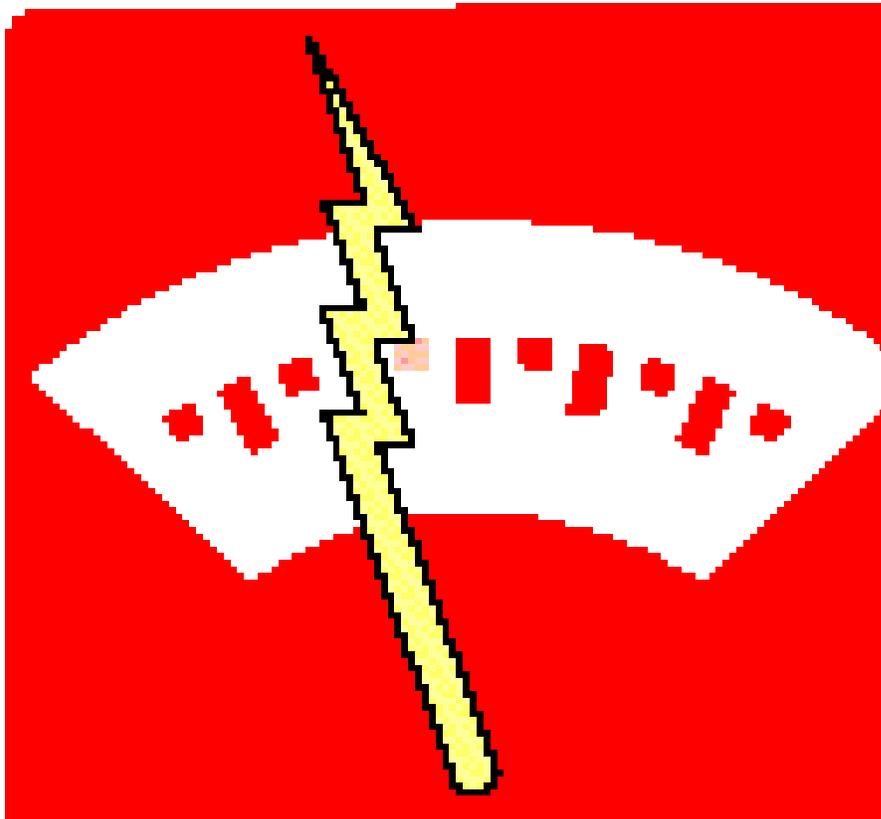


# Electricity, Electronics, & Energy Technology



# **Technology Education Safety Procedures and Recommendations For all Electricity and Electronics Classes**

## **Safety Pledge:**

Read and discuss rules, have students and their parents sign the safety pledge. Students will return the pledge signed by parent we will then keep the pledge on file while the student is enrolled in Technology Education classes.

## **General Safety:**

Discuss general safety rules applicable to any shop or lab.

## **Hand Tool Safety:**

Discuss and demonstrate proper use of common hand tools used in the lab or shop.

## **Machine Tool Safety:**

Students will learn the key features, adjustments, purpose and the safety concerns of the machines utilized in the course they are enrolled in

Students will be evaluated by tests and quizzes, performance evaluations, and observation by the instructor.

# Electricity and Electronics Safety

Electric and electronic circuits can be dangerous. Don't underestimate the potential dangers, which include: electrical shock, fires, mechanical damage, and injuries.

1. A current through the human body in excess of 10 millamps can paralyze the victim and make it impossible to let go of a "live" conductor of component.
2. Current of 100 millamperes or more can cause fatal shock.
3. Human skin has a resistance to smaller voltages, but higher voltages can force enough current through the skin to produce a shock.
4. When the skin is moist or the clothes are damp, the body's resistance to the flow of electricity is drastically reduced and moderate voltages can cause serious shock.
5. Avoid wearing rings, watches and similar items when working around exposed electric circuits.

Eye protection is required (state law) when working in the lab. Safety glasses/goggles should always be worn when soldering, using power equipment, or working with any chemicals.

Many accidents have been caused by people rushing and cutting corners. Absolutely no horseplay is allowed in the lab. You or others could be injured by your actions.

Give your undivided attention to what you are doing at all times.

Safety with soldering irons:

1. Keep the soldering iron in the stand when not in use.
2. Arrange your work so that you never have to reach over a hot iron.
3. Do not touch the tip of a hot soldering iron to see if it is hot.
4. Apply heat from a soldering iron for no more than a few seconds to avoid heat damage to components, wires and circuit boards.
5. Never solder a circuit that has power applied.

Never wire or work on a circuit when the power is on.

Only work with powered circuits when necessary for troubleshooting.

Double check circuits to make sure electrical connections are secure, correct, and have proper polarity before applying power.

Always observe polarity when connecting components or meters into a circuit.

Safety with meters:

1. Make sure meters are set for proper range and function prior to taking a measurement.
2. When measuring unknown quantities, start with the range switch on the highest setting.

Always cut wire leads so the clipped wire falls on the table and not towards others.

Keep tools and test equipment clean and in good working condition. Report damaged tools or unsafe conditions to your instructor.

Do not assume protective devices are working. Do not assume a circuit is off even though the switch is in the OFF position. Double check it with an instrument that you are sure is operational.

So-called "low- voltage equipment" can-have a high voltage section or two. Always follow the same safety procedures, not one for high voltage and one for low voltage situations.

Some devices, such as capacitors, can store a lethal charge. They may store this charge for long periods of time. You must be certain these devices are discharged before working around them.

Do not remove grounds and do not use adapters that defeat the equipment ground.

Many circuit components affect the safe performance of equipment and systems. Use only exact or approved replacement parts.

Use only approved fire extinguishers for electrical and electronic equipment.

- Water can conduct electricity and may severely damage equipment.
- Carbon dioxide or halogenated-type extinguishers are usually preferred.
- Use fire extinguishers rated "C" or "A B C".

Do not work on equipment before you know proper procedures and are aware of any potential safety hazards.

Report all injuries, however slight, to your instructor immediately.

**USE YOUR COMMON SENSE!**

#### **SIMPLE STEPS TO PREVENT HARM OR INJURY...**

- Ensure electrical equipment is turned off before it is checked.
- Check that plugs are not damaged.
- Check that plugs are correctly wired and maintained.
- Check the outer covering of the cable or wire is gripped where it enters the plug or the equipment.
- Check that the outer cover of the equipment is not damaged, i.e. look for loose parts or screws.
- Check leads, wires, or cables for damage to the outer covering.
- Check for burn marks or stains that indicate overheating.
- Check that there are no trailing extension cords. If there are, tuck them out of the way to prevent accidents.

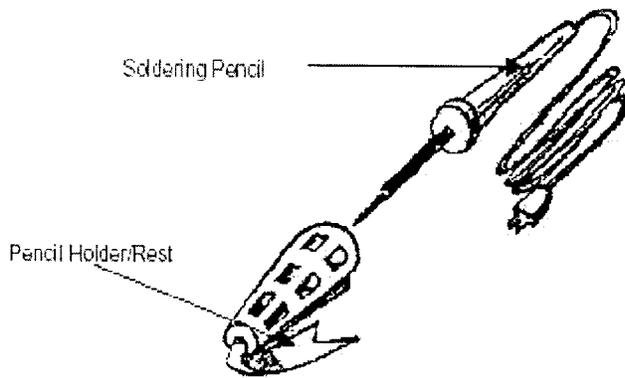
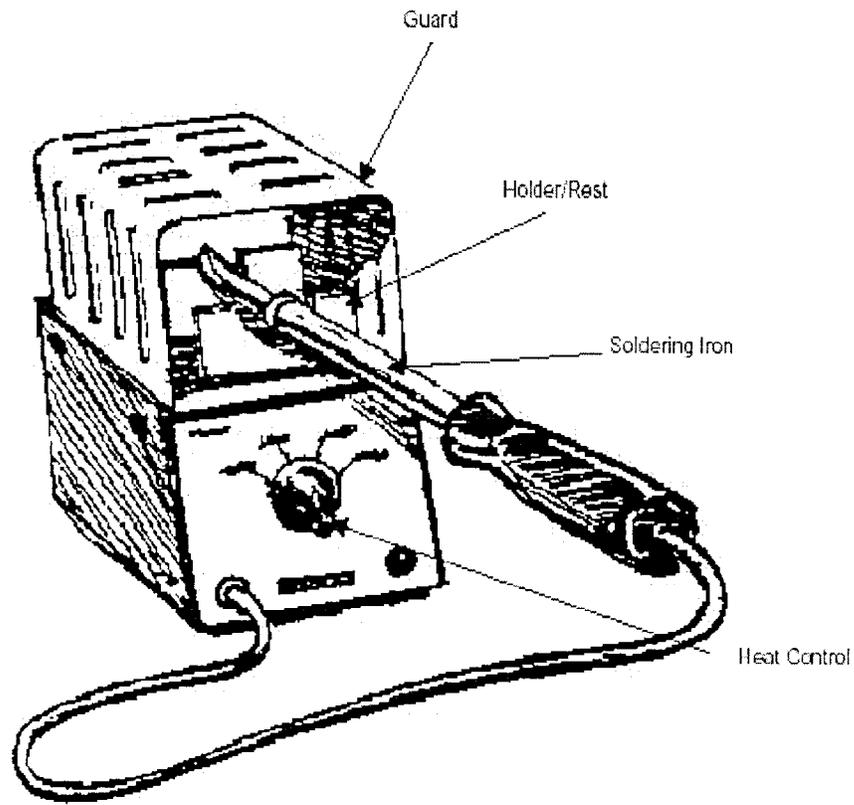
## Soldering Station/Pencil Notes

### Requirements:

Proper eye protection must be worn-operate only with instructor's permission and after proper instructions have been received.

1. Operate only with instructor's permission and after you have received instruction.
2. Remove jewelry, eliminate loose clothing, and confine long hair.
3. Make sure all guards are in place and operating correctly.
4. Always wear eye protection.
5. Avoid serious burns by treating all soldering equipment as though it was hot.
6. Always place equipment back in holder after use. Never lay it on the bench.
7. Handle all soldering equipment with caution.
8. Solder over the bench top to prevent hot solder from dropping on the operator's legs.

# Soldering Station/Pencil Parts



## Soldering Station/Pencil Written Test

Name \_\_\_\_\_ Grade \_\_\_\_\_ Date \_\_\_\_\_

Use the best answer to complete the following:

1. Eye protection **SHOULD / SHOULD NOT** be worn at all times in the lab.
2. **ONLY THE TIP / ALL OF** the soldering equipment is hot when it is on.,
3. The soldering equipment should be **IN ITS HOLDER / LAID ON THE TABLE** after use.
4. **IT FEELS COOL TO / DO NOT** let any of the melted solder touch your skin.

List 5 safety procedures you should do before you operate this machine.

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## Soldering Station/Pencil Written Test (MASTER)

Name \_\_\_\_\_ Grade \_\_\_\_\_ Date \_\_\_\_\_

Use the best answer to complete the following:

1. Eye protection **SHOULD** be worn at all times in the lab.
2. **ALL OF** the soldering equipment is hot when it is on.,
3. The soldering equipment should be **IN ITS HOLDER** after use.
4. **DO NOT** let any of the melted solder touch your skin.

List 5 safety procedures you should do before you operate this machine.

1. Tuck in your shirt.
2. Secure your hair.
3. Remove jewelry.
4. Wear Z8 safety glasses.
5. Work with a partner.
6. Listen for and report any problems immediately.
7. Make sure that all guards are in place and working.
8. No horseplay.
9. Keep work area clean.
10. Protect hands.

## Safety Test – Electricity

Name \_\_\_\_\_ Grade \_\_\_\_\_ Date \_\_\_\_\_

1. \_\_\_\_\_ should be worn to protect your eyes when using chemicals or power equipment.
2. Pay \_\_\_\_\_ to what you are doing at all times when working in the lab.
3. A current through the human body of more than \_\_\_\_\_ can paralyze the victim and make it impossible to let go of a “live” conductor or component.
4. Make sure all electrical \_\_\_\_\_ are secure and correct before applying power.
5. Human skin has a resistance to smaller \_\_\_\_\_, but higher \_\_\_\_\_ can force enough current through the skin to produce a shock.
6. A current of \_\_\_\_\_ or more can cause a fatal shock.
7. Do not \_\_\_\_\_ the tip end of the soldering iron to see if it is hot.
8. Report all \_\_\_\_\_, however slight, to your instructor.
9. Never work with electricity in \_\_\_\_\_ areas.
10. Items such as watches or rings should \_\_\_\_\_ be worn when working with electricity.
11. Never wire or work on a \_\_\_\_\_ that has power applied.
12. An electrical protective device should never be \_\_\_\_\_.
13. Always make certain that a \_\_\_\_\_ is discharged before working around it.
14. Never remove or bypass \_\_\_\_\_ on electrical equipment.
15. \_\_\_\_\_ should not be used to extinguish an electrical fire.
16. Whether working with low or high voltage, always follow the same safety \_\_\_\_\_.
17. Always cut wire leads so the clipped wire falls on the table and not is not \_\_\_\_\_ at others.
18. \_\_\_\_\_ proper safety procedures and any safety hazards is essential before working

Words to choose from:

knowing	bypassed	injuries
attention	100 milliamps	voltages
grounds	water	damp
directed	circuit	connections
touch	10 milliamps	never
procedures	capacitor	safety glasses

## Safety Test – Electricity (MASTER)

Name \_\_\_\_\_ Grade \_\_\_\_\_ Date \_\_\_\_\_

1. **SAFETY GLASSES** should be worn to protect your eyes when using chemicals or power equipment.
2. Pay **ATTENTION** to what you are doing at all times when working in the lab.
3. A current through the human body of more than 10 **MILLIAMPS** can paralyze the victim and make it impossible to let go of a “live” conductor or component.
4. Make sure all electrical **CONNECTIONS** are secure and correct before applying power.
5. Human skin has a resistance to smaller **VOLTAGES** but higher **VOLTAGES** can force enough current through the skin to produce a shock.
6. A current of **100 MILLIAMPS** or more can cause a fatal shock.
7. Do not **TOUCH** the tip end of the soldering iron to see if it is hot.
8. Report all **INJURIES** however slight, to your instructor.
9. Never work with electricity in **DAMP** areas.
10. Items such as watches or rings should **NEVER** be worn when working with electricity.
11. Never wire or work on a **CIRCUIT** that has power applied.
12. An electrical protective device should never be **BY PASSED**.
13. Always make certain that a **CAPACITOR** is discharged before working around it.
14. Never remove or bypass **GROUND**s on electrical equipment.
15. **WATER** should not be used to extinguish an electrical fire.
16. Whether working with low or high voltage, always follow the same safety **PROCEDURES**.
17. Always cut wire leads so the clipped wire falls on the table and not is not **DIRECTED** at others.
18. **KNOWING** proper safety procedures and any safety hazards is essential before working

Words to choose from:

knowing	bypassed	injuries
attention	100 milliamps	voltages
grounds	water	damp
directed	circuit	connections
touch	10 milliamps	never
procedures	capacitor	safety glasses