

Royal Robotics

Lesson Plan – Hand tools

Definition: any tool that does not use power from electricity or pneumatics is a hand tool.

Concepts & Principles:

Safety: As anyone who has hit their thumb with a hammer knows, hand tools can hurt you. Hand tools should always be used properly. This means using the right tool in the right way.

- You should check tools to be sure they are in good condition before using and if not, give them to the shop manager or a mentor to be replaced or repaired.
- Make sure you have the proper size.
- Make sure parts are secure, such as a blade in a saw handle, or a bit in a drill, a handle on a file.
- If applying lots of force it is a good idea to secure the object working on in a vise or have it held by someone.
- When using a sharp tool never direct it toward a person.
- Use insulated tools when working on or near electrical components.
- Be aware of potential heat build-up. Friction heats up metal objects, particularly aluminum.

Tool ‘Families’ (show and tell at tool box)

Measuring: Used for getting information about an object, such as dimensions or weight

Tape measure, rulers, angles, protractors, micrometers, calipers, scale, level

Wrenches: used to turn nuts and bolts Proper use: get correct size to prevent slipping. Watch for cross-threading. Don’t over tighten.

Crescent wrench, Socket wrench (Ratchets and extensions), Allen or hex, Nut drivers, Torque

Screwdrivers: used to turn screws and some bolts. Can come as a driver/bit set. Some look very similar, be sure you have the right kind or you can ‘cam out’ the screw socket.

Slotted/flathead, Phillips, Frearson (easily confused with Phillips, but has steeper point on tip and doesn’t widen in middle), Square, Hex, Torx (slang name “star”)

Pliers: used for grabbing and holding, some have a cutter built in. Come in two types, fixed and slip pivots (two kinds of slip: multi-hole and tongue and groove). Jaws come in a variety of sizes, shapes and angles to use for various jobs. Often have insulated handles for working with electrical systems.

blunt or square tip (elongated called duck-bill), Needle-nose, Locking or vise-grips, snap-ring

files & sanders: Used to smooth or shape a surface. wood and metal files differ– wood files usually have larger teeth and farther spread than metal files.

files: flat, round, half-round, triangle, square, rat-tail, blade. Rasp, sanding block

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Cutting tools: Used mainly for removing parts of objects.

Chisels, planes, utility knives, drill bits, saws (many kinds), scissors, snips, wire strippers, wire cutters (slang name “dikes”)

Hammers & punches: for pounding and prying, usually used for putting in or taking out nails

Claw hammer, ball peen hammer, sledge, rubber mallet, punches, pry bar

Specialty tools: various tasks

chain breaker (breaking chain links for smaller pieces), plumb bob (finding points), tap and die set (making threads), alligator clips (making electrical connections)

Supplies: tool quiz, tools in toolbox

http://www.stanleytools.com/default.asp?TYPE=STATICLEFT&PAGE=tooltips.htm&LEFT=left_tooltips.htm