General Safety Rules and Guidelines

1. Wear APPROPRIATE CLOTHING
   a. No loose clothing
   b. Students must wear CLOSED TOE SHOES
   c. Long Hair Must be tied Back

2. Safety Glasses are Mandatory

3. DO NOT work alone in the workshop area. A member of the maker space must be present with you at all times.

4. You must be wide awake and alert. Never operate a machine if you are ill or tired.

5. Think Through the operation you are going to do before you do it. Know what the machine will do before you do it.
   a. Do not RUSH your planning process, It’s better to do it right the first time.

6. Keep area clear and tidy to ensure you don’t trip on any parts or break any parts.

7. Always allow the machine to reach full operating speed before attempting to feed the object.

8. MAINTAIN the MARGIN OF SAFETY specified for the machine. This is the minimum distance your hands should be from the blade or cutting tool during operation. Always use a push stick (ask supervisor on hand) when pushing parts close to the blade.

9. Always SHUT OFF the machine after use even if you are returning to the machine.

SAFETY GLASSES ARE MANDATORY TO USE ANY OF THE FOLLOWING MACHINES
Band Saw

Safety Warnings

- Safety Goggles are Mandatory!
- No Loose clothing. Keep Hands and Fingers away from Blade.
- DO not try and change the blade without permission
- Use the correct approved bandsaw blade.

Using the Bandsaw

- Please use push stick or have a supervisor help you if you are uncomfortable with using the bandsaw.
- To adjust bandsaw blade height perform the following (according to picture):
  - Loosen yellow knob at back of machine perpendicular to the adjustment knob (locking knob)
  - Use adjustment knob to move to desired height
  - Tighten the rear locking knob
Mini & Full-sized Drill Press

Safety Warnings

1. Wear Safety Glasses and a dust mask when using this tool
2. Feed the bit smoothly into the work piece. When the hole gets deeper, withdraw the bit frequently to clear shavings and cool the bit.
3. Ensure the bit is centered in the spindle before inserting into work piece.
4. Make sure chuck is tightened, and the key is not still in the chuck when you turn the drill press on.
5. Use a brush to remove cuttings
6. Always shut off power before removing drill bit
7. DO NOT set speeds or adjustments until drill has completely stopped
8. DO NOT leave the drill press running unattended
Belt & Disc Sander

Safety Warnings

1. Wear Safety Glasses and a dust mask when using this tool
2. DO not use the belt sander if the piece of work can be done on another tool (ask supervisor for advice)
3. ALWAYS use a PAD or PUSH BLOCK when sanding thin pieces on the belt sander
4. Keep hands clear of sanding area
5. Before using belt sander, ensure that the belt is tracking properly (this means that the belt is not slipping to one side). If it is, ask a supervisor to adjust the belt for you.
6. Dress appropriately while using this tool. Do not wear loose clothing or jewellery. Keep hair tie back to avoid getting it caught on the motor.
7. Make sure work area is clear before using this machine.
8. WARNING! Make sure the work area is clear of any flammable materials, liquids, or gases, because the tool can generate sparks leading to FIRE.
9. Sand on the side of the DOWNSIDE disc to avoid kick back or torqueing or your object. (direction of disc is indicated on the machine)
10. DO NOT TOUCH tracking knob. Ask your supervisor, if belt is moving irregularly.
11. USE only clean wood (wood without glue), as adhesives will ruin the belt.
Belt and disc sander schematic

Bench Grinder
Safety Warnings

1. Wear Safety Glasses and a dust mask when using this tool
2. Only use metal on the bench grinder
3. DO not use the bench grinder if the piece of work can be done on another tool (ask supervisor for advice)
4. ALWAYS use a PAD or PUSH BLOCK when sanding thin pieces on the belt sander
5. Keep hands clear of grind wheel
6. Before using bench grinder, ensure that the grinder wheel is well in place. If not, ask a lab supervisor for assistance
7. Dress appropriately while using this tool. Do not wear loose clothing or jewellery. Keep hair tie back to avoid getting it caught on the motor.
8. Make sure work area is clear before using this machine.
9. WARNING! Make sure the work area is clear of any flammable materials, liquids, or gases, because the tool can generate sparks leading to FIRE.
10. DO NOT grind on the side of the wheel.
11. DO NOT apply abrupt pressure, use a gradual approach.
12. DO NOT wear any type of gloves as they can get easily get caught in the wheel system.

Miter Saw
Safety Warnings

1. Wear Safety Glasses and a dust mask when using this tool
2. Only use wood on the Miter Saw
3. Keep one hand on the trigger switch and handle and use the other hand to hold the material tightly against the fence
4. Keep hands out of the path of the blade
5. Ensure guards are tightly secure prior to plugging in the miter saw
6. Allow blade to reach full speed before cutting
7. DO NOT cut pieces smaller than 20 cm (8in)
8. DO NOT cut free-hand, material should lie solidly on the table against the fence
9. DO NOT reach behind or around the saw blade
10. DO NOT leave the saw until it has stopped completely
11. DO NOT lift the saw while it is still spinning

Chop Saw

Safety Warnings

1. Wear Safety Glasses when using this tool
2. Only use metal on the chop saw
3. Use the built-in clamp to hold the metal down firmly without having to use your hands to do so
4. Keep hands out of the path of the blade
5. Allow blade to reach full speed before cutting
6. Make sure the work area is clear of any flammable materials, liquids, or gases, because the tool can generate sparks leading to FIRE.
7. DO NOT cut pieces smaller than 20 cm (8in)
8. DO NOT reach behind or around the saw blade
9. DO NOT leave the saw until it has stopped completely
10. DO NOT lift the saw while it is still spinning
Power Drills

Safety Warnings
1. Wear Safety glasses when using electric drills
2. The material to be drilled must be clamped securely so it cannot be moved during operation.
   **TAKE THE TIME TO PLAN AND SET UP SAFELY**
3. Create a pilot hole before drilling large holes.
4. Hold the drill with two hands while removing material.

Dremel (Rotary Tool)

Tool Features
Safety Warnings

1. Wear Safety glasses
2. Use clamps or another practical means to secure and support the workpiece to a stable platform
3. Do not force the tool. Use the correct tool for the application.
4. Always wear safety goggles.
4. Never lay the workpiece on a hard surface such as concrete, stone. Etc. the protruding cut may cause the tool to jump.
5. Dress appropriately. Avoid wearing loose clothing or jewellery, and keep long hair tied back.
6. Ensure the rotary tool is off before plugging in.
7. Never touch the bit during or immediately after use. The bit may be too hot to touch by bare skin.
8. Never operate the flexible shaft with a bend radius of less than 6”. A shorter bend radius will damage the flexible shaft and the motor of the tool.
9. Never hold the tool with one hand and the work piece in the other. Always clamp the material to a solid table or vise and guide the tool with both hands.
10. Warning!! Use the right sized collet and tool. Using a collet that is too large for the accessory will result in the possibility of the accessory being thrown from the tool, which could cause serious injury.

Switching Collets on the Dremel Tool

1. Wear Safety glasses
2. Ensure that when switching collets, the tool matches the collet size.
3. Turn the switch to the OFF position and remove the plug from the power
4. Depress the spindle lock button (1) and slowly turn the collet nut (2) until the spindle lock button locks the spindle (4).
5. Remove the collet(3), insert the replacement collet into the spindle and replace the collet nut by turning it clockwise while holding the spindle lock button. (note: do not tighten the collet without an accessory installed. Doing so will damage the collet)
Portable Router

Safety Warnings

1. Always wear safety glasses when using this tool. As well as Ear protection.
2. Be sure that the material is securely clamped to a bench and will remain stationary during the routing operation.
3. The bit must be securely mounted in the chuck to a depth of at least a ½ in. the base must be tight.
4. Plug the cord into a grounded outlet and make sure that it will not become tangled during operation.
5. Hold the router with both hands and feed it smoothly down or through the cut in the correct direction.
6. Do Not lift the machine from the work table until the motor has stopped
7. ALWAYS unplug the cord when changing bits or making major adjustments.
Router schematic

Router Usage
See manual or supervisor for detailed training on how to use the router

Angle Grinder

Safety Warnings

1. Always wear safety glasses when using this equipment
2. Use BOTH hands when operating the angle grinder
3. Remember to remove any adjusting keys or wrenches before turning on the angle grinder.
4. Unplug the angle grinder while changing the disc.
5. DRESS APPROPRIATELY. Do not wear any loose clothing or jewellery while operating angle grinder, and keep all hair and clothing away from moving parts.
6. DO NOT operate angle grinder near flammable materials. It will generate sparks which may cause FIRE
7. When working with a grinder your part should be fastened to a solid object such as a vise or something similar in rigidity. This will ensure the part you are cutting off does not shoot off into an unwanted direction.
8. Ensure the Disc has stopped moving before setting the grinder down
9. Use the correct disc while grinding an object (ask supervisor if you need help)
10. ASK if you are unsure!!!

**Switching discs on the angle grinder**
Take extreme care while switching discs on the angle grinder, as the disc may fly out if not properly fastened.

1. Press the spindle-lock button (6) in order to prevent the spindle from moving.
2. While pressing the outer flange (5) by turning it counter-clockwise using the wrench
3. Remove the threaded outer flange.
4. Remove grinding wheel and place new wheel into spindle.
5. Thread outer flange back onto spindle while pressing the spindle lock button (yellow), and tighten using wrench.
6. If you are unsure if you have done this correctly please ask a supervisor for help.

**Using the angle grinder**
PLEASE SEE a SUPERVISOR IF ATTEMPTING TO USE THIS TOOL – IT can cause severe INJURY if used incorrectly

1. Wear Safety glasses
2. Angle grinders are primarily for metals (aluminum, steel, copper), do not attempt to cut wood with an angle grinder.
3. Make sure you are holding the angle grinder with two hands at all times during operation.
4. **WARNING!** The starting torque from the angle grinder creates a sudden jerk (anticipate this)
5. Always make sure the exposed part of the disc is pointing away from the operator
6. DO NOT turn off the grinder while the disc is in contact with the workpiece.
7. Turn On angle grinder (there is a lock button and an on button, become familiar with this)
8. Always cut your workpiece at an angle, or the angle grinder will kick back.
9. The optimal and safe cutting angle is 10 to 15 degrees to the workpiece. Please see diagram below.
10. Be prepared to see a stream of sparks when you make contact with the workpiece

11. When attempting to cut or grind a piece of material, do not attempt to force the grinder into the workpiece. It requires light, but steady pressure as the tool is able to apply adequate pressure with its weight.

![Correct Cutting angle](image)

**Figure 1: Correct Cutting angle**

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**Jigsaw**

![Jigsaw](image)

**Safety Warnings**

1. Always Wear Safety Glasses when operating a jigsaw
2. Ensure that the blade is not touching the work piece before turning it on.
3. Let blade reach full oscillating speed before attempting to move into the workpiece.
4. Keep your body to one side of the blade, and never in-line with the blade.
5. DO not touch the saw blade after use. It will be hot.
6. Do not reach underneath the work surface while using a jigsaw to avoid risk of injury with blade.
7. Protect your hearing while using this power tool and ear protection

Using the Jigsaw

1. In general, use slower speeds for harder denser materials and faster speeds for softer material.
2. ALWAYS CLAMP your workpiece before cutting it with a jigsaw. Failure to clamp your workpiece will result in the work piece kicking back or thrown towards you.
3. NEVER change speeds while cutting a work piece, always take the jigsaw out of your workpiece, wait for it to stop and then change the speed.
4. To turn the jigsaw on, press the yellow button underneath the handle.
5. To engage the power on lock (to keep jigsaw running without having to press the button), depress the yellow button next to the power on button. The jigsaw should engage continuous cutting mode, and can be disengage by pressing the main trigger switch.

Jigsaw Features

Orbital action
- On the left side of the jigsaw is a control lever for the jigsaw’s orbital action feature. Leave this feature on 0, and ask a supervisor if you want to change this setting.
  - Position 0 – produces normal up and down blade motion (no orbital action)
  - Position 1 – produces Moderate orbital action (less aggressive)
  - Position 2 – Produces maximum orbital action (more aggressive)
- This feature moves the blade in a circular fashion towards and away from the workpiece in addition to its up and down motion.
**Bevel Cuts**

- Be sure to make sure the jigsaw is unplugged before using this feature.
- The jigsaw can be adjusted to make bevel cuts by loosening the two hex bolts on the bottom of the jigsaw.
- Rotate the jigsaw to the desired 45 degree slot left or right, and refasten the bolts (ensuring they are as tight as possible)

**Circular Saw**

**Safety Warnings**

1. Always Wear Safety Glasses when operating a circular saw
2. Ensure that the blade is not touching the work piece before turning it on.
3. Let blade reach full oscillating speed before attempting to move into the workpiece.
4. Check that the retracting lower blade guard has returned to its starting position before laying down the saw
5. Disconnect power supply before adjusting or changing the blade
6. Do not reach underneath the work surface while using a circular saw to avoid risk of injury with blade.
7. Protect your hearing while using this power tool and ear protection

Using the circular saw

1. In general, use slower speeds for harder denser materials and faster speeds for softer material.
2. Use two hands to operate the saw (One on a trigger switch, the other on a front knob handle)
3. ALWAYS CLAMP your workpiece before cutting it with a power tool.
4. NEVER change speeds while cutting a work piece, always take the circular saw out of your workpiece, wait for it to stop and then change the speed.

Adhesives

White Glue
- Use with wood, cardboard, paper, cloth (organic porous materials).
- Not effective with glass, metals, plastic.
- Clamping time of 30 minutes’ minimum, maximum strength 24 hours.
- Non-toxic good shelf life.
- Water resistant but not water proof, softens with heat.

Carpenters Glue
- Yellow in colour.
- Will not clog sandpaper.
- Water resistant but not water proof, softens with heat.
- Shorter shelf life than white glue.

Glue Stick with Glue gun – CAUTION melts at high temperatures, can causes severe burns.
- Apply to one surface and immediately contact to another surface.
- Press together for 60 seconds or clamp for a short period of time.
- Water resistant but not water proof, softens with heat.