

## General Safety

### GENERAL SAFETY PRACTICES:

1. Safety rules are for your protection and the ones working around you. Safety is a skill, and like all skills must be practiced to be maintained.
2. Never use any tools or machinery without first receiving permission from the instructor.
3. Use the correct tool for the job.
4. In case of sickness or injury, no matter how slight, report at once to your instructor for direction.
5. Safety devices are for your protection. Never operate tools or equipment unless all guards are in place.
6. No food or beverages are allowed in the Laboratory/Shop.
7. Students must remain in the laboratory/shop area unless called away by the school and the instructor has given permission.
8. Always use a dust collection, fume extraction system and/or proper ventilation.
9. Make sure there is proper lighting throughout the work area in order to properly see the task at hand.
10. Read and obey all safety and emergency signage in the laboratory/shop.
11. Horseplay, running, throwing objects, scuffling, and fooling around is unsafe and will not be tolerated.
12. Pay attention to what you are doing at all times when working. Be aware of your surroundings as a hazard may originate outside of your work but could enter your immediate area requiring you to react.
13. Wearing headphones or earbuds in the laboratory/shop distract from the work being performed. They also make it difficult to hear potential hazards and may use cords which can be an entanglement hazard.
14. The operator must be in control the machine while in operation.
15. If you see someone working carelessly and are liable to be hurt; stop them, explain the hazard, and ask the instructor to re-teach the proper set up.

16. Never distract the attention of another student as you might cause injury, this includes staying out of the machine safety zone (unless it is in an attempt to prevent an injury).
17. Know the location of the first aid station/kit and the basic contents.
18. Know the location and the proper operation of the eye wash and safety shower.
19. Know the location of the Safety Data Sheets (SDS) and their purpose.
20. Do not handle or clean up any bodily fluids. Notify an instructor and get appropriate personal to deal with it immediately. Biohazards must be disposed of properly.
21. Jewelry, rings, bracelets, watches, chains, keychains, etc. shall not be worn for these objects may catch in the machines and cause serious accidents.
22. Keep long, loose hair restrained and securely tied back to prevent machine and tool entanglement.
23. Do not wear loose or baggy clothing that can interfere with your work.
24. Make sure material is free from foreign objects, debris and defects before using any machine. Such as stapled, nails, screws, knots, paint, grease, oil, debris, etc.
25. Keep your hands away from moving parts. The minimum distance your hands are away from moving parts is called the margin of safety. Tools and equipment each have their own recommended margin of safety.
26. Never reach across a machine's point of operation when the machine is on.
27. Never force material through the machine to speed up operation.
28. Report all damaged tools, equipment, and devices to the laboratory/shop instructor.
29. Prescription medication and over-the-counter medication that says "do not operate heavy machinery" or that it "may cause drowsiness" can put a student at risk and those around them. Inform an instructor if this is the case for you.
30. All power tools must be disconnected from the power source when not in use or when making adjustments.
31. Never leave items with stored potential energy available to anyone without proper safety training; remove clamps, pressure, air pressure, power sources, etc. Before leaving the items. Springs, pneumatics, hydraulics, batteries, and levers are all examples

of stored potential energy.

32. Do not attempt to lift or push objects that may be too heavy or awkward for you. Ask for help when needed. Learn to lift the right way to avoid strains, bend your knees, keep your body straight, and then push up with your legs. This is the easiest and safest way.
33. Using proper ergonomics helps eliminate fatigue when working which improves safety.
34. Material handling
  - a. Material handling procedures start with awareness of the specific materials, handling risks involved, and the proper safety equipment for the situation.
  - b. Maintain a work area free of obstacles and ensure adequate lighting.
  - c. Maintain the correct posture: avoid bending over and keep lifts close to the body.
  - d. Lift in a careful, deliberate manner and avoid any sudden lift movements.
  - e. Never lift materials from a sitting position, or twist to pick up a heavy object.
  - f. Use the correct grip on objects; lifts should be shoulder high and with full grasp of the hands.
  - g. Get assistance to avoid successive lifts of heavy objects.
  - h. Always go around a blocked pathway, never step over an obstacle while carrying material.
  - i. Maintain a clear line of site; objects should not block vision; lift only where there is sufficient lighting.
  - j. Whenever possible; reduce load sizes, adjust bulky objects to ease movement.
35. Housekeeping
  - a. Keep all walkways and stairways clear of trash/debris and other materials such as tools and supplies to prevent tripping. Maintain a 3-foot clear area.
  - b. Slippery floors cause falls, keep the floor clean and clear.
  - c. Store materials, racks, crates, boxes, ladders and other equipment at least 3 feet away from aisles, exits, firefighting equipment, lighting, electrical panels, etc., as not to block access. Fire escape doors must be kept clear.

- d. Keep the work area around you clean. Discard all debris in the appropriate container and return all tools to their correct location. A clean laboratory/shop is a safe area to work in.
- e. If you see a spill or something that needs to be addressed, clean it up.

36. Basic color coding

- a. OSHA outlines two broad requirements for safety colors in [its standard for safety color codes](#) (29 CFR 1910.144). The standard maintains that red and yellow must be used for marking physical hazards.
- b. Red must be used for fire-related hazards, as well as emergency switches, stop bars, and buttons on hazardous machines. ("Fire-related hazards" may include identifying fire protection equipment and containers of flammable liquids.)
- c. Yellow indicates caution and is used for physical hazards, including striking against, stumbling, falling, tripping, and "caught in between."

37. Electrical Protection

- a. Electric power tools used outdoors are required to be plugged into a Ground Fault Circuit Interrupter (GFCI).
- b. Do not use extension cords with only two wires or a three-wire cord with the ground plug removed.
- c. Cords for handheld power tools, machines, and extension cords are to be inspected before each use for frayed or damaged power cords.
  - (1) Extension cords must be inspected regularly for damage. External damage to the insulation may be repaired by a qualified electrician. Damage to internal wiring will require disposal of the cord.
- d. Power tools with observed damage shall be taken out of service until repaired by a qualified person or replaced.
- e. Extension cords used with power tools must be rated for the power demands of the tool and have an intact grounding pin.
- f. Portable electrical equipment must be handled in a manner that will prevent damage to the electrical cord and equipment.

- g. Electric power tools should always be disconnected from outlets/extension cord by pulling the plug rather than the cord.
  - h. Control switches must be located within easy reach of the operator at his/her operating position.
  - i. On/Off controls must be easily identifiable.
  - j. Power strips must not be used in series with other power strips or extension cords.
  - k. Extension cords are for temporary use only.
  - l. Extension cords running along or across areas of foot traffic must be secure to prevent a tripping hazard. If possible, re-route your cord to eliminate hazard.
  - m. If an extension cord is suspended, never hang any object from cord.
  - n. When cords are being ran through wall openings such as doors or windows, protect cord from being damaged from sharp edges.
  - o. Shop made extension cords with receptacle boxes do not meet electrical code requirements and cannot be used.
  - p. The symbol for a double insulated tool is a square inside a square.
38. Fire Safety/Prevention
- a. Heat, fuel, and oxygen must be present in the same place and at the same time for a fire to occur, these elements are called the Fire Triangle.
  - b. When using power tools, it is the responsibility of the student to be aware of a tool getting hot. If this happens, immediately turn it off, disconnect from the power source, and report it to the instructor.
  - c. If a tool emits a burning smell disconnect the power source and inform the instructor immediately.
  - d. Any finishing materials should not be used near an open flame. This would also include thinners and paints.
  - e. Rags that have absorbed any amount of linseed oil, solvents, stains, paints, or any other flammable products must be disposed of in an approved covered metal container as a precaution against spontaneous combustion.

- f. When using torches, report to the instructor any odor of gas. Flammable gases can not only cause a fire or an explosion, it can also make people ill.
  - g. When unplugging an electrical cord, always do so by the plug itself and not by the cord. This causes damage to the wires and can eventually be the cause of a fire.
  - h. In the event of a person clothing catches on fire, Remember **Stop! Drop! Roll!**
  - i. Fire Extinguishers
    - (1) In the event of a fire, do not panic. If it is small (i.e., the size of your hand), put it out immediately. Don't give it time to get large and out of control.
    - (2) If it is a large fire, inform the instructor immediately and calmly follow his/her instructions. Leave firefighting to the professionals and get out. Smoke inhalation and heat can kill you as easily as fire. Walk calmly to the nearest exit. Nothing we own is worth injuring yourself or losing your life.
    - (3) Know the location of all fire extinguishers - including hoses and fire blankets, and how to use them.
    - (4) Do not hang anything on fire extinguishers. The 3-foot area around fire extinguishers should be kept clear so that they may be reached without delay.
    - (5) Flammable liquid fires should be put out by smothering with non-flammable material. Spraying such fires spreads the fire.
  - j. Fire blankets are useful for smothering small fires where fire extinguishers cannot be used.
  - k. All flammable chemicals must be stored in an approved flammable storage cabinet.
39. Personal Protective Equipment (PPE)
- a. Eye Protection - Always wear appropriate eye protection.
    - (1) Safety glasses provide eye protection from moderate impact and particles associated with grinding, sawing, scaling, broken glass, and minor chemical splashes, etc. Side protectors are required when there is a hazard from flying objects.
    - (2) Eye protection must be approved and comply with the ANSI Z87.1

- (3) Sunglasses and Prescription glasses that are not ANSI Z87.1 rated and contact lenses are not approved eye protection.
  - (4) Students shall wear eye protection that incorporates the prescription in its design, or must wear eye protection that can be worn over the prescription lenses
  - (5) Students must wear approved eye protection whenever in the lab/shop area
  - (6) Safety Glasses Germicidal Cabinet - Eye protection that may be used by multiple students shall be stored in a germicidal cabinet. The cabinet shall be turned on after each class for the minimum required time to eliminate any germs on the eye protection.
- b. Shaded Glasses/Welding Helmets - Welding activities produce bright light can burn the eyes and skin. Make sure you have the correct shade lens for the welding application to protect your eyes.
- c. Hearing Protection should be used when noises exceed permissible decibels and durations as laid out in OSHA's table G-16. Acceptable devices to reduce noise include ear plugs and earmuffs which come in a variety of noise reduction ratings.
- d. Coverings
- (1) Gloves- Use the appropriate gloves for the task at hand (welding gloves for welding, neoprene gloves for staining, rubber gloves for chemicals, etc.). Never use gloves while working with machines that can "grab" the glove and pull your hand into the operation.
  - (2) Aprons and/or Lab/Shop Coats – Use aprons and/or lab/shop coats to protect your clothes from damage. Make sure the apron is tied tight or the coat is completely buttoned and will not catch in any machine.
  - (3) Face Shields- An item used to protect the wearers entire face from hazards such as flying objects, debris, chemical splashes or potential infectious materials. Face shields are not approved eye protection.
  - (4) Leathers- Welding jackets, gloves and clothing items (sleeves) intended to protect welders from metal splatter, sparks and high heat. Used to protect the welder's body.
  - (5) Beanies- Are welding caps that welders need to wear to protect their heads, necks and ears from welding sparks that fly all around them. Especially used

for keeping welding sparks and slag out of their ears.

- (6) Coveralls - Are essentially a full body protection suit, generally worn over personal clothing and can protect workers against a number of hazards, including chemicals, mechanical thermal and biological nature.
- (7) Footwear - Open toe, sandals, or high heel shoes are never permitted in the laboratory/shop. Avoid shoes with slippery soles, good traction will help you remain safe. In certain cases, leather, safety toe, and non-conductive shoes may be needed.
- (8) Hard Hats/Bump Caps should be used when there is overhead, falling, and flying objects.
- (9) Dust Mask, Face Mask, and Respirators covers the mouth and nose of the wearer, worn when in a dusty or toxic atmosphere, or when doing work which creates dust or noxious fumes.

#### 40. Fall Protection

##### a. Ladders

- (1) Before using any ladder, inspect it making sure it has good safety feet and is free from cracks, broken rungs or other defects. When there is **any** danger of slipping, have another student hold the ladder or secure ladder at top and/or bottom.
- (2) Extend ladders at least three feet above the landing to provide a handhold and for balance when getting on and off the ladder.
- (3) The base of the ladder should be placed so that it is one foot away from the building for every four feet of height to where the ladder rests against the building. This is known as the **4 to 1 rule**.
- (4) Do not let your belt buckle extend past either side of the ladder rail.
- (5) Always face the ladder when climbing or descending and use the 3-point rule of contact. Have either two hands and one foot or two feet and one hand in contact with the ladder.
- (6) Never hurry or skip rungs when using a ladder.
- (7) Use all ladders as it was designed and for its intended purpose. Verify duty rating and only one person is allowed on a ladder.

b. Scaffolds

- (1) Secured ladders must be used to get on and off scaffolds and work platforms.
- (2) Keep scaffolds and work platforms free of debris.
- (3) Erect scaffolds on firm and level ground with a solid base, no rocks
- (4) Erecting and dismantling scaffolds must be under the supervision of the instructor.
- (5) Extend planks at least 6" over the edge or cleat them to prevent movement. The planks must not extend more than 12" beyond the end supports. This prevents tipping when stepping or working.
- (6) Manufactured (or stamped) scaffold planks shall carry no more than the allotted weight (material & people).
- (7) Scaffolds that are more than ten feet above the ground or floor surface must have a standard guardrail. To ensure adequate protection, install guardrails along all open sides and ends before releasing the scaffold for use.
- (8) Guardrails are not required when the front end of all platforms are less than 14 inches from the face of the work.
- (9) Each platform must be planked and decked as fully as possible.

COMPLETION QUESTIONS:

1. In any life-threatening emergency, dial \_\_\_\_\_.
2. Extension ladders must be placed at the proper angle. Use a \_\_\_\_\_ ratio for setting ladders.
3. Students must wear hearing protection when noises exceed acceptable \_\_\_\_\_ and durations.
4. A SDS is a \_\_\_\_\_.
5. Report all tool/equipment \_\_\_\_\_ to the instructor.
6. All power tools must be disconnected from the \_\_\_\_\_ when not in use.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

7. Keep your hands away from \_\_\_\_\_ parts.
8. Be sure a machine has been \_\_\_\_\_ from the power source before making any adjustments.
9. Pay \_\_\_\_\_ to what you are doing at all times when working in the lab.
10. The symbol for a double insulated tool is a \_\_\_\_\_ inside a \_\_\_\_\_.
11. Safety is a skill, and like all skills it must be \_\_\_\_\_ to be maintained.
12. The \_\_\_\_\_ must be in control of the machine while in operation.
13. The minimum distance your hands should ever come to the cutting tool while it is in operation is called the \_\_\_\_\_.
14. A clean \_\_\_\_\_ is a safe area to work in.
15. Wearing headphones or earbuds in the laboratory/shop \_\_\_\_\_ from the work being performed.
16. GFCI stands for \_\_\_\_\_.
17. Store materials, racks, crates, boxes, ladders and other equipment at least \_\_\_\_\_ feet away from aisles, exits, firefighting equipment, lighting, and electrical panels.
18. Which of the following must be present in the same place, at the same time for a fire to occur \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
19. Open toe, sandals, or high heel shoes are \_\_\_\_\_ permitted in the laboratory/shop.
20. Extension cords must be \_\_\_\_\_ regularly, damaged cords must be disposed of.
- 21.