for scaffolding is sound, rigid, and capable of carrying the maximum intended load without settling or displacement.
2. Unstable objects such as barrels, boxes, loose bricks, or concrete blocks cannot be used to support scaffold or planks.
3. No scaffold will be erected, moved, dismantled, or altered except under the supervision of the instructor.
4. Guard rails and toe boards will be installed on all open sides of platforms more than 10 feet above the ground or floor.
5. Scaffolds 4–10 feet, having a minimum horizontal of less than 45 inches in either direction, will have standard guardrails installed on all open sides and ends of the platform.
6. Scaffolds and their components will be capable of supporting without failure four times the maximum intended load.
7. All planking of platforms will be overlapped a minimum of 12 inches or secured from movement.
8. An access ladder or equivalent safe access will be provided.
9. Scaffold planking will extend over their end supports not less than 6 inches or more than 12 inches.
10. The use of shore or lean-to scaffolds is prohibited.
11. The poles, legs, or uprights of a scaffold will be plumb and securely and rigidly braced to prevent swaying and displacement.

COLOR CODING

1. RED

Fire. Red shall be used as the basic color for the identification of fire protection equipment and apparatus.

Stop: Emergency stop bars, buttons, or electrical switches on hazardous machines shall be red.

Danger: Safety cans and safety signs shall be painted red.

2. ORANGE

Orange shall be used as the basic color for designating dangerous parts of machines or energized equipment. Orange shall be used to emphasize hazards when enclosure doors are open or when gear bolts or other guards around moving equipment are open or removed, exposing unguarded hazards.

3. YELLOW

Yellow shall be the basic color for designating caution and for marking physical hazards. Solid yellow, yellow and black stripes, or checkers (or yellow with suitable contrasting background) should be used interchangeably using the combination that will attract the most attention.

4. GREEN

Green shall be used to designate safety and the location of first aid equipment (other than firefighting equipment).

5. BLUE

Blue shall be the basic color for designation of caution, limited to warning against the starting, use of, or the movement of equipment under repair or being worked upon.

6. PURPLE

Purple shall designate radiation hazards.

7. BLACK AND WHITE

Black, white, or a combination of these two shall be the basic colors for designation of traffic and housekeeping markings.

NOISE CONTROL

The ability to hear is a precious gift. Without it, it is difficult to lead a fully productive life either on or off the job. Noise can destroy hearing, create physical and psychological stress, and thereby contribute to accidents in addition to the obvious cause by making it impossible to hear warning signals. Practical arts and vocational education laboratories and shops are not exempt from noise pollution considerations, particularly if maximization of learning and safety are the goal!

Noise is an unwanted sound. It is a form of energy or vibration that is conducted through the atmosphere. There are four variables that can affect the intensity of noise and its potential danger.

1. The level of the sound, as measured in decibels (dB).
2. The length of time to which one is exposed to the sound.
3. The numbers and lengths of quiet (recovery) periods between periods of sound.
4. Individual sensitivity to or tolerance for sound.

Table 1.1 indicates that workers cannot be exposed to a sound level that exceeds 90dB on the average for an eight-hour day. It should be noted that the standards in this table apply only to work; i.e., day-to-day environments, and schools are typically different. In some cases, however, vocational courses approximate the work situation and, hence, these standards might well apply. Furthermore, it also deserves noting that instructor exposure is often the equivalent of industry despite the fact that student exposure is not. Since hearing is affected by the totality of the noise that one is exposed to, any precautions are appropriate.

Fortunately, noise exposure can be controlled. No matter what noise problems occur in the laboratory and workplace, the technology exists to reduce the hazard. The responsibility to correct noise problems rests on the individuals, i.e., supervisors, teachers, etc., involved. In general, there are three basic ways to control noise.

1. **Source Control**

The best and most effective approach to control noise is to control it at its source since in this way no further hearing danger is posed and, therefore, other control methods are probably not needed. Techniques of noise source control include:

- a. Reduction of impact noise.
- b. Reduction of the speed of moving and rotating parts.
- c. Reduction of pressures and flow velocities in circulating systems.
- d. Reduction of flow resistance in circulation systems.
- e. Balancing of rotating parts.
- f. Reduction of friction in rotating, sliding, and moving parts.
- g. Isolation of vibration within equipment.
- h. Reduction of the size of the surface radiation areas.
- i. Application of vibration-damping materials to vibrating parts and surfaces.

2. Path Control

If source control is not possible, the next best approach is to control the noise along its path. Although such controls limit the number of persons exposed to the noise, they do not always eliminate the noise problem for all persons affected. In path control, noise is blocked or reduced before it is heard. This can be accomplished by:

- a. Containing or enclosing the noise.
- b. Absorbing the noise along its path.
- c. Deflecting the noise away from our ears.
- d. Separating the noise from the hearer.

3. Hearing Protection

Finally, ear protection equipment is available. This is not as desirable as either source or path control because it affords protection only to those wearing the equipment. Students must be willing to wear hearing protectors whenever they are exposed to potentially dangerous noise. Certain conditions and activities can reduce the effectiveness of the hearing protectors themselves.

TABLE 1.1 PERMISSIBLE NOISE EXPOSURES

<u>Duration per Day in Hours</u>	<u>Sound Level—DBA—Slow Response</u>
8	85
6.2	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Free safety and health consulting and education services are available from the state of Washington Department of Labor and Industries, Division of Industrial Safety and Health. To contact the Voluntary Services section nearest you, call 1-800-LISTENS.

HEARING PROTECTION

Cotton should not be used as protection against abrasive sound. While a wad of cotton may minimize waves of certain frequencies, it fails to alter the intensity thus providing a false sense of security.

Sound is measured by two fundamental characteristics: frequency (related to pitch) or number of waves per second and intensity level (related to loudness). The human ear reacts to frequencies ranging from 20 cycles per second to about 20,000. Sound at a level of 85 db. begins to lead to a loss of hearing, depending on (1) the intensity, (2) the frequency, (3) the duration of exposure, and (4) individual sensitivity. The following are examples of noise and the approximate db for each.

Busy street traffic at about 100 feet.....	60 db.
Office tabulating machines (electric typewriter, etc.)	80 db.
20 feet from subway	90 db.
Pneumatic diesel shovel (idling)	90 db.
Diesel shovel (idling)	90 db.
Automatic screw machines.....	95 to 105 db.
Wire rope stranding machine.....	102 to 108 db.
Header	103 to 108 db.
Circular saw.....	105 to 115 db.
Between two compressors	110 db.
Drop hammer (depending on size)	110 to 135 db.
Punch press	112 db.
Between two drills, 20 feet apart	117 db.
Five feet from pneumatic press	130 db.
40 feet from jet engine.....	138 db.
59 feet from rocket engine.....	150 db.

EMERGENCY ACTION

Emergency Communications

It is recommended that the following be implemented to ensure proper channels of communication during an emergency:

1. Procedures should be reviewed with the administration and employees to set methods of communication in the event an emergency occurs.
2. Order of notification under the following conditions:
 - a. If serious injury (uncontrollable situation)
 - school nurse
 - ambulance
 - principal
 - parents
 - b. If serious injury (controlled situation)
 - school nurse
 - principal
 - parents
3. Telephone
 - a. Each department should have communication with the building office.
 - b. Emergency telephone numbers should be conspicuously posted and the procedure posted for dialing “outside.”
4. A card file should be maintained in each school for all students. This card should include the names and telephone numbers of parents or guardians to be notified in the case of injury.

First Aid

General

All certificated career and technical education employees maintain a valid CPR and First Aide Card and the records of this requirement be maintained at the local level.

Administering

1. Qualified personnel should administer first aid.
2. Do not diagnose illness or prescribe or administer medication of any sort.
3. Disperse crowds if accident is serious and keep the area as quiet as possible.
4. Stick to basic procedures:
 - a. Call for aid.
 - b. Stop bleeding.
 - c. Treat for shock.
 - d. Mouth-to-mouth resuscitation (if breathing has stopped).
 - e. Cardiopulmonary resuscitation (CPR) (if required).

Transportation

1. Parents shall be notified immediately of all cases of illness or injury. If the student is to be sent home or elsewhere, the parents should arrange for the transportation. The principal should take appropriate action for the best interest of the student.
2. When the injury is serious, do not attempt to move the student except for first aid procedures until professional medical help arrives.
3. If a school is uniquely located where special transportation may be required, procedures should be established at the beginning of the school year.