Year 10 Art and Design 3d Design- Term 2

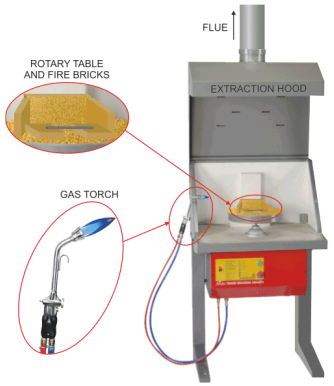
Manufacturing processes

Casting

A manufacturing process involving melting materials such as pewter and pouring them into a cast.

Brazing

- Steel can be joined by using a technique called brazing.
- Brazing gives a permanent joint that is ideal for most metalwork such as bicycle frames where there is a need for a certain amount of flexibility in the joint.
- Two steel parts are joined by heating them to 'red' heat and then applying a brazing rod to the joint.
- The brazing rods melts at a lower temperature than the steel and so it melts to form a molten liquid.
- This liquid brazing rod then flows along the joint between the two steel parts.



Key spellings

- Ferrous
- Material
- Design
- Equipment
- Instructions
- Technology
- Brazing
- Manufacture
- Process
- Funnel

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Can you spell these words and put them in a sentence?

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Name 2 different manufacturing processes used for metal work. Can you explain the two processes?

Non-Ferrous Metal- Metals which DO NOT contain Iron such as Pewter, Aluminum, gold

NON-FERROUS METALS PEWTER

Pewter is a soft, malleable alloy, 85% to 99% tin. Other metals are copper, lead, antimony and bismuth. Has a low melting point compared to many metals (170–230 °C) making it highly suitable for casting.

Usually purchased in ingots and cast to shape in a workshop.

Used for making tankards and other decorative pieces.

NON-FERROUS METALS ALUMINIUM

Light grey in colour. Smelted from bauxite ore. Aluminium 95%, Copper 4%, Manganese 1%

Ductile, soft, malleable, machines well on lathes and milling machines. Very light and resists corrosion. Can be cast into products from ingots.

Used widely in aircraft, drinks cans, window frames, ladders, and kitchen ware.

NON-FERROUS METALS COPPER

Reddish brown in colour, darkens slowly when in contact with air. This metal is not an alloy.

Ductile, can be beaten into shape as it is relatively soft. Conducts electricity and heat.

Electrical wiring, tubing, kettles, bowls, pipes and plumbing. Used also in the production of printed circuit boards.

Ferrous Metal- Metals which contain Iron such as steel, wrought iron

FERROUS METALS - MILD STEEL

Carbon 0.1 - 0.3%
Iron 99.9 - 99.7%

Alloy of carbon and iron. Tough. High tensile strength. Can be case hardened. Rusts very easily unless the surface is protected from moisture.

Most common metal used in school workshops. Used in general metal products and engineering.

FERROUS METALS CARBON STEEL

Carbon 0.6 - 1.4%
Iron 99.4 - 98.6%

Alloy of iron and carbon. Higher carbon content than mild steel. Tough and strong. Carbon steel can be heat treated e.g. hardening and tempering. Used for cutting tools such as drills and lathe tools.

FERROUS METALS STAINLESS STEEL

Alloy of iron, nickel and 10.5% to 11% chromium.
Tough, resistant to rust and stains. Does not corrode.
Cutlery, medical instruments, specialist corrosion resistant products such as pipes. Stainless steel pots and bans. Jewellery and watches.

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Name 2 Non- ferrous metals and 2 ferrous metals and their uses.