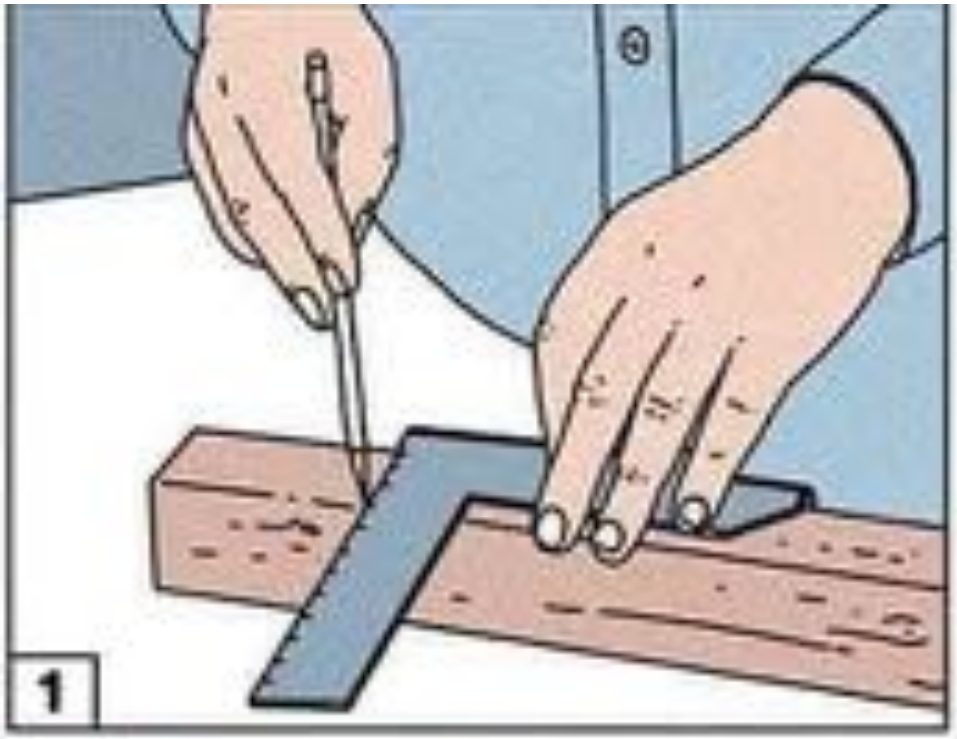
Shop Safety

Machine safety and proper tool use supplemental study guide

This Power Point is not a substitute for in class learning and teacher demonstrations. Missed demos will be made up on your own time WHEN it is convenient for the teacher

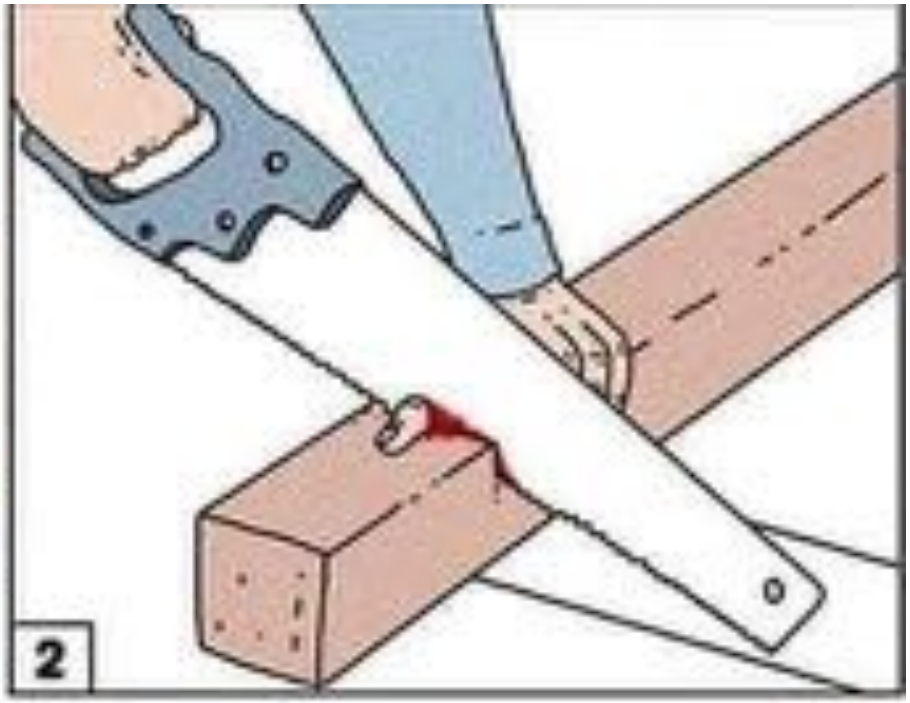
Mr. Holbrook – Engineering and Metalworking/Jewelry

Bold Words are **PROBABLY** on the safety test…



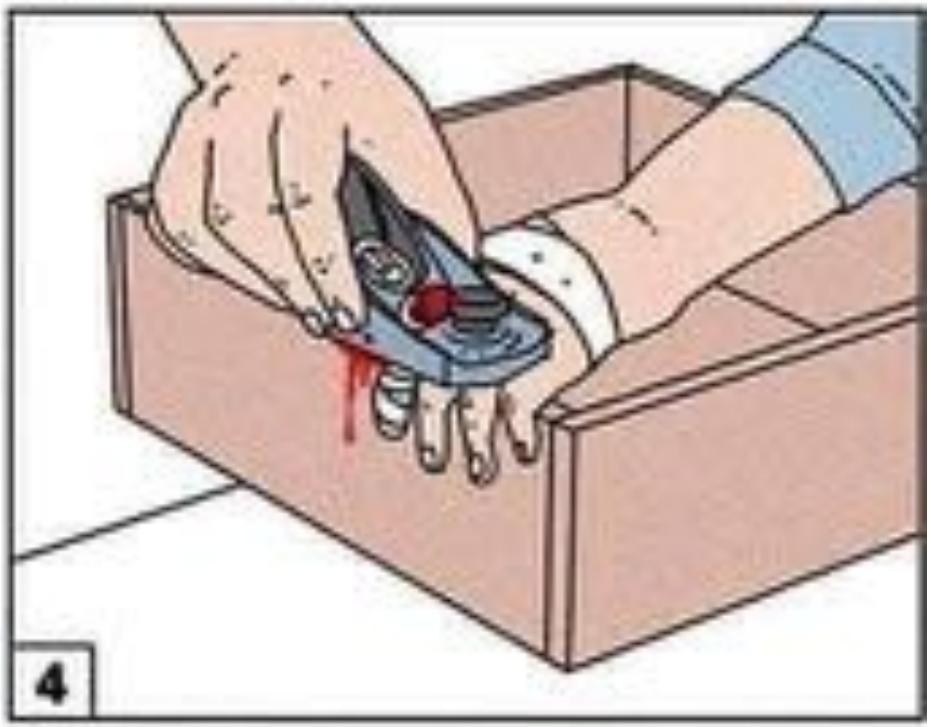
- Goal: Don’t injure yourself while working

- 1. Good: using the correct tools to draw a straight line

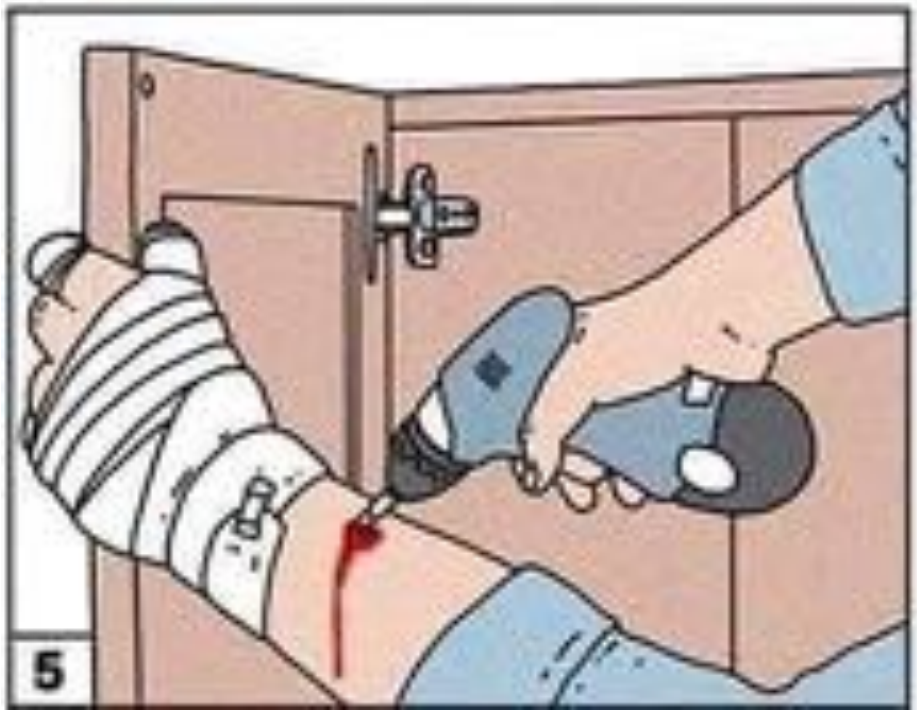


- Goal: Don’t injure yourself while working
- 2. Good: Stabilizing your material by holding in place and not cutting into the table
  - Bad: Thumb got in the way
  - Could have used a clamp to hold the material to the table

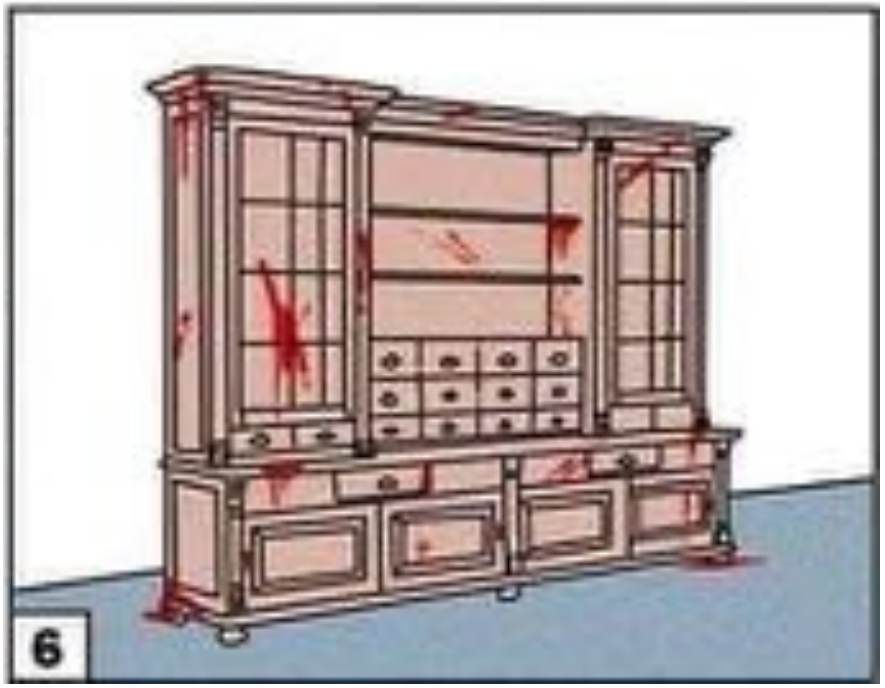
- Goal: Don’t injure yourself while working
- 3. Good: Using the correct tools and fasteners to nail 2 boards together
    - Bad: Finger should be moved out of the way once the nail has been started



- Goal: Don’t injure yourself while working
- 4. Good: holding the jack plane correctly
- Good: Previous injury bandaged up
- Bad: jack planning your hand instead of the drawer/box. Starting to run out of bandages



- Goal: Don’t injure yourself while working
- 5. Good: Using the correct bit driver to attach hinges to cabinet
- Good: They seem to have found more bandages
- Bad: Blood loss seems to continue impairing judgement. There was no screw where the person aimed the drill. Unable to tell if the drill was set to forward or reverse.
- Good: The tool seems to be in good working order



- Goal: Don’t injure yourself while working
- 6. Good: Cabinet appears to be built and assembled
- Bad: The wood stain looks a little off
- Good/Bad? The body is nowhere to be found

What have we learned from this?

- Ask for help if unsure how to operate a tool or machine
- See the teacher right away if an injury occurs
- If you see an injury happen to someone else see the teacher right away
- Put pressure on a wound to stop any bleeding
- Stop working for the day if you are injured
- Use judgement for yourself and those around you
- Don’t shake hands with danger

General Shop Rules

- Before you use any machine in the shop you must obtain your **teachers permission**.
- **Eye protection** is mandatory at all times once a work period begins
  - If you are near someone else who is using a tool you are expected to wear your eye protection in case they mess up. Safety is up to all of us.
- Always pay **attention** to what you are doing on a machine or tool
- Do not **distract** the operator
- Tuck in **loose clothing**, remove **jewelry** and tie back **long hair**
- Unsure of a material or substance. Always **ask the teacher**!
- Reminders are given daily and we are expected to help and look out for each other at all times

Tools and Materials

- Use a **clamp** or **vice** to hold material securely so it will not slip or move
- Always take the time to get the right **tool** for the job. Using the wrong **tool** can lead to damage of the **tool**, material, or yourself!
- Heavy or long objects? Lift with your **knees** and lift with a partner when possible!
- Carry **sharp objects** with the **pointed end facing down**!
- Store flammable or combustible materials in the **FIRE PROOF CABINET**

Power Tools

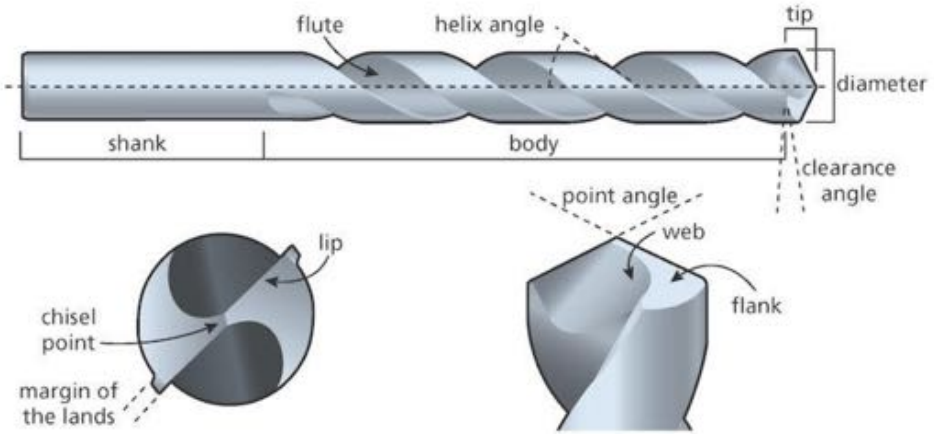
- Use only tools that are in **good working order/condition**
- Always **unplug, shutdown, turn off, lockout, isolate** a machine before doing any maintenance work. You do not want a machine or tool to turn on while your hands are near a dangerous part
- Only the **operator** is to turn on the tool or machine
- Do not walk away from a machine until it has come to a **complete/full** stop (there are some exceptions like disc sander or bench grinder)
- Make sure all the **guards** and safety devices are in place and functioning properly
- Always check the **ON/OFF button/switch** before plugging in a power tool!

Drill Press/Milling Machine

- Make sure the **Chuck Key** is clear before starting the machine
- **Clamp/Secure** down work to be drilled or hold in a **vice**
- Use **SCRAP WOOD** on the table to prevent blowout or prevent unwanted holds in the machine
- Tie **long hair** back. No **loose clothing**, **strings**, **headphones**, that could get caught in the machine. Dress appropriately for the shop if you want shop privileges.
- Center punch hard materials before you drill them. This prevents the drill bit from slipping when you start the hole.

Drill Press/Milling Machine

- The **lips/flutes** of a drill bit should not be clamped.
- Always make sure the **Shaft** of the drill bit is held securely
- Turn off, isolate, lock out the machine whenever changing drill bits to avoid injury



Dremel/Hand Drill Safety

- **Clamp/Secure** down work to be drilled or hold in a **vice**
- Only use bits that are properly **sharpened** and **tight/secure** in the chuck
- Always wear **eye protection/safety glasses/full face mask** for your eyes and wear **hearing protection** to protect your hearing

Welding Safety

- Things can burn or shock you! Wear **protective clothing/leather jacket** to protect exposed skin from welding spatter and UV rays, and wear **leather gloves** to protect your hands from burns and shock.
- **Water** is a good conductor and can cancel out the protective qualities of your clothing and gloves. Only work in a dry area.
- The light from welding is bright enough to damage your **eyes/sight** permanently.
- Wear approved welding helmet with a **#10** lens or darker for Mig/Tig/Arc welding. I go darker when I can to fully protect my eyes

Welding Safety

- Wear **eye protection** when chipping, brushing or grinding your welds. Pieces can fly off in random directions. Take care of yourself and others around you!
- Always have effective **ventilation** to clear away welding fumes/smoke
- Never weld a container that has held flammables unless it has been **steam cleaned** or was **filled with water**. Vapours or fumes from solvents, fuels or other flammable liquids can be **explosive**
- Always assume everything in the welding areas is hot so wear **leather gloves** on your hands or use **pliers/tongs** to lift or move materials

Oxy-Acetylene Torch Safety

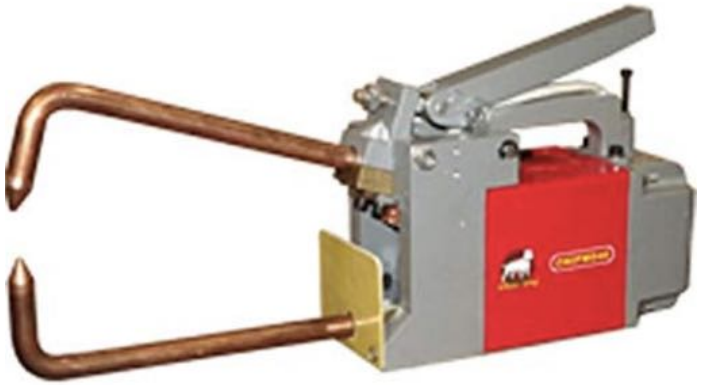
- Open cylinders slowly, **¼** (**quarter**) turn at a time
- Always wear **leather gloves**, **WELDING eye protection**, and **protective clothing**
- Ensure proper **ventilation** to clear fumes and/or smoke
- Suspect everything in the welding area to be **HOT**!
- Never weld or solder where **flammables** may be present
  - Flammables can be oil, gas, unknown liquids, or vapours.

Oxy-Acetylene Torch Safety

- Always light with a **striker/sparker**, **Acetylene** gas first
- Be conscious of where you are pointing the **torch/flame**
- **A before O or up you go**
  - **Acetylene before Oxygen when lighting the torch**
- Have your setup checked by the **teacher** before you start welding or cutting with the torch

Spot Welder

- Dress properly. Do not wear **loose clothing** or jewelry. **Pants** are required to cover the entire leg.
- **Open toed footwear** (sandles, etc) is not allowed on/near the spot welder
- Use **leather gloves** or **pliers/tongs** to hold and position the hot metal parts being spot welded.
- The **OFF** the spot welder once you are finished using it.
- Metal should be flush and without gaps before you try and weld. The electricity can arc and/or sparks can shoot in all directions across the classroom

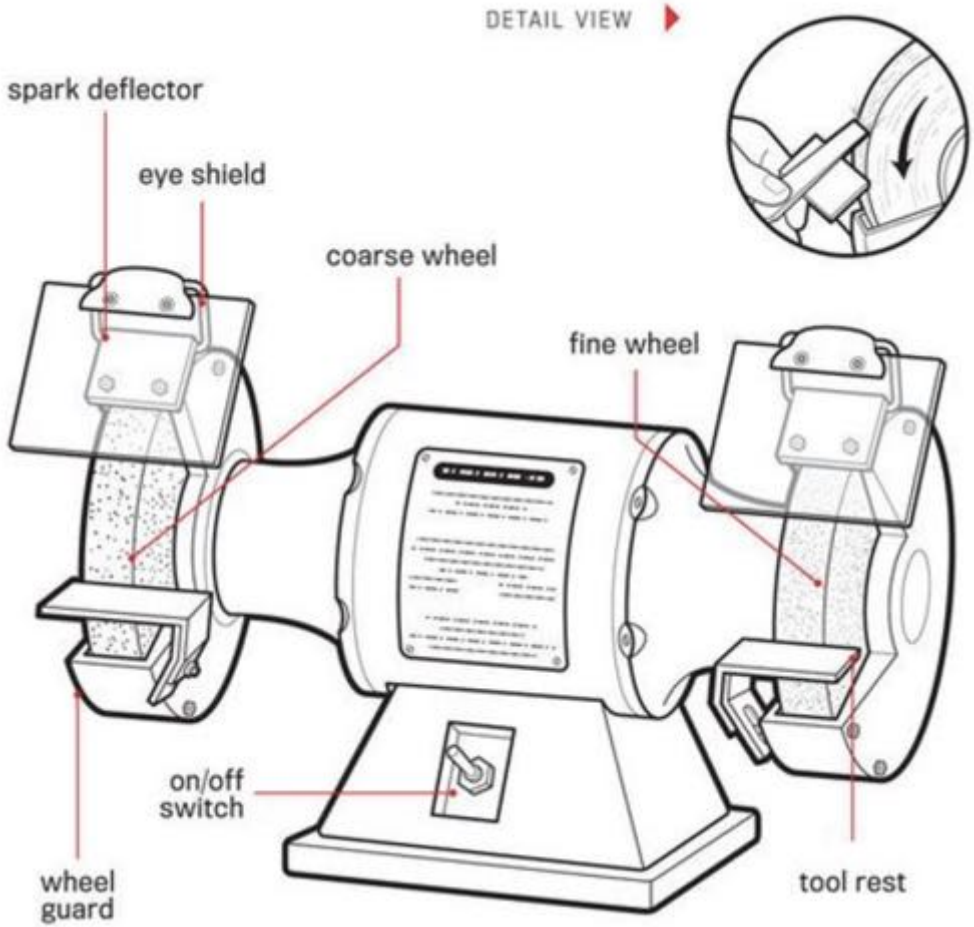


Bench Grinder Safety

- Inspect the grinder prior to use to ensure there are no **cracks/breaks** in the abrasive disc.
- Also check for what looks like melted metal in the “pores” of the disc. If a naughty person was grinding aluminum on a wheel that is meant for steel then it can cause an explosion in your face!
- Check there are no **flammables** in the area. Watch for sparks!
- Only grind on the **face/front** of the stone. Never on the side.
- Avoid grinding **small pieces**. They can easily get pulled from your hands

Bench Grinder Safety

- Do not grind either **sheet metal** or metals like **aluminum**, **brass**, **copper**. They can easily get caught or plug up the stone disc.
- Grinding generates a lot of **heat** in the metal.
- Cool your material/dunk in water regularly and take care not to burn yourself
- A **Full Face Mask**, **leather apron/jacket**, and **hearing protection** are required when using the bench grinder.
- Rest material on the tool rest and always use a firm grip



Buffer/Wire wheel safety

- The biggest danger on the buffer or wire wheel is having the wheel **Grab Your Work.** You could get pulled in!
- Hold your work against the wheel just below the **center/middle point**. If the wheel should grab it, it will **throw it down and away from you**!
- *I try to hold my material between "3-6 o'clock"*
- Be sure to wear a full face mask in case strands of wire come loose from the wire wheel.

Right angle grinder safety

- Inspect grinder to ensure no **cracks/breaks** in the abrasive/cutting disc
- Ensure the **guard** is properly in place and never remove it
- **Clamp/secure** stock before grinding it. Free hand grinding is not recommended!

Right angle grinder safety

- Avoid shooting **sparks** through the air and endangering others. If that is a challenge you get to use a hand file or toothbrush instead!
- Wear **full face mask**, **hearing protection**, and **protective clothing** to protect from burns or injuries to your ears, eyes, and body. A broken disc can be bad!

Metal Cut Off Saw Safety

- Make sure the material/stock is tightly **clamped in place** before starting your cut. If it isn't the blade will grab it and roll it around.
- Keep your **hands/fingers/body** clear of the path of the blade at all times
- Do not **Force** the cut. This could overload the machine or damage the blade.
- Never use your **hands/fingers** to clean metal chips or filings. Use a **Brush** to clean metal chips or filings
- Wear **Eye protection** and **Hearing Protection**
- Wear appropriate **gloves** when handling hot material/stock

Metal Lathe Safety

- Make sure material/stock is **Secure** and locks are **Tight** before turning on the lathe. This will prevent the material from **Spinning/Slipping** when you start to cut it
- NEVER LEAVE THE **CHUCK KEY** in the chuck
- Use the **Tailstock/Live Center** to support material that extends more than twice its diameter from the chuck.
- Tuck in or remove **loose clothing** or **objects** to prevent it from getting caught in the feed and lead screws which are right by your hips

Metal Lathe Safety

- Wear **eye protection** to protect your eyes from flying metal
- Wear appropriate **gloves** when handling stock but not when operating the lathe
- Ensure the stock/chuck has stopped **completely/fully** before attempting to handle it.

Foundry/Kiln/Forge operations

- Wear **leather gloves**, **eye protection**, **protective clothing** when opening a recent casting.
- Do not adjust the kiln or oven unless the **teacher** has given permission
- Overcrowding the foundry/kiln/forge area can cause **accidents**. Be aware of your surroundings and communicate with **students** around you.
- Assume everything around you is hot! Be aware!

Plasma Cutter

- Wear approved shaded eye protection, shade **#10** or darker
- Use protective screens (welding curtains, etc). Warn others nearby before **cutting/working**.
- Always work in a well **ventilated** area.
- **Water** is a good conductor of electricity. Make sure your area is DRY before cutting
- Always **secure/clamp** your work on the table, cut over the cutting table funnel to contain the sparks
- Never cut a container that has held **flammables**.
- Have teacher check your material and setup before cutting

Spin Caster/Jewelers Torch/Soldering Iron

- Wear **eye protection** at all times. Wear **leather glove**s to protect your hands (spin caster). Tie back **long hair** and strings. Remove loose objects or jewelry.
- Keep your **hands/body** away from the spin caster safety shell until it can come to a **full/complete stop**
- Make sure your work area has effective ventilation

Spin Caster/Jewelers Torch/Soldering Iron

- The tip of the torch or soldering iron should always be considered **hot**. Be mindful of the tip and any other hot parts of the tools!
- When plugging in the soldering iron make sure the **tip** does not touch the **power cable**.
- Do not breath in solder or welding **fumes**
- Melted solder can burn through **clothes** and **skin**.

Disc/Belt Sander

- Always keep your **Material Flat** on the work table. No free floating
- Sand side to side so that you wear the **belt** evenly. If you stay in one spot too long you will damage the **belt/abrasive** and brake it
- When sanding on the disc always sand on the side of the disc turning **DOWN** towards the work table
- When sanding small parts always use **LOCKING PLIERS** to hold your material.

Disc/Belt Sander

- NEVER wear **gloves** on the sander. If you get your fingers too close the **belt** will pull your hands in
- **Cool in water** or **Take a break** if the material gets too hot
- Hands and fingers should be no closer than **2 inches/5 centimeters** to the moving abrasive.
  - Loosing skin via it getting torn/sanded off is not as much fun as it might sound

Beverly Sheer/Squaring foot sheer

- The sheer is a dangerous tool as you can crush or sever your fingers. NEVER place your **hands/fingers** under or near the blade.
- Never force the cut. No round materials!
- How many people can use the Beverly Sheet at the same time? **1!**
- Do not place your **foot** under the foot pedal of the foot sheer
- Use the **side gauges** first on the foot sheer to line up your material

Chemicals, combustibles, toxic and hazardous substances safety

- How do your store flammable or combustible materials? In the **fire proof container!**
- Tell **the teacher** if any container or bottle is missing its label or not in original container!
- Before handling any hazardous substances ensure your are wearing proper protective gear such as **Eye Protection**, **Protective Clothing**, **Proper chemical gloves** (NOT LEATHER GLOVES)
- Follow all **procedures** for safe use
- Some cylinders can explode if dropped or heated. Keep them away from **heat sources**
- Always work in a well **ventilated** area or wear a **mask/respirator** to protect your lungs

Hot Glue Guns

- Make sure the glue gun is on a **safe/controlled surface** and the power button/switch is turned **OFF** before plugging it in. Do not leave it un-attended
- Hot glue can **burn/melt** your skin. Ensure you have a firm grip on the handle and never tough the **tip or glue when hot**. Almost all glue injuries happen to fingers and hands.
- Wear **eye protection** to protect your eyes and appropriate **clothing** to protect your skin
- Use hot glue guns in a well **ventilated** area to keep breathing air healthy!

Band Saw Safety

- Set the **guard** so it is just above the stock/material
- Use a **push stick** to push your material to prevent hands/fingers from being in line with the blade
- Make **Relief** cuts on sharp corners
- Never cut round or odd shaped pieces unless you use a **clamp/jig** to stabilize them
- To stop the bandsaw press the **off button** first then use your foot on the pedal (if machine is equipped) to stop the blade. DO NOT LEAVE THE MACHINE IF IT IS RUNNING

Band Saw Safety

- If the blade breaks or is dull, turn off the machine and tell **the teacher**
- Always wear **eye protection** to protect your eyes
- Never stand on the **RIGHT** side of the bandsaw. If the blade breaks it might flip out in that direction
- Please check if it is a wood cutting or metal cutting blade before use
- Do not use our machines to cut meat or your fingers

Compound Miter Saw – “Chop Saw” (wood)

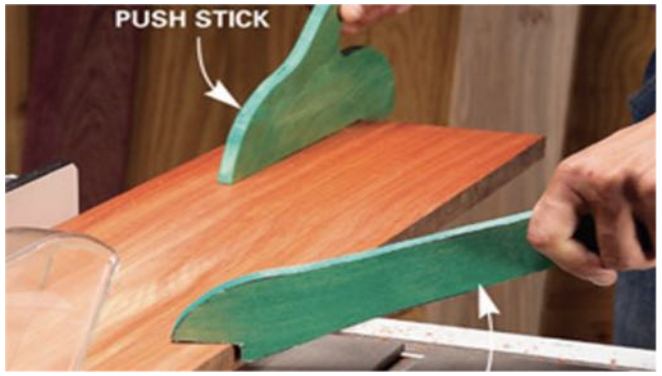
- No loose objects or clothing
- All guards must be in place and operating
- Hands and fingers must be kept clear of the path in which the blade travels
- Hold or clamp all material securely against the fence when cutting. No free hand operations
- Wood must be longer than 30cm (12 inches) for use on the chop saw
- After completing a cut, release the trigger and allow the blade to come to a complete stop then raise the blade from the workpiece. Injury can result from accidental contact.

Table Saw

- Ensure all **guards** and **anti-kickback fingers, and splitters** are in place and functional
- Set the blade height to clear the wood by 5mm. While you may see different in industry this is to prevent your fingers/body from getting to close to the blade!
- Never cut stock/material that is less than 300mm long (1 foot). Small stock is dangerous because: a) it brings your fingers closer to the blade and, b) it can kick back more easily because it is lighter

Table Saw

- Always use a **push stick** if your fingers will come within 10cm (4 inches) of the blade
- The most common table saw accident is when wood **kicks back**. Always stand **TO THE SIDE** of the material when rip cutting so you won't get **KICKED**!
- Never reach around or over the blade of a running table saw. Shut it **OFF/DOWN** first!
- Always use either the fence or miter gauge. Never make **FREE HAND** cuts on the table saw

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