

# Robotics Safety Notes

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## ***Equipment Safety Notes***

### **A. Preparation**

1. Wear safety glasses for all machine operations.
2. Secure loose clothing and remove jewelry or clothing accessories that may catch in the machine.
3. Clear area of scraps.
4. Position guards.
5. Set up machine for the specific operation. If the machine is computer controlled, step through the program.
6. Position stock for the machine operation.
7. Consider physical demands and use a helper if necessary.
8. Check with instructor before performing the operation.

### **B. Task Performance**

1. Mentally review the operational procedure and machine safety rules.
2. Focus full attention on the machine operation.
3. Never leave the machine.
4. If a problem is encountered, stop the machine at a safe point.
5. Make machine or stock adjustments only when machine motion has stopped.

### **C. Termination**

1. Make sure machine is turned off and all motion has stopped.
2. Remove scrap material that accumulated during the operation.
3. Return the machine to its customary set-up.

# General Safety – Part I

## Requirements:

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

1. Always wear eye protection. Wear safety glasses, goggles or a face shield.
2. Get the instructor's permission before you use the equipment.
3. Use the equipment **only** when the instructor is in the laboratory.
4. Report all accidents, near accidents, or injuries to the instructor immediately.
5. Don't use tools or equipment that are in any way defective. Tell the instructor if a tool is dull or broken or isn't working properly.
6. Don't use any equipment until you have been shown how to use it correctly and safely. Don't use it unless you understand the instructions.
7. Keep clothes tucked in and sleeves neatly rolled up. Loose clothing can get caught in a machine and cause an injury.
8. If your hair is long, tie it back or wear a cap over it. Long hair can be caught in a moving machine.
9. Remove rings, bracelets, watches, and necklaces before you do any work in the laboratory. Watches and jewelry should not be worn in the laboratory.
10. Wear protective shoes. Wear hard shoes or boots with rubber soles and rubber heels. **Don't wear sandals in the laboratory.**
11. Wear approved ear protection around loud, noisy equipment.
12. Wear a dust mask or an air filter when working around a lot of wood dust. Wood dust can be
13. harmful if inhaled.
14. Use finishing materials, thinners, or other oily or flammable liquids only in well-ventilated areas.
15. Clean up spills. Don't leave anything on the floor that someone could slip on.
16. Keep used rags in an approved, covered metal container. Damp, oily rags can ignite through spontaneous combustion. The heat produced by oxidation is enough to start a fire.
18. Know where the fire extinguishers are located and know how to use them **before** there is an emergency.
19. Keep cabinet doors and drawers closed.
20. Aisles have to be kept clear and free of litter, scraps, and materials. Don't leave anything on the floor that could be tripped over or slipped on.
21. Vises should be kept closed when they're not in use.

## General Safety – Part II

### Requirements:

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

1. Keep workbenches clear and organized. Don't pile up tools and don't lay tools down so they hang over the edge of the bench.
2. Always use a brush or a rag to clear away sawdust and scraps. Never use your hands to wipe off a surface.
3. Use the right tool for the job. Use the tool only for what its designed to do. Use the right size tool.
4. Carry pointed or sharp tools with the point or edge held down toward the floor. This will help avoid injuries if you bump into something or if someone bumps into you.
5. When you hold a tool, hold it by the handle. When you hand someone a tool, hold it so they can take it by the handle.
6. When you're finished with a tool, return it to its proper storage area. Return it to the tool room, tool rack, or cabinet where it belongs.
7. If you're handling large or heavy materials, get someone to help you. Also, ask someone to help or "tail-off" for you when you cut a large piece of material on a machine.
8. Lift with your legs, not with your back. Lifting improperly or carelessly can cause severe back injuries.
9. Be sure your hands are dry and that you're standing on a dry floor when you use electrical devices.
10. Check the condition of the power cord. Don't use the equipment if the insulation on the cord is damaged, cut, or frayed. Tell the instructor.
11. When you disconnect a power cord, pull the plug; don't yank on the cord. Hold the plug and pull it out of the outlet.
12. Use all the recommended guards and safety devices on the power equipment. Never remove a guard without the instructor's permission.
13. Disconnect the power equipment any time you need to make major changes or adjustments. Unplug the tool or machine or disconnect it at the circuit breaker panel. If you disconnect the circuit breaker, put up a sign: "Don't Connect."
14. Turn off the machine any time you make minor changes or adjustments. Never adjust equipment while it's running. Wait for it to come to a complete stop before you make the adjustment.
15. Do not at any time leave a machine. Turn it off and stay with it until it comes to a complete stop.
16. When you approach a machine to use it, make sure the person who used it before you turned it off. Make sure it's completely stopped.
17. Respect the safety zones. Stay away from anyone operating the power equipment. Don't talk to them or distract them in any way. Don't let anyone distract you when you're using the equipment.
18. Concentrate on what you're doing; give it your full attention. If you don't feel well or if there's some reason you can't concentrate, tell your instructor.

19. Work at a safe speed. Don't rush or hurry through a project. Working too fast is dangerous and it will result in poor craftsmanship.

## Hand Tool Safety Requirements:

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

1. Wear eye protection. Always wear safety glasses, goggles, or a face shield when you work in the laboratory.
2. Always use the right type of tool for the job. Use the tool designed for the work you want to do.
3. Use the right **size** tool. Don't try to do heavy work with a small, light tool; don't try to do fine work with large, heavy-duty tools. Use the tool that suits the work.
4. Before you use a tool, check it to be sure it's clean and in good condition.
5. Never use your hands or fingers to test whether or not a tool is sharp. If the tool is as sharp as it should be, you'll cut yourself.
6. Be sure the tool handle is fitted tightly and securely.
7. Don't use a dull, broken, or defective tool. Report defective or damaged equipment to the instructor.
8. Always carry tools by the handle.
9. When you carry a tool, hold it so the point or sharp edge is aimed down toward the floor.
10. Avoid holding the work with one hand while you use the tool with the other hand. Fasten the work down so you'll have both hands to use the tools.
11. Plan the work so you can keep your balance. Always keep your weight on both feet, and don't over-reach.
12. Don't lay tools down near the edge of the bench. Don't lay tools down where they could roll off, where someone could bump into them or where someone could trip over them.
13. Never aim a cutting tool toward your hands, arms, or body. Aim the tool away from you and away from others, whether you are working with it or just holding it.
14. Always keep your hands and arms out of the path of a cutting tool. Keep hands and arms behind the cutting edge.
15. When you are finished with a tool, return it to its assigned storage area. Don't leave tools lying around.
16. Use the tools **only** if you understand how to use them correctly and safely. If you're not sure, check with the instructor.

# Portable Power Tool Safety

## Requirements:

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

1. Portable power tools produce a lot of wood chips and dust. You can prevent eye injuries by wearing eye protection. Wear safety glasses, safety goggles, or a face shield.
2. You must have the instructor's permission before you use any of the power tools.
3. Use power tools only when the instructor is present in the shop.
4. Don't wear loose clothing. Keep shirts tucked in and shirtsleeves rolled up neatly.
5. Remove rings, watches, bracelets, and necklaces.
6. Long hair must be tied back out of the way or tucked under a cap.
7. The tool has to be sharp and in good condition. Check the blade, knives, or bit to make sure that they are sharp and in good condition.
8. Don't over load or force a portable power tool. Use it only for what it was designed to do.
9. Electricity should never be used around water or moisture. It can cause a severe electric shock. Be sure your hands are dry and you're standing on a dry floor when you handle electric power tools.
10. Electrical power tools must be grounded or double insulated to prevent a possible electric shock. Don't use equipment that isn't properly insulated or grounded.
11. Check the power cord to make sure the insulation is in good condition. Don't use the tool if the insulation is broken, cut, or damaged in any way.
12. Keep the tool disconnected when it is not in use. Plug it in when you are ready to use the tool, and pull the plug as soon as you are finished.
13. Check the switch before you plug in the tool. Always check the switch first to make sure it's in the "off" position before you plug it in.
14. Keep the power cord well out of the way when the tool is operating. Keep the cord out of the path of the tool.
15. Always disconnect the tool before you make any changes or adjustments. Don't make any changes or adjustments while the tool is plugged in.
16. When you disconnect a power tool, pull the plug. Don't yank on the cord.
17. Fasten the work down. Avoid holding the work with one hand and operating the tool with the other hand.
18. Hold the tool firmly. It may twist when you turn it on. Hold the tool so you always have control of it.
19. Wait until the tool comes up to full speed before you start the cut.
20. Don't overreach. Keep yourself balanced.
21. Wait until the tool has come to a complete stop before you set it down.
22. Using a power tool will require all your attention. Don't let anyone distract you. Keep your attention on what you are doing so you can work safely at all times.

# Power Equipment Safety

## Requirements:

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

1. Always wear eye protection.
2. You must have the instructor's permission before you use the equipment.
3. Don't use any of the power tools unless you've been shown how to use them correctly and safely. Don't use a tool until you understand how to use it properly.
4. Power equipment may be used only when the instructor is in the shop. No power equipment may be used unless the instructor is present.
5. If you don't feel well or if you can't concentrate, tell the instructor. Don't use any of the tools unless you can give your full attention to what you are doing.
6. Your hands must be dry when you work around electricity, and you must be standing on a dry floor.
7. When you approach a machine, be sure the person who used it before you has turned it off and it's completely stopped.
8. Check the cutting tool in the machine. The cutting tool must be sharp and in good condition.
9. The cutting tool must be installed correctly and properly adjusted for the work.
10. Check to see that all the safety guards are in place and working properly. Use all the safety guards whenever possible.
11. Never remove a guard unless you have the instructor's permission.
12. If the machine doesn't sound right or if it doesn't work properly don't use it. Turn it off and tell the instructor.
13. Use the machine only for what it was designed to do. For example: don't overload the machine or use it on something too small to be safe.
14. If you have to make any adjustments or changes, get permission.
15. Before making any major changes or adjustments, disconnect the power. Pull the plug or disconnect the power at the circuit breaker.
16. Minor adjustments should always be made with the machine turned off and completely stopped.
18. Work in a well-lighted area. Stand so you can see clearly.
19. Keep yourself balanced. Don't overreach or put your weight on a machine.
20. Check the condition of the material. The wood must be clean and free of defects. It must be clear of hardware, paint, or finishes.
21. Always wait for the machine to come up to full speed before starting the cut.
22. Use an even, steady pressure to make the cut. Don't force it or over, load the machine.
23. If the material is large or heavy, get help. Ask someone to "tail-off" for you. The tail-off helper should support the material while you control how it is moved into the cut.
24. Get permission to use special set-ups, jigs, or attachments. Ask the instructor to double-check special set-ups before you use them.
25. Don't let anyone distract you while you're operating the machine. Keep your full attention on what you are doing.
26. Use a piece of scrap wood, a push stick or a brush to remove scraps around the cutting tool. Never use your hands to clear away scraps or dust.
27. Stay out of the danger zones when someone is using the equipment. Make sure that others stay clear when you're operating the equipment.
28. When you are finished using equipment, turn it off and stay with it until it has come to a complete stop.
29. Remove any special attachments or special cutting tools you may have used. Replace the guards if you've removed them and readjust settings to their normal position.
30. Use a brush to clean off the equipment, and then sweep the area around the machine.



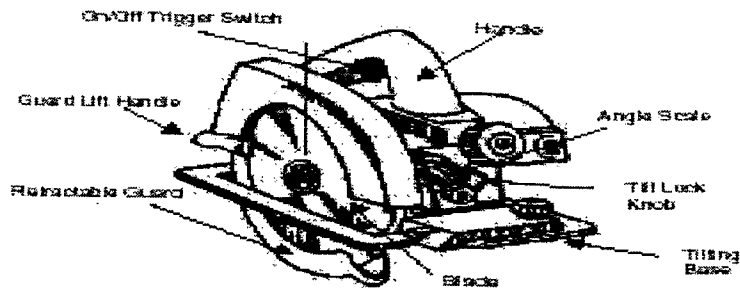
## Portable Circular Saw Notes

### Requirements:

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

1. As with any machine, you must wear proper eye protection, pass ALL tests with 100 percent, and have your teacher's permission to operate it.
2. All stock must be well supported and securely clamped down.
3. Adjust the depth of cut to the thickness of the stock (material) plus 1/8 inch.
4. Make sure the power cord is clear of the blade and that your work area is clean before you start cutting.
5. Check the base and angle adjustments to be sure they are tight.
6. Always place the base of the saw on the stock you will be cutting. Make sure that the blade is not actually touching the stock before you turn it on.
7. Advance the saw blade slowly and evenly making sure that it cuts straight through the work.
8. Never put the saw down until the blade has come to a complete stop!
9. Always unplug the machine to change the blades or to make any kind of adjustments.

### Portable Circular Saw Parts

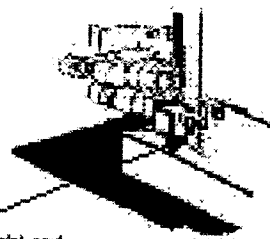
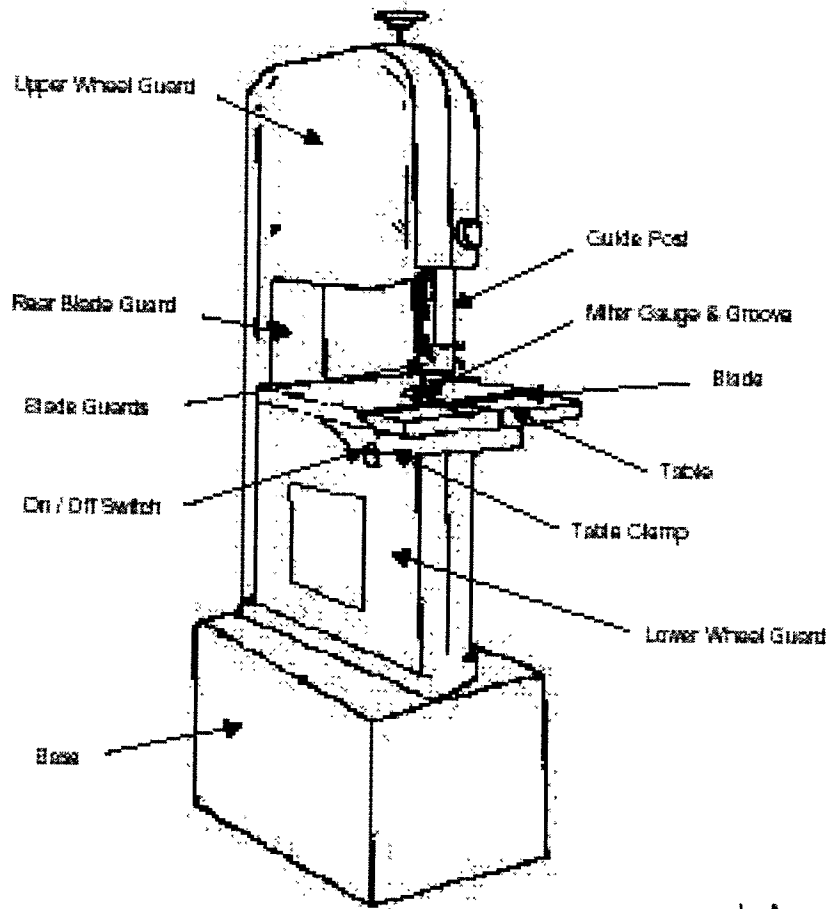


## ***Jig/Bayonet Saw Notes***

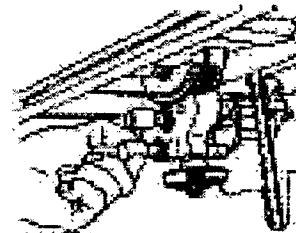
### **Requirements:**

1. As with any machine, you must wear proper eye protection, pass ALL tests with 100 percent and have your teacher's permission to operate it.
2. Select the correct blade for the stock (material) and clamp the blade down tightly in the chuck.
3. Always disconnect the saw to change blades or make adjustments of any kind.
4. Use vise or clamps to securely hold the stock (material) that you will be cutting. A C-clamp, wood clamp, or *quick grips* are the easiest ones to use.
5. Keep a constant and even cutting pressure. Do not force the blade into the work. Just like with any saw, if it's not cutting, there is a reason!
6. Do not attempt to cut curves that are so tight that the blade can be twisted and then broken.
7. Never sit this saw or any power tool down on the workbench until it has completely stopped. If you are not going to use it again immediately, you should also unplug it so that it does not get accidentally turned on before you need it again.

## Band Saw Parts



**NOTE:** Blade height and cut slight curves!



**NOTE:** Adjusting the table angle & clamping down in place.

## ***Band Saw Notes***

### **Requirements:**

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

1. Adjust the blade guard to where it is  $\frac{1}{4}$  inch above the highest part of the wood.
2. Use a push stick whenever possible and always when cutting small objects.
3. ONLY one person can use the machine at a time. Everyone should form a line and wait patiently and quietly behind the yellow line.
4. Never force your wood into the blade. Let the machine do the work.
5. If it is not working properly, turn it off and tell your teacher immediately.
6. Cut sharp curves on the scroll saw.
7. Avoid backing out of a cut. If there is no way to avoid it, then you need to turn the machine off, wait until the blade has completely stopped, and then carefully back out.
8. Your fingers should be on either side of the blade, but never in front of the blade.
9. Blades do occasionally break. If the blade breaks while you are operating it simply turn it off and send your partner to get the teacher. Never leave the machine or try to open the casing and fix it yourself.
10. Make sure that the dust collector is on and that the vent is open.
11. Round stock must be cut using the V-block to secure it. Also, never reach around the blade to remove your work.
12. Always use scrap wood to push or move scrap wood away from the blade.
13. Never leave the machine until it has come to a complete stop, then clean the table off by using a table broom, never your hands.

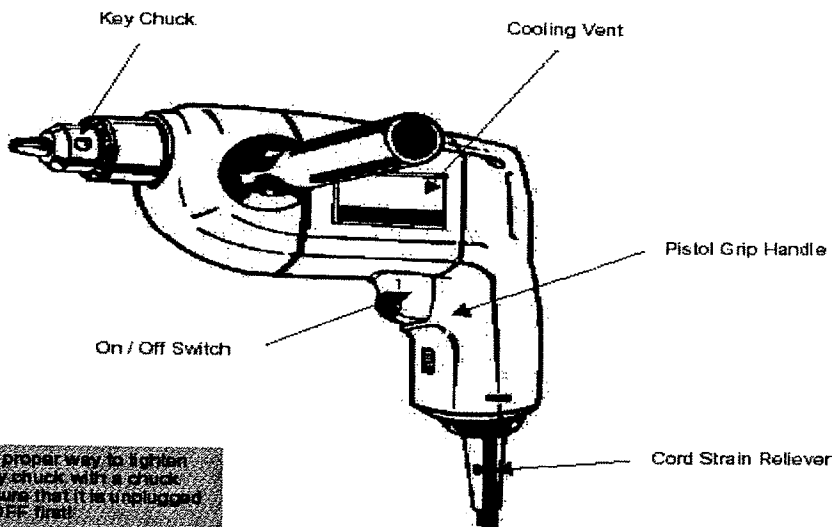
## Portable Drill Notes

### Requirements:

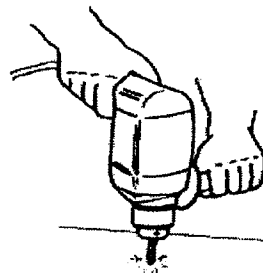
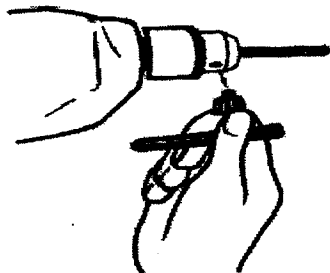
Proper eye protection must be worn—operate only with instructor's permission and after proper instructions have been received.

1. Select the correct drill bit just like you would for the drill press.
2. Secure a piece of scrap wood and the good wood to the table so that it will not move around while drilling.
3. Make sure that the switch is OFF, the chuck key is removed, and that your work area is clean and dry BEFORE you plug the drill in and turn it ON!
4. Drill with a straight, even, and steady pressure.
5. When drilling deep holes, withdraw the drill bit several times to clear the area. This helps to provide a SAFE and even drilling process.
6. As with any machine, DO NOT PANIC if something "goes wrong." Turn it OFF, unplug it, and tell a teacher.

### Portable Drill Parts



**NOTE:** The proper way to tighten down the key chuck with a chuck key. Make sure that it is plugged and turned OFF first!



**NOTE:** The correct and SAFE way to drill.

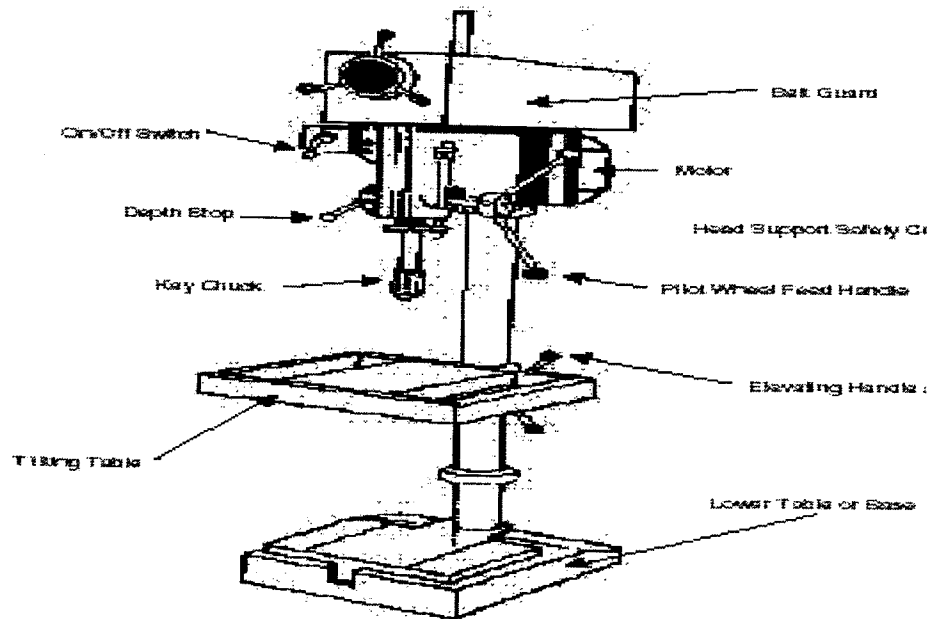
## Drill Press Notes

### Requirements:

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

1. Always use a piece of scrap wood and set the table or stop to keep from drilling into the tabletop.
2. Use a clamp or vise grips to secure/fasten your wood to the table.
3. Make sure that your scrap wood, good wood, and any clamp you are using are the ONLY objects on the table. Other objects can get caught in the machine and cause injuries.
4. Use a "V-block" clamp for CO<sub>2</sub> cars or round or irregular-shaped stock.
5. Select the right size and type of bit. Wood bits for wood, metal bits for metal.
6. Use a center punch for a guide whenever possible. Always use a center punch when drilling into metal or hard woods.
7. Do not panic if the bit gets stuck in the wood. Turn the machine off. When it has completely stopped, remove the bit from your wood.
8. Select the correct drilling speed. For metal or hard woods and large drill bits you should use a slower speed.
9. Always remove the chips from the table after the machine is turned off and is no longer moving. Use a table brush, never your hands.
10. As with any machine, if it is not working properly you should always turn it off, unplug it, and tell a teacher.

### Drill Press Parts



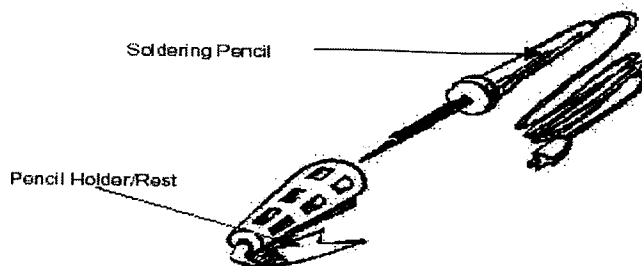
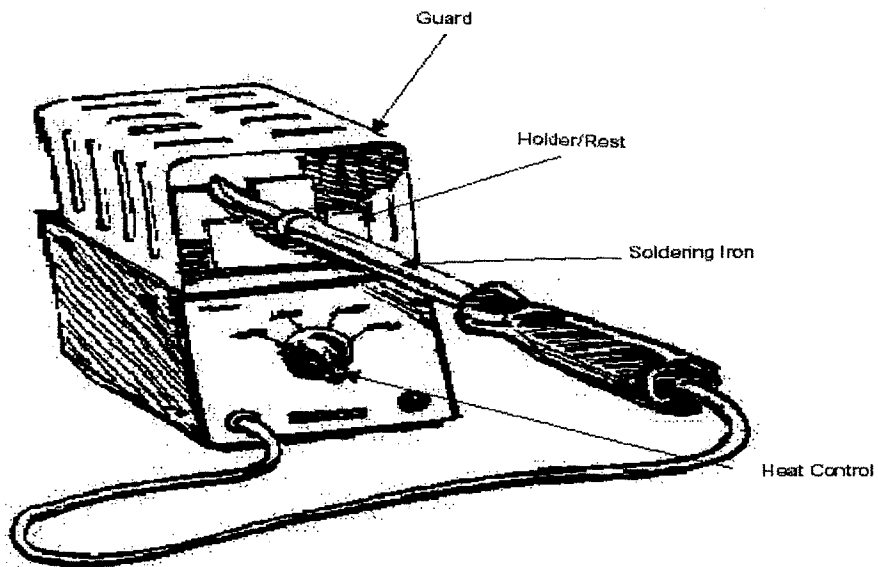
## Soldering Station Pencil Notes

### 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



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