

Hand Tool Safety and Basic Use

Version 1.4

Colophon

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Course Synopsis

In this Project class, you will learn how to use most of the tools that don't require electric power to work. This will include unpowered, cordless, plug-in and smaller stationary tools. This class is a survey of the most common tools used in any project. Starting with basic safety information, we will learn about the proper tools and techniques to cut, shape, assemble and finish a project. Please take notes on this handout – if you see a picture of an item you are unfamiliar with, please ask and let's get it identified.

Time Required: 2 Hours

Tools Required

- ☐ Safety
- ☐ 11 Useful Tools to Know About
- ☐ Measurement
 - Tape measures, rulers, squares
 - Calipers, micrometers gauges
- ☐ Vises and Clamps
- ☐ Cutting
 - Hand Wood Saws
 - Hack Saws
 - Jig, circular – stationary
 - Snips, wire cutters, strippers
- ☐ Shaping
 - Files, rasps, sureforms, sandpaper, file cards
 - Routers, grinders, sanders
 - Rotary tools
 - Chisels
- ☐ Drilling - tapping
 - Bits
 - Taps and dies
 - Drills, drill presses
- ☐ Attaching, fastening, gluing
 - Screws, nails, nuts, bolts
 - Screw drivers, wrenches, pliers
 - Rivets
 - Soldering
 - Glues, epoxies, hot glue
- ☐ Wiring
- ☐ Ladders
- ☐ Air Compressor

SAFETY

General Safety

- ◇ Take the Safety class and get a sign-off by the Shop Manager BEFORE using any of the tools in the shop
- ◇ NEVER loan your shop key to anyone! If someone wishes to tour the shop, you can escort her into and out of the shop. Visitors may not use any of the shop equipment
- ◇ Always sign in and out of the shop
- ◇ Know where the fire extinguisher is and how to use it, know where the first aid kit and eye wash are
- ◇ Cell phones do not work in the shop.
- ◇ Safety equipment - ear and eye and breathing protection is your responsibility, use them when in the shop. Wood dust is an irritant and over time can produce or exacerbate respiratory problems, protect yourself by wearing at minimum a dust mask, or purchase a personal respirator that can provide a positive seal and allows you to change to the appropriate canister when working with different harmful vapors or irritants
- ◇ For your protection, please wear long-sleeved shirts when working with chemicals, short-sleeved shirts for anything with a rotary motor (saws, lathes, etc.) and closed-toe shoes in the shop. Remove jewelry, tie back long hair, and remove loose clothing that may get caught in machinery
- ◇ Do not operate any tools while under the influence of drugs, alcohol, or medication
- ◇ NEVER work with power tools alone in the shop - buddy up
- ◇ If you broke it, log it so it can be repaired (Repair/Request/Removal Form, near the entry door)
- ◇ Clean up after yourself - leave the shop cleaner than you found it. Attaching the shopvac to the power tools will significantly cut down on the sawdust
- ◇ Wipe down all tools you use and put them back where they go
- ◇ Need a tool that we don't have (or the one we have isn't working) - let the Shop Manager know on the Request/Repair/Removal Form, near the entry door)

- ◇ Supplies and materials are your responsibility. Need paint, sand paper, drill bits - these are considered disposable, so, you should bring your own
- ◇ If something isn't cleaned up, is broken, or not functioning properly when you come to use the shop, please let the Shop Manager know
- ◇ There is limited space behind the stairs for storage of your project in process, please remove your stuff when your project is finished. Personal property is not to be stored anywhere in the shop
- ◇ Use all tools as designed to avoid possible injury or damage to the tool
- ◇ Do not over reach, and be sure your work is properly held down/supported

SAFETY FIRST

Any time you are cutting, sanding, hammering etc, you should be using eye protection. If there is a tool in your hand there should be safety glasses on your nose. Use ear protection if your work is noisy and a mask if the work is dusty. If you don't know how to use it, don't use it – ask someone for a quick tutorial, find the manual in the shop, look up the manual online, or check it out on YouTube.com.

11 Useful Tools to Know About

1. **Utility Knife:** A retractable utility knife lets you cut through boxes and rope, trim wallpaper, and score wallboard. The blades can be adjusted to whatever length you need, and dull blades can be switched out or broken off to continue working.
2. **Multibit Screwdriver or Screwdriver Set:** Having Phillips and flathead screwdrivers of different sizes ensures that you will be ready for whatever the job needs - Either a set of screwdrivers or a single screwdriver with interchangeable bits.
3. **Hammer:** A basic claw hammer lets you hang pictures, pry out loose nails, hang holiday lights outside, and numerous other household tasks.
4. **Level:** Use a bubble level or a laser level to check whether an object is horizontally level or vertically plumb.
5. **Pliers:** Pliers are great for holding objects still so they can be cut, bent, or compressed. The tension of the jaws is nice for manipulating objects that are too small or too tight for human fingers.
6. **Adjustable Wrench:** A wrench is used to turn nuts or bolts or to stop them from turning. An adjustable head permits you to increase or decrease the size of the jaws in order to produce the fit you need.
7. **Socket Wrench Set:** A socket wrench (ratchet) features multiple sockets to fit whatever size of nuts and bolts you encounter. Socket wrenches are especially useful in tight spaces because they do not need to be removed and refitted after each turn like a standard wrench.
8. **Allen Wrench Key Set:** Allen wrenches are similar to socket wrenches but they are used for screws and bolts that have a hexagonal socket in the head.
9. **Tape Measure:** A self-retracting tape measure lets you measure up to 25 or even 100 feet, much farther than a standard ruler. Most models can measure down to 1/32 of an inch.
10. **Square:** A framing square provides an easy way to measure and produce right angles. You can also use it as a straightedge when drawing or cutting.
11. **Hand Saw:** A handsaw has one flat, sharp edge to cut wood or metal. It may take more effort than a power saw, but it is handy when there is no power source nearby or when you need to avoid cutting too far (such as around wires).

Survival Equipment!!

- Duct Tape
- Zip Ties
- Velcro

Measurement



Tape measures, rulers and squares are typically used for 'coarse' work. Micrometers, calipers and gauges are used for 'fine' work. Number 2 pencils are fine for marking wood, but a scratch awl or hardened scribe is better for metal.

Vices and Clamps

Your result will be much improved if the material you are using is held securely. Vices, clamps and clamping pliers are all methods to secure your work.



Cutting



Most handsaws are specific for the material they cut. English handsaws (wood) and hacksaws (metal) work on the 'push' stroke – they are a "one-way" tool. Japanese saws (wood) work on the 'pull' stroke and are capable of more precise work.

For your safety, make sure your saw blades are sharp and do not have any burs on them or teeth missing or misshapen. These are considered consumable, so, you should have a set of your own if you plan to do any significant work in the shop.

Jigsaws and circular saws are powered tools that are **NOT** to be used until you have taken the Power Tool Safety Class.



Shaping and Grinding



Files and rasps are specific for metal or wood. These tools work on the ‘push’ stroke they are a “one-way” tool (pushing and pulling back and forth will dull the teeth on the file). Files need to be ‘cleaned’ occasionally.

Cold chisels (metal) and wood chisels are very different and specific for the material. Sharpening chisels properly is an art.

Hand power sanders and grinders are also specific as to the materials they work with. Sandpaper comes listed in grit size – the higher the number, the finer the grit. When using chisels, the appropriate hammer or mallet needs to be used.

Sand paper is considered a consumable, so you should have your own if you plan to do any significant work in the shop.

Drilling



Standard drill sizes (English) are given in fractional or decimal inches, like 1/4” or .25” Common sizes would be 1/8, 1/4, 3/8, 1/2, etc.

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- Twist drills can be used in both wood and metal. Brad point, spade and Fostner bits are for wood.
- Drilling hard metals like steel may require setting the proper speed, pressure and cooling/lubrication for cutting a clean hole.
- Metric and numbered drills are used for precise machine work, usually when tapping (making a threaded insert) is involved.

For your safety, make sure your drill bits are sharp and do not have any burrs on them. These are considered consumable, so, you should have a set of your own if you plan to do any significant work in the shop.

Attaching



Methods of attachment include glues, screws, nuts and bolts, nails, and rivets. The tools used are hammers, screw and nut drivers, ratchet and open-ended wrenches. Go slow and easy and make sure you are exactly perpendicular to the top of the screw so you don't strip the head of the screw. There are a wide selection of nuts and bolts and screws in the various bins around the shop for your use. These are considered consumables, so, you may need to purchase what you need for your project, including wood glue, rivets, and glue sticks.

HOT TIP:

Screw not holding in a wood hole?

Get a few round wooden toothpicks (they're made of hardwood) and some wood glue. Dip the toothpicks into the wood glue and push them into the stripped hole until it's full and tap with a hammer to ensure that they are set all the way into the bottom of the hole. Let the glue dry overnight. Use a hammer and hit the side of the toothpicks that are sticking out of the hole and they will break off at the top of the hole. Tap the top of the hole to flatten any toothpicks that didn't break off smoothly. Reinsert your screw and carefully screw it back in place.

Screw not holding in a metal hole?

Get some braided wire (coated or uncoated) the same diameter as the screw hole that is stripped. Press the wire into the hole, tapping with a hammer to ensure that it's as deep in the hole as possible. Clip the wire off at the top of the hole. Tap the top of the hole to flatten any wires that didn't cut off smoothly. Reinsert your screw and carefully screw it back in place.

Wiring



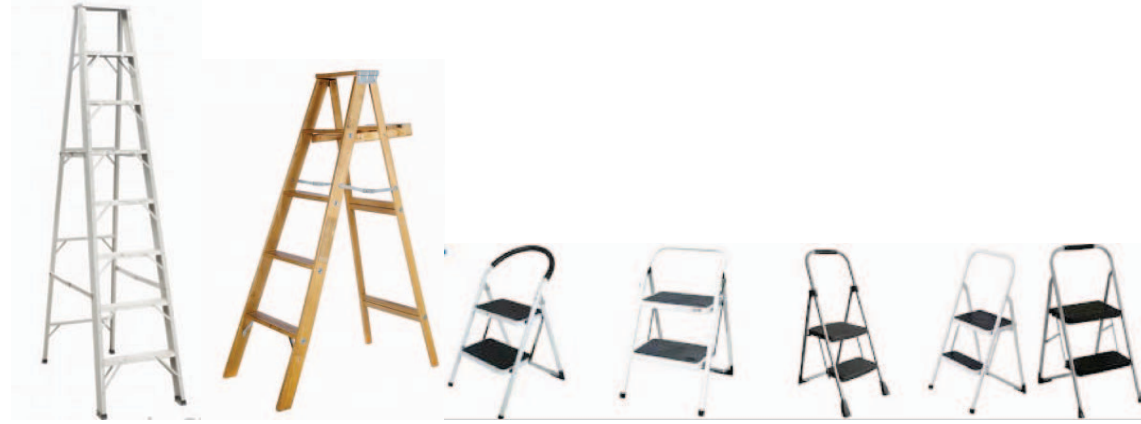
Using cutters, strippers and crimps – many simple wiring tasks can be done. Be sure to use caution when working with house currents. There are some rolls of wire and wire nuts in the various bins around the shop for your use. These are considered consumables, so, you may need to purchase what you need for your project, including wire and wire nuts.

Ladders

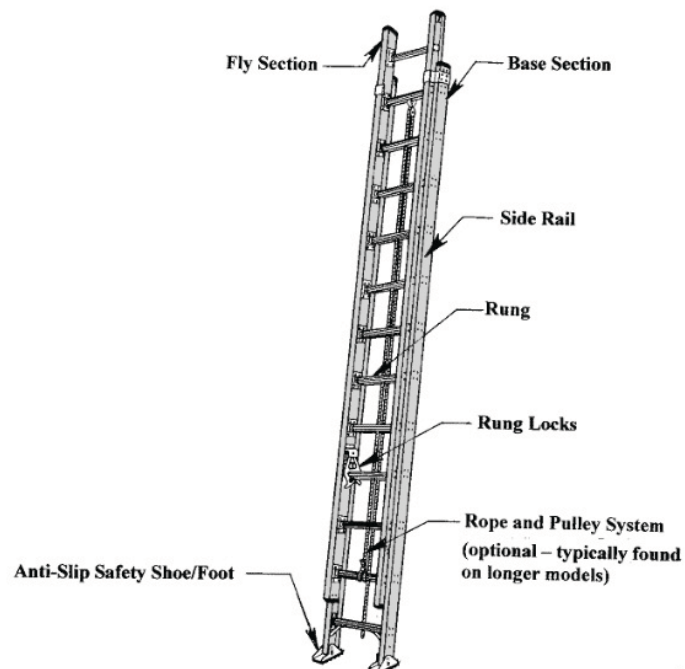
Some of the simplest types are called step or A-frame ladders. A small stepladder may be used indoors to reach upper storage spaces or to hang artwork on the walls. A-frame ladders are often used to elevate the user perhaps four feet or so from the ground. Step and A-frame types use fairly wide treads (steps) for stability and usually fold together for easy storage.

ALWAYS have someone hold the ladder to keep it, and you steady while you are up on the ladder.

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For those who must reach the sides of their homes for painting or roofs for maintenance, extension ladders are a must. Extension ladders may fold down to the length of one segment for storage, but can be telescoped to reach many feet in the air. Unlike the self-supporting A-frame design, extension types are often propped against walls or other sturdy surfaces for support. The legs have adjustable footpads that provide level contact with the ground. The rungs of many are round and narrow, unlike the wide and flat treads of stepladders. Wearing proper footwear is essential when working with this type, since the rungs can become oily or wet over time.



Air Compressors

An air compressor is a device that forcefully pushes air through a hose. Because they serve so many functions, they can be useful to have around. You can inflate basketballs, footballs, soccer balls, air mattresses and tires. But you can also attach a blowgun to remove sawdust from your woodworking projects, apply paint or stain with an airbrush, and power a surprising array of tools. Air-powered tools (sometimes called pneumatic tools) include nail guns, palm nailers, staplers, drills, screwdrivers, grinders, cutting tools, sanders, polishers, socket wrenches, impact wrenches and paint sprayers, among many others.

Note: these tools are accessories for an air compressor and we don't have any of them in our shop. We do have a blowgun, tire pump attachment, and several other small accessories with quick release fitting for easy changeout.



IMPORTANT SAFETY NOTE:

It is important to always let the air and water (condensation) out of the tank when you are finished using the Compressor. There is a small stopcock on the bottom of the tank, between the wheels that needs to be turned to open and let air out of the tank. This avoids rusting of the inside of the tank, which compromises the strength of the tank walls, and it could explode.



Cleanup Checklist

- ☐ Wipe off and put all tools back where they belong
- ☐ Check the Compressor to be sure the tank is empty
- ☐ Sweep up or vacuum any debris on the floor or workbenches
- ☐ Dispose of any left over pieces and trash
- ☐ Sign out (sheet is on the inside of the door)
- ☐ Check that the rolldown door is locked down
- ☐ Turn out the lights
- ☐ Close and lock the door

Shop Etiquette

- If it's not yours, please don't mess with it! If you need to use the bench space that someone else has their project on, carefully move their project and put it back when you are done using the space.
- Wood inside the shop is NOT for general use, it belongs to someone else
- If you don't know how to use it, PLEASE ASK someone!
- If you broke it, please report it on the forms on the shop bench, near the door – stuff happens, accidents or mistakes – don't let someone else find the broken equipment, they could get hurt using it
- Use the correct tool for the job
- Monkey tight, not Gorilla tight

What's NOT on the APPROVED Hand Tools List

- ☐ Table Saw
- ☐ Band Saw
- ☐ Circular Hand Saw
- ☐ Chop Saw
- ☐ Router
- ☐ Scroll Saw
- ☐ Jig Saw
- ☐ Drill Press
- ☐ Wood Lathe

The power drills and the electric sanders ARE on the APPROVED Hand Tools List, as are ladders, hydraulic jacks, and the air compressor. If you are not sure if a tool is on the APPROVED Hand Tools List, just ask don't guess. SAFETY is our number one priority!

LOCAL RESOURCES

Places near DBR to get materials and supplies:

- Home Depot, 1145 W Washington St, Sequim, WA, 98382
(360) 582-1620
- Thomas Building Center, 301 W Washington St, Sequim, WA 98382
(360) 683-3393
- Clallam CO-OP, 216 E Washington St, Sequim, WA 98382
(360) 683-4111
- Harbor Freight, 1940 E 1st Street, Suite 168, Port Angeles, WA 98362
(360) 457-2042
- Thurman Supply, 1807 E Front St, Port Angeles, WA 98362
(360) 457-8591
- Swain's General Store, 602 E 1st St, Port Angeles, WA 98362
(360) 452-2357
- JoAnn's Fabrics & Crafts Store, 150 Port Angeles Plaza, Port Angeles, WA 98362 (360) 452-9498
- Henery DO It Best Hardware, 218 W Sims Way, Port Townsend, WA 98368
(360) 390-5603
- Arrow Lumber & Hardware, 8457 State Route 20, Port Townsend, WA 98368
(360) 385-9474

There are also many of these stores in Silverdale, including Lowe's, Home Depot, JoAnn Fabrics & Craft Store, and Michael's Craft Store, to name a few.

COOL LINKS

<http://www.harborfreight.com/> A good place in Port Angeles to get inexpensive tools

<http://www.homedepot.com/b/Tools-Hardware/N-5yc1vZc1xy> Tools from Home Depot

<http://www.youtube.com> Use the Search Tool to find out how to use a specific tool and how to build anything

OTHER LEARNING RESOURCES

1-2-3 DVDs Home Improvement Essential Skills 1-2-3 DVD from Home Depot
(Amazon.com)

Home Improvement 1-2-3: Expert Advice from The Home Depot (Amazon.com)

How Your House Works: A Visual Guide to Understanding & Maintaining Your Home by
Charlie Wing