

Practical skills

Practical

Hand tools



Tenon saw
This tool is used to cut straight line cuts through piece of timber and manufactured boards.



Coping saw
This tool is used to cut curves or holes in piece of timber or manufactured boards.



Hack saw
This tool is used to cut metal or plastic materials to size.



Pillar drill
This tool is used to drill holes in a variety of materials. Its height is adjustable and the drill accuracy is very good.

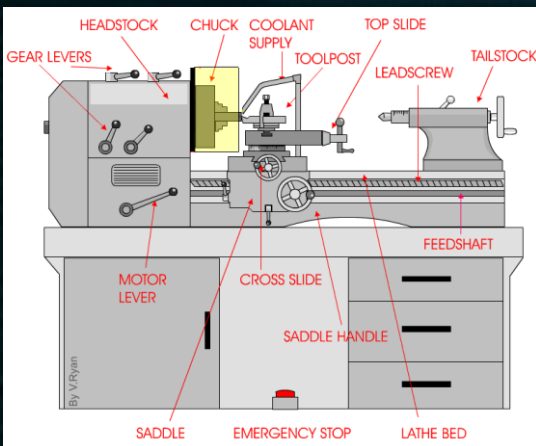


Hand drill
This tool is used to drill holes in timber by hand. One hand holds the top of the drill and the other turns the handle to spin the drill and cut through material.



Electric drill
This tool is used to drill holes in a variety of materials. The battery on the drill makes it portable but more powerful than a hand drill.

Centre Lathe



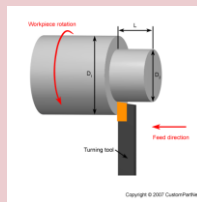
Facing off

This process involves the cutter moving across the end of the material at 90 degrees making it flat.



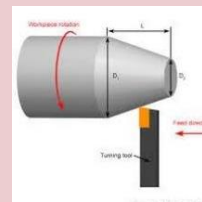
Cylindrical turning

This process involves cutting down the length of the material reducing the diameter of the material.



Taper turning

This process involves cutting the material down the length but at an angle.



Parting

This process involves cutting through the material to separate it from the rest.



Drilling and boring

This process involves drilling a hole in the end of the faced off material or cutting from the hole outwards to make a larger hole.



Laser cutting



Laser cutting involves a beam of light that vaporises through a piece of material to cut a shape to the desired shape.

Advantage

- Faster at cutting
- Accurate cutting
- Automatic – leave it to cut
- Can cut a variety of materials, paper, card, fabrics, plastics, timbers and metals.

Disadvantage

- Cost of equipment
- Training needed
- Maintenance
- Does leave a burnt edge
- Need to have a 2D drawing

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3D printing OR Fused deposition modelling



This process involves modelling an object in 3D on the computer.

The sending this file as a STL file, the 3D printer software will then split the model into thin layers.

The 3D printer will then deposit each layer onto the 3D printer bed and begin to build the 3D model layer by layer.

The advantage of this is that you can get very complex models made by machine that would be difficult by hand. Also you don't get any waste as the 3D printer is adding material layer by layer. Another advantage is that you don't need to pay a craftsman as the machine will make it for you.

Fixings



Nuts and bolts are a good fixing because they can be undone allowing pieces to be separated when needed. Also they are good because you can get them in many different sizes, thickness and types depending on what they are needed for.

Screws are another good fixing which can hold two pieces of timber together well and can be undone but only a limited number of times before the thread on the screw wears away the material. As with Bolts you can get them in many different sizes and thicknesses as well as in different shaped heads.

Simple Rivets are a way of joining two piece of metal, plastic or leather together permanently. You need access to both sides where the rivet needs to be cut to length and then the smaller end hammered into a dome shape using a plug.

Pop rivets are another way of joining two piece of material permanently together. With these you only need access to one side where you use a rivet gun to pull the pin out compressing the other end together clamping the two pieces of material together.

Finishes

Painting	Dip coating	Electroplating	Galvanising	polishing
This method involves using a brush or a spray can to add a coloured pigment onto the material. This has the advantage of adding aesthetic appeal and protection to the material.	This method is only used on ferrous metal where the ferrous metal is heated and then dipped in plastic granulate which melt to the surface protecting the metal from oxidisation.	This method involves coating a base metal with a thin layer of another method by using an electronic current to attract particles from one metal (the anode) to the other (the Cathode).	This method involves coating a steel with Zinc to make is corrosion resistant so the steel can be used externally (outside).	This method involves getting a piece of metal or plastic and placing up against a polishing pad that rotates round until the material has a nice shine like a mirror.

Homework task 1

When building the base of your lamp describe in detail how the materials were shaped, what tools were used to mark out, cut, shape and finish the Base piece.

The aluminium pipe will be bent into shape and will need to have hole to allow the lamp shade head to move up and down the pipe. Describe how you are going to complete this process.

What finish will you use on the Pipe to make sure it is attractive / aesthetic to look at?

Homework task 2

The Pin to allow the lamp shade head to move up and down the pipe will be completed on the Lathe.

Describe the individual steps you would go through to make the pin for your lamp.

Homework task 3

The lamp shade head will be made from two circular pieces of acrylic that get bolted together with a 3D printed.

Why is Laser cutting the best method for creating these two pieces?

What is needed before we can start to laser cut the pieces out of the acrylic?

Name and explain an advantage of using the Laser to make these components for the lamp.

What other way could we make the two circular pieces of circular acrylic?

Homework task 4

The depth of the Lamp shade head has been made from a 3D printed component

Explain why you think the 3D printer is suitable for part of the lamp

What other method could you think of for making this part of the lamp?

Homework task 5

Name and explain a method we could use to join the Plywood Clamp to the MDF Base

Name and explain a method we could use to close up the lamp to hold the pipe in the Clamp

Name and explain a method of joining the circular acrylic pieces to the 3D printed lamp shade.

Homework task 6

Name the three finishes you used on your Lamp

Explain why these finishes are suitable for each part of the lamp

Research some other finishes you could have used on both the metal and wooden parts of the lamp.