Year 9 Design Technology– Knowledge Organiser

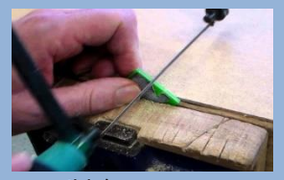
Practical: - Booklets in the middle of the table. Hair tied back. Wear an apron. Stools stacked in four.

Equipment: Pencil, ruler, Tenon saw, Coping saw, bench hook, file, brush, Pillar drill.

Accessories are items of equipment that are not usually essential, but which can be used with or added to something else in order to make it more efficient, useful or decorative.

How to use a Coping saw

Using a coping saw is a test of skill as it can be difficult to control and requires practice.



1. **Draw on the material with a pen.**
2. Secure the material in the vice.(Low as possible)
3. **Keep the blade parallel to the table.**
4. Rest the blade against your thumb nail. Drag back the blade towards you. (3times)
5. **Move your thumb and pinch the material (fingers above the blade)Use the full blade**
6. Go slow. Watch carefully to make sure the cut is staying on the line.
7. **If need to come back out, keep moving the blade back and forth and reverse back upwards.**

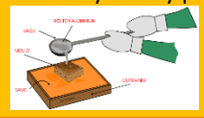
Pillar drill

Step 1 – 1 person at a time.
Step 2 – Goggles to be worn.
Step 3 – Hold your material down at all times.
Step 4 – Work slow, hold the handle that is furthest away from you.
Step 5 – Go back up slowly when hole has been drilled.
Step 6 – Then turn off.

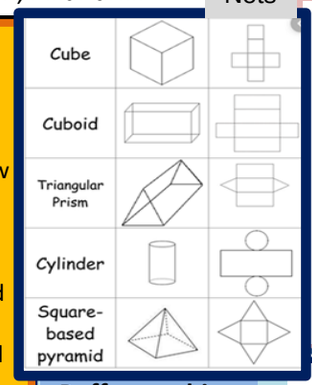
Sand Casting

Sand casting is one of the few available processes for metals with high melting temperatures such as steels, nickel, and titanium.

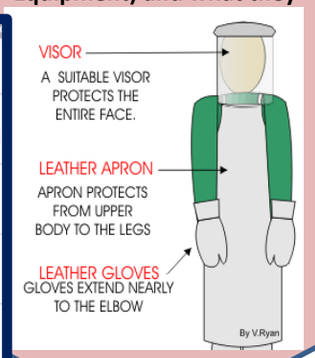
- Due to its flexibility, heat resistance and relatively low cost, **sand casting is** the most widely **used casting** process.
- A specific sand is used, cannot get it from B&Q.
- Low material strength due to high porosity compared to a machined part.
- Low dimensional accuracy – because of shrinking and the surface finish dimensional accuracy is very poor.



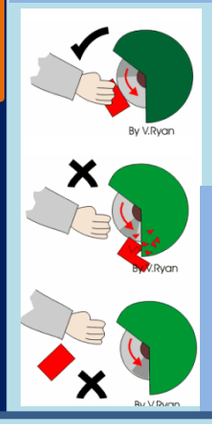
Nets

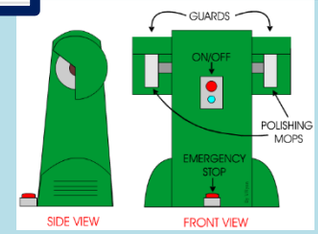


PPE (Personal Protective Equipment) and what they



Buffer machine



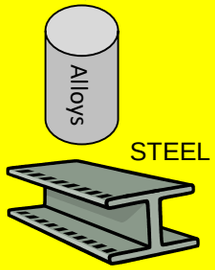


1. Only use the Buffer after you have used the files to clean up the saw marks.
2. Hold the work with both hands from below the polishing mop.
3. Moving the product backwards and forwards.

Categories of metals

Metals can be broken down into these main categories:

Ferrous metals → Alloys → STEEL



Non-ferrous metals → Alloys → ALUMINIUM

Pure metals do not contain any other metals or elements. → Pure Metals → PEWTER

ACCESSFM

Aesthetics - What does the product look like? Colour, Style, Texture.

Cost - How much is the product? Price, Materials , Manufacturing?

Customer - Who would buy the product? Age, Gender, Hobbies.

Environment - Is the product sustainable? Six R's, Impact, Sustainability.

Size - How big is the product? Width, Length, Height.

Safety - Will the product cause harm? Hazards, Risks, Precautions.

Function - What is the product designed to do? Purpose, How it works, Could it work better?

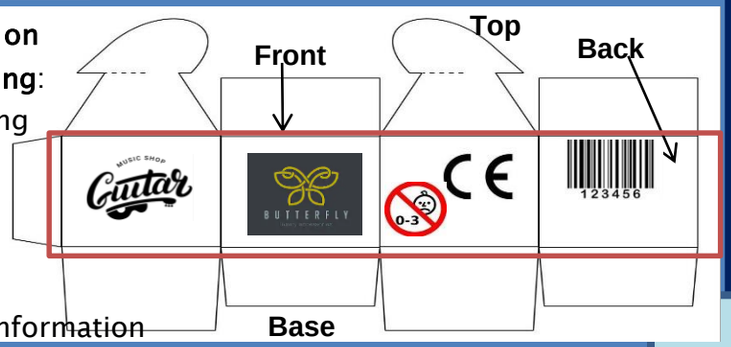
Materials - What is the product made from? Materials, Properties, Suitability.

Why do we use packaging?

To **P**rotect.
To **I**nform.
To **C**ontain
To **D**isplay.
To **T**ransport.

Details on packaging:

CE marking
Barcode
Logo
Colour
Safety
Product information



Good Practice for cleaning up.

1. Work together as a team.
2. Throw big off cuts into the bin.
3. Brush dust slowly to the floor.
4. Put tools into the toolbox.
5. Any tools taken from the tool cupboard to be replaced.
6. Ask the teacher to check equipment before putting away.
7. Collect your stools.
8. Hang up the aprons

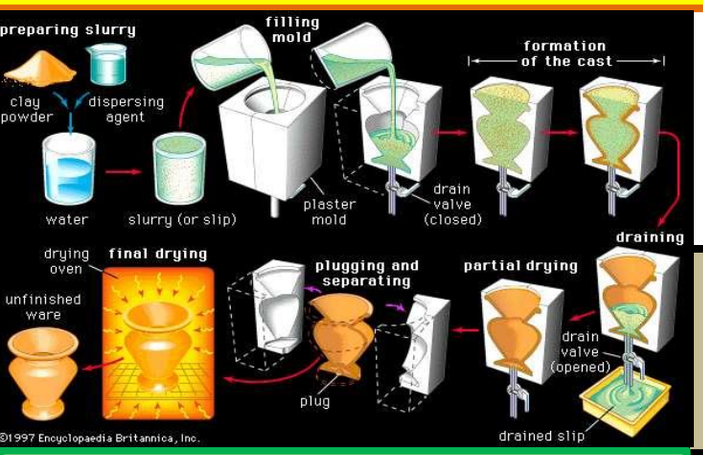
Pewter Casting

- An Alloy that is of relatively low melting point compared to other metals. Used widely in schools due to this.
- Most modern pewter is composed of 96% tin and 4% copper although there are many variations.
- It is a soft metal and can be shaped easily by hand tools and machine tools.
- Moulds can be produced as one offs or for batch production.
- The internal area of the mould tends to wooden. (what type of wood?)
- The outside of the mould can be wooden or die cast Aluminium. Used for jewellery and had been used to make cutlery, tankards and bowls.

Wider thinking / further reading

https://creativeword.uk.com/blog/localization/culture-influences-design

A **prototype** is an early sample, model or release of a product built to test a concept or process.
It is a quick approach to get something going and to demonstrate the potential, while the actual **product** is something that you look forward to launching in the market for people to use it.



Slip Casting

- Primarily for ceramics (pottery), now you can use it for jewellery pieces.
- Time consuming is the cast creation, after that it is fairly quick to produce various amounts of the same piece.
- Batch production.
- Gives a very smooth finish.
- The ability to cast complex shapes with thin walls.
- Not economical for mass production.

Alloy Metals Facts

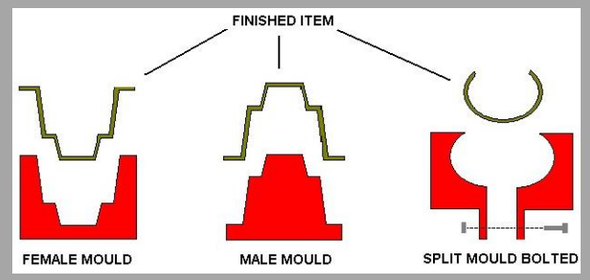
Lowers the melting point, it will alter the thermal and electrical properties. It makes a material harder for cutting purposes and improves the resistance to corrosion, helping metal to flow better into a cast.

Non – Ferrous Metals:
They contain no iron and are not attracted by a magnet.

Ferrous Metals
Contain iron, they will corrode unless protected. They are attracted by a strong magnet. They are rigid and cheap.

Moulds

- Come in 2 types - Male and Female moulds.
- Can be used separately or together.
- Male moulds are cheaper to produce. – It produces the positive design.
- Female moulds are more expensive to produce. – This produces the negative design. – More expensive to produce because more detail has to go into it.



Junior hacksaw

- Place the material in a vice.
- The junior hacksaw is held in one hand and then pushed forward (the teeth of the blade face forward, away from the handle).
- The 'cut' only takes place on the forward stroke.
- The first few 'cuts' should be taken with care, until a grove is cut in the metal, which guides the saw blade and then more rapid sawing can take place.