THE BASIC SHOP PROFICIENCY GUIDE

A self-guided tour of working in the Academy of Art campus shop facilities.

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Video Resources:

What to wear in the Shop (PPE):
http://blogs.academyart.edu/student-resources/ind-core/videos/what-to-wear-in-the-shop.html

All about Protective Eyewear (PPE):
http://blogs.academyart.edu/jem/videos/all-about-protective-eyewear.html

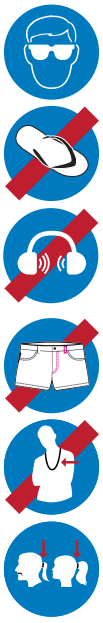
How to Use a Tablesaw:
http://blogs.academyart.edu/student-resources/ind-core/videos/how-to-use-a-tablesaw.html

How to use a Bandsaw:
http://blogs.academyart.edu/student-resources/ind-core/videos/how-to-use-a-bandsaw.html

PPE

What to wear in the Shop (PPE):
http://blogs.academyart.edu/student-resources/ind-core/videos/what-to-wear-in-the-shop.html

PLEASE MIND THE FOLLOWING:



WEAR EYE PROTECTION AT ALL TIMES.

NO SANDALS/OPEN TOED FOOTWEAR.

NO HEADPHONES

NO SHORTS/SKIRTS.

DO NOT WEAR LOOSE FITTING CLOTHING OR JEWELRY.

TIE BACK LONG HAIR.

We are going to get started with safe shop attire. Hazards in the shop fall into several categories, including: projectiles, rotating parts, chemical hazards, and noise. As shop users we need to dress in ways that protect us from these hazards.

Projectiles:
Tool use often create flying debris, as a result we need to protect our eyes with **Safety Glasses**, **wear long pants, and closed toed shoes**. Since materials often become airborne, *safety glasses must be worn at all times in the shop even if you are working at the tables.*

Rotating parts:
Many tools have rotating parts which have the ability to draw you or objects attached to you into their blades or motors: Sweater ties, long hair, earbuds, loose fitting clothing, *and work gloves* **all need to be removed or tied back before you start working on any machine.** Watch out for working with small pieces too. There are size limitations on many tools because small pieces often get pulled into belts and gears sometimes taking users hand with them.

Chemicals: Wear the correct PPE when working with chemicals. This information can be found by searching the internet for a given products SDS or Safety Data Sheet and looking at the permeability charts for gloves and respirators provided by NIOSH & OSHA. Even if you think you know what you are doing, CONSULT A TECHNITIAN before with any new chemical in the shop.

Noise: Hearing damage does not go away. We suggest wearing earplugs or the provided earmuffs when working with loud machinery.

HAZARDOUS MATERIALS 2

STORAGE & DISPOSAL

Many of the materials you work with in the shop may be toxic or flammable and will need to be stored, used, and disposed of in ways you are not familiar with. When you begin work in the shop, please talk with a technitian about what materials you will be using and familiarize yourself with the following:

HAZARDOUS MATERIAL HANDLING INSTRUCTIONS:

1. **CONSULT** a technitian before bringing in new chemicals/oils/finishes.

2. **LABEL** all materials you with your name and provide a technitian with an SDS for the material you will be using once it's use is approved.

3. **CLEAN** your tools and work area after you finish.

4. **DISPOSE** of the waste you generate in the appropriate containers.

COMMON CONTAINERS:

LIQUID WASTE CAN

Use this for disposing of LIQUID WASTE, Primarily OILS & WATER BASED SUBSTANCES.

DO NOT dispose of liquid fuel or reactive chemicals in these containers.

SHARPS DISPOSAL CONTAINER

Use this for disposing of BLADES, GLASS SHARDS, METAL SHARDS, or anything that might cause a puncture wound.

DO NOT put these materials in the normal trash.

SOLID WASTE DRUM

Use this for disposing of OILY RAGS, FLAMMABLES, USED CHEMICAL CONTAINERS, CURED INVESTMENT OR PLASTER, and other solids.

DO NOT dump liquids into these containers.

FLAMMABLES CABINET

Use this for storing flammable chemicals/oils/finishes in their original container.

DO NOT store butane, acetylene or other fuels in these cabinets.

DO NOT store corrosive acids or Oxidizers in these cabinets.

DO NOT store unlabelled containers.

HAZARDOUS MATERIALS 3

MATERIAL GUIDELINES

PROHIBITED MATERIALS & METHODS:

Materials that may be harmless in one form can produce dangerous gas and dust when heated, abraded, or cut. As a result, *please remember to exclude the following processes and materials from your workflow when planning projects to do in the shop*:

- **Do not sand concrete or plaster.**

  Concrete dust contains unfused silica and can cause silicosis and other long term lung con ditions which you won't get until 5-10 years after exposure. These conditions are debilitating and incurable.

- **Do not sand or burn foam.**

  Urethane foam creates a fine invisible dust which much like silica coats the inside of your lungs and doesn'tdegrade. Polyester foam melts when sanded releasing fumes which attack and necrotize the tissues of your lungs. Use of hot wire cutters is permitted but ONLY with the appropriate PPE and Feume hoood.

- **Do not cast, pour, or abrade polyester resin, bondo, or any substance which contains methyl ethyl ketone (MEK).**

  Methyl Ethyl Keatone is a senisitizing agent which can cause sudden anaphalatic shock and trigger longer term allergic reations

- **Do not cut, abrade, or heat pressure treated wood.**

  Pressure treated wood can contain copper chromated arsenic a biocumulative toxin that de stroys liver, kidney, and lung function and is a carcinogen.

- **Do not heat or burn PVC or Polycarbonate.**

  These substances emit chlorine gass when burned which has severe long term and acute affects. *They should not be laser cut under any circumstances.*

- **Do not heat or abrade substances that may contain lead or mercury including paint, solder, or objects.**

  These are chronic bioculmulative toxins exposure to which can lead to cancer or acute heavy metals poisoning.

- **Do not leave stains, sprays, acetone, oil paints, bags of powdery substanc- es, or casting plastics unattended on shop tables, in personal lockers, or on desks.** *They can and will spill!*

BE AWARE OF HAZARDOUS MATERIALS
PROPER USE AND STORAGE.

EMERGENCY RESOURCES 4

REPORT ALL ACCIDENTS AND INJURIES TO A TECHNICIAN, INSTRUCTOR OR CAMPUS SECURITY.

HOMEWORK!
When you step into the shop for the first time, familiarize yourself with the locations of the shop's:

FIRST AID KITS
EYEWASH STATIONS
EMERGENY SHOWERS
EMERGENCY EXITS
FIRE ESCAPES
FIRE EXTINGUISERS
FIRE BLANKETS

In the case of an injury:

EYEWASH STATION

A. For serious or life threatening injuries: call 911 and seek help immediately, alert the campus host and they will contact campus safety.

FIRST AID KIT

B. For small scale injuries; such as small scale cuts and burns you are welcome to use the first aid kit located in each of the shop facilities. We are required to fill out an incident report and contact campus safety whenever a student receives an injury in the shop. An officer will interview you about the injury and make sure you are ok.

C. For injuries involving chemical splashes in your eyes:

- For smaller particulate like dust we have ophthalmic solution in the first aid kit.
- For emergency situations involving objects or liquids: Use one of the eyewash stations to flush both eyes with water for at least 15 minutes.

AAU CAMPUS SAFETY:

1 (415) 618-3911

GENERAL EMERGENCY SERVICES:

-911

TABLE SAWS 5

VIDEO: http://blogs.academyart.edu/student-resources/ind-core/videos/how-to-use-a-tablesaw.html

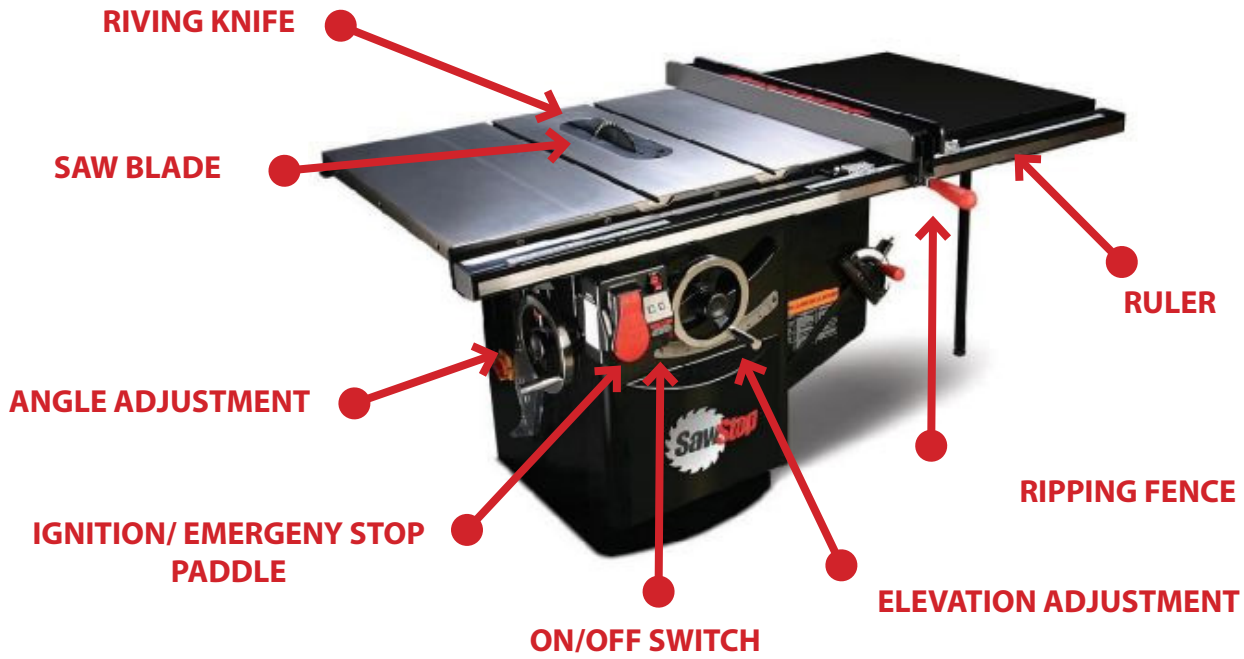


Table Saws are used for making accurate square and mitered cuts in materials with at least one square edge and one flat surface. You cannot make freehand or curved cuts, but they can be used with different blades and jigs that allow you to make slots, and cut angles, and tenons,

MATERIAL OPTIONS:

Wood, Plywood, MDF, Foam, Acrylic (plastics). Each material may require a different blade, consult a technician for their installation.

SPECIAL NOTES:

SAWSTOP CONDUCTIVE BRAKE

Saw Stop table saws contain a brake that is triggered by electricity. In order to protect users, an aluminium brake will be launched into the saw blade whenever the blade makes contact with any object that can conduct electricity such as skin (demonstration video). Since brake activation also ruins the sawblade check that your material is free of any hardware before cutting and do not cut the following:

- **Materials Which Contain Carbon** **(burnt materials, laser cut materials, carbon fiber..)**
- **Wet Materials** **(Glue-ups less than 24hrs...)**
- **Metal** **(screws, staples, metal coatings..)**
- **Mirrored Acrylic**

KICKBACK

A kickback is a dangergous situation in which your material binds up between the rotating saw blade and the fence casing your workpiece to shoot back at you with great force. To avoid kick back, select materials that have square sides and are free of defect, always stand to one side of the blade whilie cutting,.and follow the operating instructions on the next page.

TABLE SAWS (continued) 6

VIDEO: http://blogs.academyart.edu/student-resources/ind-core/videos/how-to-use-a-tablesaw.html

OPERATION INSTRUCTIONS:

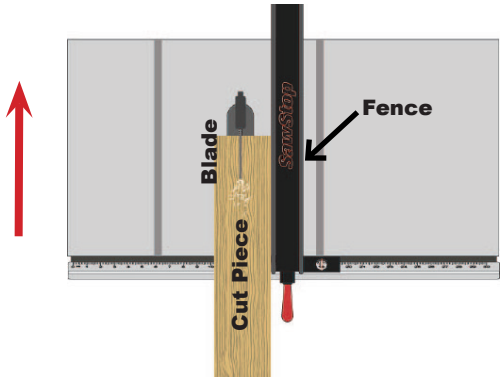
1. Locate the dust collector (not pictured). Turn it on.

2. Raise the blade, until the tip is ¼" above highest point of material. Grab a pushstick if your are making a rip cut.

3. Stand to one side side of tha blade to avoid kickback.

4. Make sure your material is not touching the blade & then follow the instructions below for making a Rip Cut or a Crosscut.

Rip Cuts (only with ripcut fence)



Rip cuts are cuts that are made parallel to the longest side of your material. They should be made using a ripping fence and a pushstick

TO CUT:

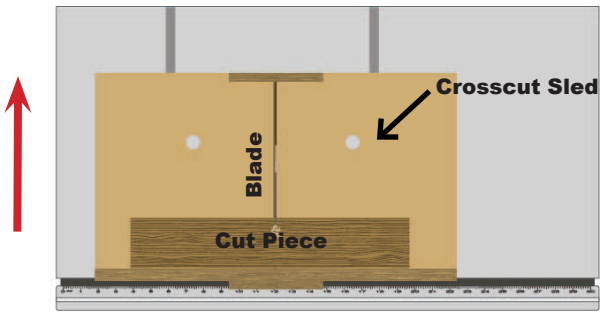
A. Use the measuring tape on the table to find your desired sizeand lock the fence into position on that increment.

B. Using your hands, feed your material into the saw. Keep the material flat against both the table and the rip fence while feeding the material into the blade. If the material wanders away from the rip fence, it WILL kick back.

C. When the material reaches the edge of the table nearest you, keep on hand on your workpiece and use the other to grab the pushstick. Feed the remaining material through using the pushstick.

Never release the forward pressure on your workpiece during this process.

Cross Cuts (only with crosscut sled)



Cross cuts are cuts that are made perpendicular to the longest side of your material. They should be made using a cross-cut sled.

TO CUT:

A. Measure and mark the piece you want to cut. Set your piece on the sled and align the blade with your mark.

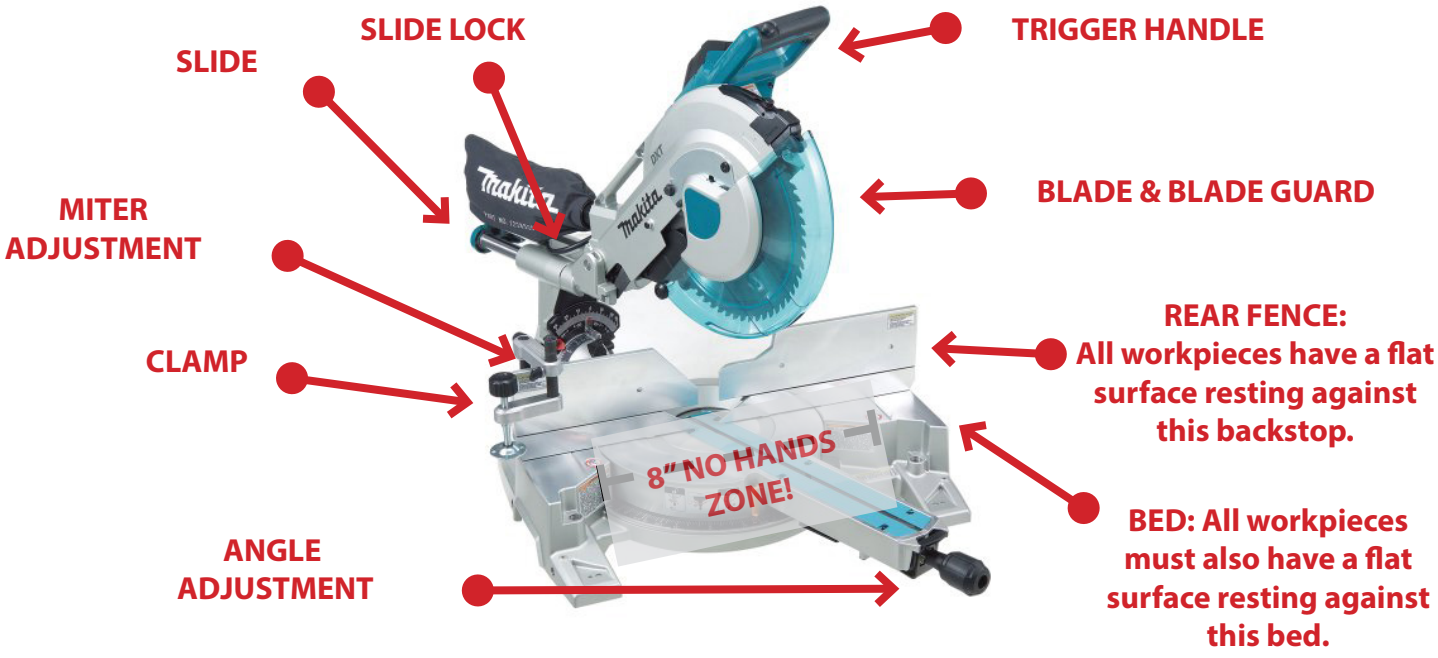
B. Start the saw.

C. Push the entire sled through the cut. Do not pull the sled back until after you have turned off the saw and tha blade has come to a complete stop.

5. Turn off the saw. **Wait for the blade to come to a complete stop.**
6. Remove any off-cut and vaccuum up your dust.

CHOP SAWS

CROSSCUTS ONLY!
MINIMUM MATERIAL SIZE: 9” X 1/4” X 1/4”
MAXIMUM SIZE: 12’ X 11” X 2”



Chop Saws are used for making square, angled, mitered and compound mitered CROSSCUTS in materials with at least one square edge and one flat surface. You cannot make freehand, curved cuts, or rip cuts with this saw.

MATERIAL OPTIONS:

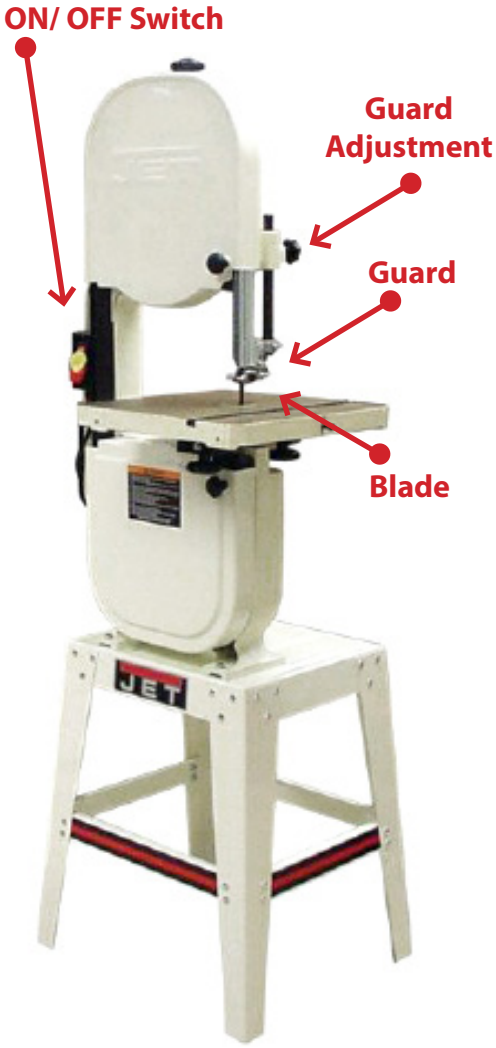
Wood, Plywood, or MDF. Pieces must be long enough for you to safely clamp them to the rear fence of the saw or use the integrated clamp. You may hold materials in place as long as your hands are at least 8” away from the blade at all times. Your material cannot be deeper than the reach of the saw (around 11”) or thicker than the blade to the arbor (2”).

OPERATION INSTRUCTIONS

1. Measure and mark your desired cut on your workpiece before approaching the saw. when you get to the saw, set **and lock** all the angle adjustments you will need.
2. Locate the dust collector (not pictured). Turn it on.
3. Hold your material firmly against the fence and table, **at least 8” away from the blade.** Never cross your hands over one another in front of the blade to do this even if you are left handed.
4. Pull the sawblade torward yourself on it’s slide until it sits in front of the edge of the material closest to you. **Make sure the blade is not touching your material** & then turn on the saw.
5. Allow the motor to reach full velocity, then plunge the blade into the material pushing down into the material and back against the rear fence. **NEVER PULL THE SAWBLADE TOWARDS YOU TO MAKE A CUT. Pulling the saw towards yourself will cause it to kickback.**
6. To complete the cut, lift the blade out of the material while it is at full speed and then release the trigger when the blade is no longer touching the material. Let the blade come to a

BAND SAWS 8

VIDEO: http://blogs.academyart.edu/student-resources/ind-core/videos/how-to-use-a-bandsaw.html



MATERIAL OPTIONS:

You can use this tool with Wood, Plywood, MDF, Foam, Acrylic, irregular and regular surfaces with flat base.

CUTTING OPTIONS:

This saw is excellent for cutting both straight lines and curves.

Since the blade of this saw is pushing your material against table, you can go any direction as long as you keep your piece of material on the cutting bed. Bandsaws with narrow blades are better for cutting sharper curves, so ask a technitician if a thinner blade is available before making a cut.

SPECIAL NOTES:

Relief Cuts

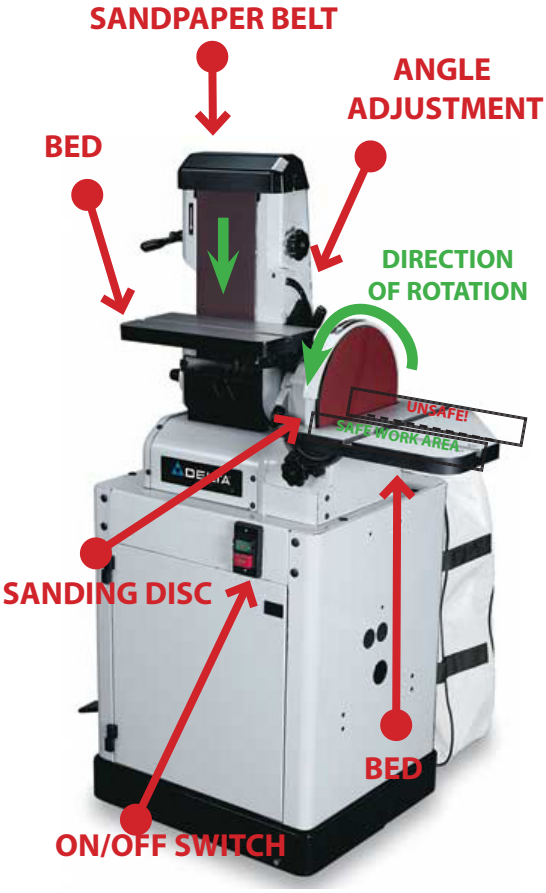
While bandsaw blades are flexible, too much twisting will break it and cause bad cuts. So YOU MUST use something called "relief cuts" to cut tight curves. A relief cut is a short cut that you make directly into the material then back out again*, so that the material falls away. Ask for a demonstration.

*PLEASE NOTE:

This is THE ONLY SAW, aside from a scroll saw, in ours shops on which you can back out of a cut and cut freehand curves.

OPERATION INSTRUCTIONS:

1. Draw out your desired shape and your planned relief cuts before approaching the saw. When you reach the saw, setup **and lock** in place any ripping fences or miter guages if you will be using.
2. Locate the dust collector (not pictured). Turn it on.
3. Locate the guard: raise the guard **¼" above the highest point of the workpiece**. This will both keep your fingers safe and prevent poor quality cuts.
4. Make sure your material is not touching the blade & then turn on the saw.
5. Make your **relief cuts.**
6. Make your **final cuts.**
7. Turn off the saw. **Wait for the blade to come to a complete stop removing any off-cut**.
8. If the blade brakes it will make a loud noise. Calmly shut off the band saw and alert a technician. They will replace the blade for you.



MATERIAL OPTIONS:

You can use this tool with Wood, Plywood, MDF, irregular and regular surfaces with flat base. **NO FOAM OR PLASTER.**

SANDING OPTIONS:

Sanders are very good options for finishing pieces. Large amounts of material should be removed elsewhere first such as on a bandsaw or tablesaw. There are many different types of sanders in the shop so don't hestiate to ask for a demonstartion of the correct use before you start.

SPECIAL NOTES:

OVERCOMING SMALL PIECE HAZARDS

All sanders have a gap in between the bed and the sanding surface. Materials can get pulled in between the table and belt and can take your fingers with it. To prevent injury, stick small pieces to a sacraficial board with double stick tape to keep them from getting pulled into gap. Never sand workpieces that require your hands to be closer than 2" to the sanding belt, and never sand the face of material that are thinner than 1" thick.

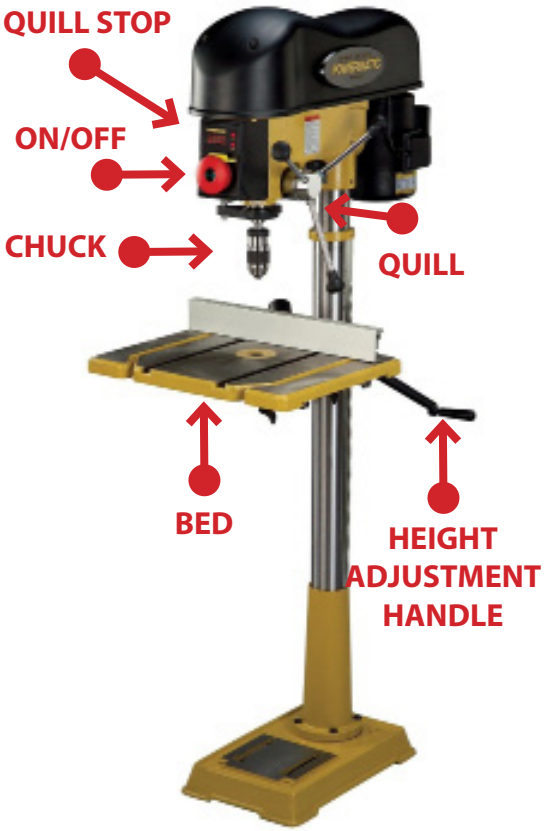
NOTICING THE DIRECTION OF ROTATION

Sanders, like saws, have a direction of rotation. All the force of the sanders motor pushes material in this direction while the tool is running. On disc sanders, barrell sanders, and spindle sanders it is particularly important to note which way the sanding surface is rotating because sanding on the 'up' side of the sander, can cause the piece your working with to shoot back at you or someone near you. Inthis image, the disc spins counter clockwise. Please note the location of the safe work area in the image above.

OPERATION INSTRUCTIONS:

1. **Set up your workpiece so that it is safe to sand.** Tape it to a sacrificial board if you can not hold it with your hands more than 2" away from the sanding disc.
2. Locate the dust collector (not pictured). Turn it on.
3. Adjust **and lock** the angle of the workbed. If the sander is a disc sander, note the direction of rotation and place your workpiece on the left half of the bed.
4. **Make sure your material is not touching the sanding belt** & then turn on the sander.
5. Sand your piece by **lightly** passing it across the front of the sandpaper.
6. Turn off the sander. Wait for the belt to come to a complete stop before walking away.
7. Shut off the machine and **notify a technician** if you begin to smell burning metal or see the edge of the sanding disc cutting into the side of the machine. Sometimes sander belts come out of alignment and the machine needs to be adjusted to operate safely.

DRILL PRESS



MATERIAL OPTIONS:

You can use this tool with Wood, Plywood, MDF, foam, and irregular and regular surfaces with flat base.

DRILLING OPTIONS:

DRILL BITS

Drill bits come in varying sizes 1/16”-2”. All can be checked out in the tool cage. You will need different drill bits depending on what material you use, and the size of hole you want to make. Different and materials may also require different speeds.

Ask a shop technician for assistance when adjusting the drilling speed. Speeds are based on the size of drill bit being used and the type of material being drilled. Generally the larger the bit or harder the material, the slower the speed setting.

SPECIAL NOTES:

Use a backing board to prevent tear out and to keep yourself from drilling can take your fingers with it. Remove dangling objects you have near your head and neck and tie back your hair. Drill presses pose particularly bad entanglement hazards.

OPERATION INSTRUCTIONS:

1. Mark the area you would like to drill and select a drill bit.
2. There is no dust collector for this tool. Vaccuum your work space immediately after use.
3. Place your bit in the chuck. Make sure the flute of your bit are sitting below the jaws of the chuck.
4. Use the provided chuck key to tighten the chuck. Place the chuck key to the side: NEVER LEAVE THE KEY IN THE CHUCK WHILE DRILLING.
5. Loosen the bed lock knob and adjust the table height. Lock the table when it is in the correct position. Set your quill stop if you wsh to drill multiple holes to the same depth.
6. Clamp down your backing board work materials and/or vice. All work must be firmly held in place by a vice or two clamps. Never attempt to drill material without the use of a clamp, vise, or other suitable device! Materials can easily become stuck on the drill bit and spin out of control, causing injury.
7. Turn on the drill press and Feed the bit smoothly into the material. When drilling a deep hole, withdraw the bit frequently to clear shavings and cool the bit.
8. If a drill bit breaks, calmly turn off the machine and step away from it. Wait for the machine to come to a complete stop and notify a shop technician.

CONGRADULATIONS!

You've read through the basic guide and are almost ready to begin work in the shop!
Please take a moment to review these final policies listed below before moving on to the next step.
Then complete...

...your Basic Woodshop Shop Proficiecy Quiz
and
...your Academic Policies & Procedures Agreement.

Good Luck!

STUDENTS ARE RESPONSIBLE FOR A CLEAN SHOP.

Clean up your area! All students using the facility must help keep it clean! Shop technicians will lockout tools and require students to conduct a cleanup **any time conditions warrant throughout the day. DO NOT leave anything in the shop overnight!** Any items left on tables, work areas, lockers, shelves, floors, or in the laser room will be disposed of the following morning.

DO NOT USE ANY EQUIPTMENT ON WHICH YOU HAVE NOT BEEN TRAINED.

Instruction on the proper use of individual tools and machines is obtained only from a qualified instructor or shop technician. If you are unsure about how to properly use a tool or machine, please STOP and ask an instructor or shop technician for assistance.

KEEP SAFETY GUARDS IN PLACE.

All safety devices, guards, and shields installed on tools and machinery must be used at all times. Students are not authorized to remove guards without the permission of a shop technician. Sleds, fences, push sticks, clamps, vises, and jigs are available and should be used at appropriate times. If you are unsure about the safest way to conduct an operation consult a shop technician.

IF YOU ARE WORKING IN A MANNER THAT ANY TECHNITIAN DEEMS INAPPROPRIATE OR UNSAFE YOU WILL ASK TO LEAVE THE SHOP FOR THE DAY.
UNSAFE PRACTICES WILL NOT BE TOLERATED.

Your safety is most important to us: please do not attempt to operate machinery under the influence of drugs or alchohol, even if they are perscription. If your behavior seems to be unsafe we will ask you to leave the shop for the day or until you can act in a safer manner. Please also never operate a machine without an instructor or shop technician present in the facility. The buddy system is the safest way to work even for the most experience workers!