



# Robot Garden

## Wood Shop Safety and Basic Usage – 1

### Equipment

- Hand Tools
- Hand Saw
- Drill Press
- Table Saw
- Table Grinder
- Band Saw

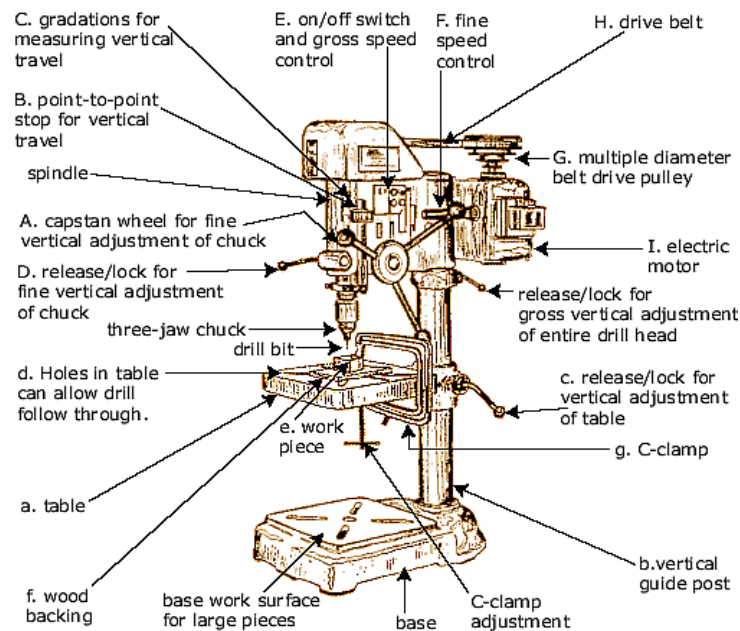
This SBU is designed to orient you with the equipment, safety procedures, etiquette and common use modes for operating Robot Garden's shop tools. Safety is your responsibility, please be aware of your surroundings.

The safest way to do work is to do work that is well thought out and planned prior to cutting, drilling, sanding or other shop related operations.

### Smart points to working safely:

- Visualize the work you plan to do.
- Think about the equipment.
  - Consider possible points of caution for the equipment.
  - What is needed to operate the tool safely?
  - Can you do the job alone or do you need a helper?
- Inform other members in the shop area of the work you are about to do.
- Ensure that there are not more than the allowed number of people in the shop area prior to the start of your work.
- Check to ensure that you are familiar with the safety equipment, first aid kit, fire extinguisher.
- Make sure you have
  - Safety glasses
  - Ear plugs
  - gloves if needed
- Tie up loose clothes and long hair.
- Be mindful and TAKE YOUR TIME.
- You absolutely must sign the waiver and be on the Cleared Usage list prior to using any of the equipment in the shop area.

## Drill Press Safety Instructions



1. Secure all work with a vise, C-clamp, or V-block whenever possible. Be certain that table and drill press head are secure.
2. Always wear safety glasses upon entering the lab situations.
3. Remove watches, rings, or neckties before operating the drill press. Roll up long sleeves, remove jackets before operating the drill press.
4. Do not wear any type of glove while operating the drill press.
5. Stand balanced and do not lean too close to the drill press or you may catch your clothes or hair in the rotating parts.
6. Be sure that the taper drill shank or the chuck arbor is firmly seating in the drill spindle. A falling drill or chuck may cause injury.
7. Never leave a chuck key in the chuck socket. If the power is turned on, the key will be thrown out and may injure someone.
8. Operate feed handle to see that drill cuts evenly into the work. Be sure the drill does not pass through stock into the vise or table.
9. Select the proper drill and make certain that it is sharp. Preset depth of cut adjustments before turning on the power.
10. Adjust the drill press to the correct speed. A drill turning too fast may break and flying pieces may strike you. For safer drilling, use slower speeds for larger holes and faster speeds for smaller holes.
11. Always clamp work securely. Never try to hold work in your hands while drilling. The drill may catch, jerking the work out of your hands and you may be struck by the flying piece.
12. Never try to STOP a revolving piece of work that is caught in the drill by grabbing it. Remain calm

and shut off the machine.

13. Ease the pressure on the feed as the drill breaks through the under-side of the work being drilled. This will keep the drill from breaking or the work from being jerked out of the vise. When the hole is drilled, back out of the cut and stop the machine.

14. Check the machine over carefully to determine its condition using it. Someone could have left it broken or out of adjustment.

15. Always use a brush to remove chips or shavings and keep the floor area around the drill press clean. Never try to remove loose metal shavings with your hand.

16. Never touch the rotating chuck or drill as this may cause a serious injury.

17. When finished with the drill press, return it to a clean and normal setup by removing bits, shavings and fixtures.

### **Start with a Risk Assessment to ensure a safe work area:**

1. A two foot perimeter around the drill press should be kept clear of people, debris and sawdust that impair traction or footing to avoid slips and falls.
2. Safety glasses with side shields or a face shield must be worn. Hearing protection should be worn.
3. Remove loose fitting clothing, jewelry, and tie back long hair.
4. Give the work your undivided attention.
5. Do not wear gloves or anything that would allow a hand, fingers or clothing to be wrapped around the revolving bit.

### **Operational Safety Rules:**

1. Approach your work in the shop and on the drill press with a safe attitude!
2. Make all drill press adjustments with the power shut off.
3. Keep all guards and covers on the machine when it is on and running.
4. Make sure the size of the bit is equal to or less than the capacity of the drill press.
5. Do not exceed the recommended speeds for the type and size of drill bit being used or composition of the stock being drilled.
6. Center punch the drill-hole location into the stock.
7. Insert bit into drill chuck and tighten with the chuck key. Remove chuck key from the drill chuck before starting the drill press.
8. Use a clamp or vise to securely fasten the stock to the drill press table. Never attempt to hand-hold stock while drilling.
9. Drill into cylindrical stock using a "V" block.
10. Long stock should be drilled with the excess to the left of the operator. If the stock rotates it

will hit the post, not the operator.

11. Support the underside of the stock to be drilled with a backer board secured to the drill press table.
12. Never start the machine without the table clear of everything except the stock you are drilling.
13. Keep hands and fingers at least 3” from rotating drill bits.
14. When drilling deep holes, frequently raise the drill bit from the hole to remove cuttings and cool the bit.
15. When you begin to break through the underneath side of the stock, ease up on the feed as to not tear the wood from the underneath side.
16. If a drill bit binds, turn off the drill press and carefully turn drill chuck backwards by hand to free the drill bit.
17. Never reach around or under a rotating drill bit or grab the chuck to stop a drill press. This can result in hand puncture or other serious injury.
18. Turn the drill press off before looking up or walking away from the machine.
19. Never stop the rotation of the drill chuck, spindle, or stock rotating on bit with your hands or fingers.
20. Don't touch the drill bit and shavings since they are hot immediately after drilling.
21. Always clean the drill press table and work area upon completion of the drilling task. Do not use your hands or blow the drill shavings, use a bench brush.

## Table Saw Safety Tips

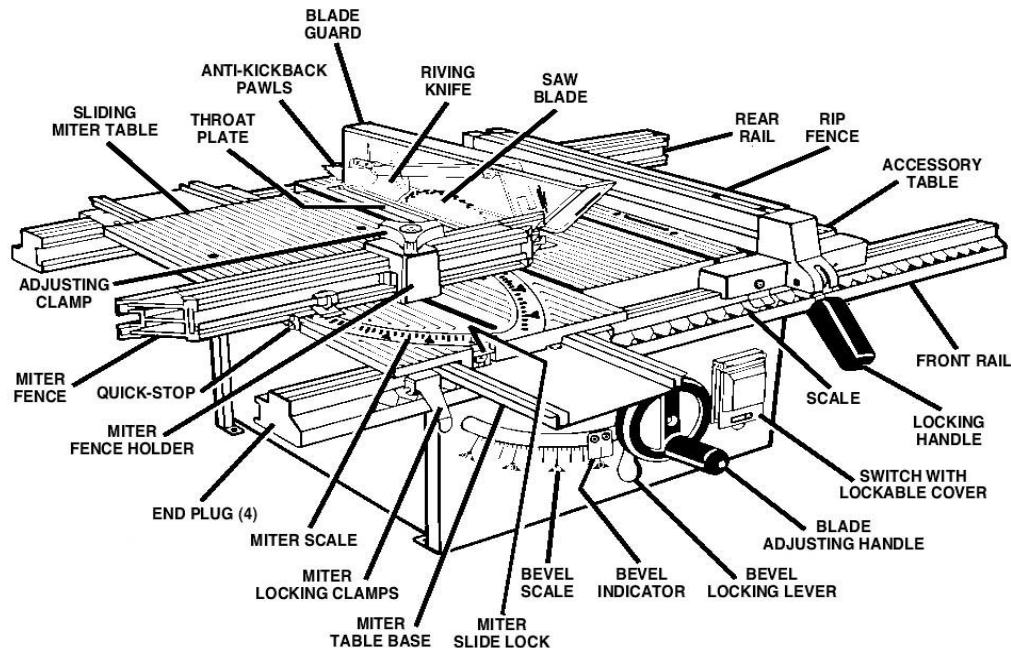


Table saw safety is extremely important to woodworkers because most woodworkers who use power tools use table saws as their main shop tool. Add to that the power of the saws and the dangers it presents, and we quickly understand that lots of personal damage is possible. The table saw has been in use for many, many years, so most of the problems possible can be easily foreseen and avoided. The double dozen below should help you avoid most, if not all, problems.

### Table Saw Safety Rules:

1. Do not wear gloves while operating a table saw. There are several reasons, but loss of tactile sense is probably foremost, while a possible loss of gripping power is also close to the top. And some kinds of gloves are loose enough to present an item for the rotating blade to grab.
2. Keep the floor in front of the saw free of cut-offs and piled up sawdust. Tripping or sliding into a running, or even stopped, saw blade can really create problems, but even slipping and banging your head against the cast iron table can bring on a bad injury.
3. Wear proper eye and hearing protection. Eyes need to be protected from damage by projectiles--and no, standard eyeglasses will not do the job. Hearing protection is something every woodworker should start with, and continue. Hearing loss creeps up on you without warning, and often without symptoms, until it's too late to reverse the procedure.
4. Wear short sleeves, leave the ties at the office, and junk your dangling jewelry. Get rid of other loose fitting clothing while operating a table saw. Any of these items might get caught in the blade and yank you into it before you can react. Stand comfortably, with your feet far enough apart for good balance. This is always important, but more so when you're cutting stock long enough to require several steps towards the saw to keep the feed going. Then, you build up momentum and want to be able to stop easily. Wear footwear with non-slip soles.

5. Stand comfortably, with your feet far enough apart for good balance. This is always important, but more so when you're cutting stock long enough to require several steps towards the saw to keep the feed going. Then, you build up momentum and want to be able to stop easily. Wear footwear with non-slip soles.
6. Avoid any awkward operations. If you feel like a gawky fool doing a cut, then don't do the cut in that manner. This helps you avoid losing your balance and possibly falling into the blade or table.
7. Use a push stick to cut stock that is 6" or less in width. A hand that isn't close to a blade isn't going to get cut. Generally, a 6" minimum distance to the blade is considered safe, though some recommend 4".
8. Use a stop block when you crosscut short lengths. Mount a stop block on the fence--this can be as simple as a clamped on board that stops just before the saw blade, so that cut-off pieces cannot bind between blade and fence.
9. Position your body so that it is NOT in line with the blade. This keeps sawdust feeding back through the slot of the blade out of your face, and much more important, it keeps you out of the line of most kick-backs.
10. Never reach behind or over the blade unless it has stopped turning. Sometimes this looks safe. It almost never truly is. This does not mean you should stop pushing your work before it finishes passing through the blade, itself an invitation to kick back.
11. Always disconnect the power before changing the blade or performing any other maintenance operation. I like to drape the plug over my fence rail so I know in an instant the saw's unplugged...or not.
12. Make sure that the blade has stopped turning before you adjust the table saw. The reasons are obvious. Making adjustments can get hands too close to the blade, and even a slowly spinning blade has a multitude of sharp edges that can do damage. Always make sure that the blade is turning free before you turn on the power: this is especially helpful after you make changes or adjustments. In other words, spin the blade without power a time or two to make sure there are no scraps or tools touching it.
13. Keep the tabletop smooth and polished. A dirty or rough table requires you to use more force to push the stock through the blade. It may also rust like crazy, further reducing the saw's effectiveness.
14. Keep the rip fence parallel to the blade so stock doesn't bind on the blade and kick back. Some woodworkers prefer to keep the rear of the fence kicked out (away from the blade) by 1/64".
15. Use zero clearance inserts. These reduce the chance of slender cuts dropping into the lower part of the blade and making the round trip to speed by your head. They also reduce splintering in cuts.
16. Never operate a table saw with the throat insert removed. Wood that is fed into a gaping hole can drop down and get caught on the blade. That can't happen if the throat insert is in place.
17. Do not make free-hand cuts on a table saw. Guide the stock through the blade using the rip fence or the miter gauge.
18. Keep the blade guards, splitters and anti-kickback fingers in place and operating freely. Check the

action of these items before starting work.

19. Work should be released only when it is past the blade. Releasing work too early is an invitation to kickback as it is possible for the blade to grab the part that has not yet gone by.

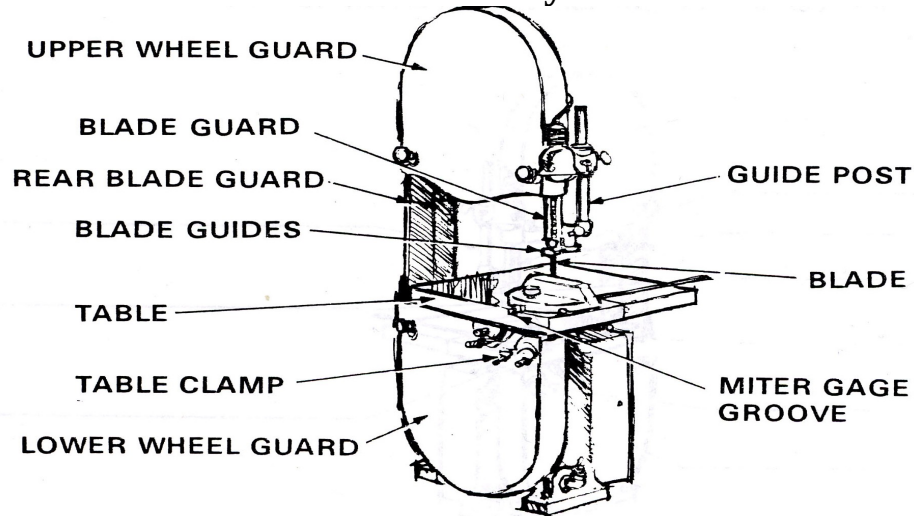
20. Whenever the stock is lifted or tilted above the surface of the table, the saw is able to shake the stock. If this happens, and you lose your grip, duck down and hit the stop button because losing your grip on the work means it probably is going to come back at you.

21. Check stock before cutting. Look for nails, knots, screws, or stones. Such fun items may become projectiles. If they hit, they smart, and may cause serious injury as well. Also, damage to carbide tipped blades can be major, even if all it does is scare you.

22. The fence and the miter gauge are not meant to be used together. Under some circumstances, you can use both (see above on stop blocks), but the fence then needs an auxiliary fence added. That fence or stop must end just before the saw blade.

23. Don't mess with the fence adjustment when the saw is running. And a general addition, which goes for all tools and all techniques in a wood shop: if a procedure feels unsafe, it probably is, so don't use it. Find another way to do what has to be done.

## Band Saw Safety Rules



The Band Saw has a thin vertical blade that allows cutting curves, re-sawing, and large depth cuts on thick material. To avoid accidents, the following operational safety rules must be observed by everyone working on the KCWG Band Saw. Failure to follow the safety rules will result in a loss of shop privileges.

### **Band Saw Safety Rules:**

1. Follow the 3" rule from the blade; always keep fingers 3" from the blade.
2. Check the blade tension and tracking before starting.
3. Don't cut stock that is not flat on the bottom without a jig.
4. Keep a balanced stance at the band saw.
5. Never clear small pieces while the blade is moving.
6. Never use your thumbs to push toward the blade.
7. Never back out of a curve cut while the machine is running.

### **Start with a Risk Assessment to ensure a safe work area:**

1. A two foot perimeter around the saw should be kept clear of people, debris and sawdust that impair traction or footing to avoid slips and falls.
2. Safety glasses with side shields or a face shield must be worn. Hearing protection should be worn.
3. Remove loose fitting clothing, jewelry, and tie back long hair.
4. Give the work your undivided attention.

### **Operational Safety Rules:**

1. Approach your work in the shop and on the band saw with a safe attitude!
2. The teeth of the band saw blade should point down toward the table.
3. The blade should be 1/32" from the rear roller bearing behind the blade.



4. The blade alignment tracking should be at the center of the wheels.
5. Make sure that the upper and lower wheel guard doors are closed when running.
6. Keep the blade guard & guide only 1/4" above your stock.
7. Keep bystanders away from the right hand area of the saw. Broken blades have a tendency to fly out to the right.
8. Always keep your fingers and hands away from the path of the blade.
9. To control the stock, use push sticks, feather boards, or any other safety device when cutting small or short stock.
10. Use a "V" block when cutting cylindrical stock.
11. Cut at a moderate feed rate into the blade. Do not force a cut.
12. Cut relief cuts prior to cutting long or tight curves. The relief cuts will free the blade of the tension of the tight curve and the wood will fall away. The blade size will dictate the radius of the cut.
13. If you need to back out of a cut, shut the machine off, after blade stops, and then back out.
14. If a blade breaks, shut the machine off and stand clear until everything stops.
15. If the work is too large for one person to handle, get help holding the stock.
16. When cutting with the table at an angle, clamp a block to the table to prevent your stock from slipping off the table.
17. Always disconnect the power before changing the blade or performing any other maintenance operation.
18. Turn off the band saw and wait until comes to a complete stop. Never stick an object into the blade to stop the machine quicker. Let it stop on its own.

- Content from the guidelines set by the Kansas City Wood Worker's Guild.