

ORGANISER

Casting is a manufacturing process in which a liquid material is usually poured into a mould, which contains a hollow cavity of the desired shape.

Casting can be used to mass produce lots of identical products. Engine blocks are cast so that they are very strong and durable. **SAFETY** – casting can be very dangerous because of the heat and fumes. PPE must be worn – leather apron, Leather gauntlets, safety goggles.

Pewter

- Pewter is a traditional **low-temperature metal**- (casting material **170°C - 230 °C**)
- It is used to make everything from jewellery to goblets.
- Pewter is an **alloyed** metal made primarily from tin (**tin 91%, antimony 7.5% & copper 1.5%**)
- Pewter is grey in colour and was traditionally used to make plates and beer tankards. Pewter objects were found in the Egyptian pyramids

TOOLS

Techsoft 2D Design CAD software (Computer Aided Design)

Flamefast furnace – used to cast pendant

Digital thermometer – to check the temperature of the pendant once cast. 40°C or less you can pick up the mould after casting.

MDF – Medium Density Fibreboard . Laser cut mould as quick & good detail.

Junior hacksaw – used to cut the sprue from the pendant design

Pillar drill – clamp down work and use 2mm drill to put hole into pendant. PPE – apron, guards and goggles.

Vice – used for holding a workpiece

Centre punch – mark the centre of a hole when drilling. A centre punch forms a dimple large enough to direct the tip of the drill to the located position.

Needle files – cross and draw filing. Cross filing is made across the surface to be filed from tip to handle. Draw filing on the other hand, is done across the surface by moving from one edge of the file to another.

Emery cloth – is a fabric that is covered with a range of grades of abrasive materials and is used for 'sanding' down to either smooth a surface, remove deep scratches, remove oxidised layer, or form an angle.

Wet and Dry paper: different grit (grades) 120, 240 and 400. 120 grit is rough and 400 is fine (smooth).

Polish – polish on pewter to leave it gleaming



Junior hacksaw



Emery cloth



Flamefast casting system



Centre punch



Needle files



KEY WORDS

DESIGN BRIEF – A statement about what you are going to design and make.

DESIGN SPECIFICATION – A check list of specific requirements to make the product successful

MOULD – a container used to shape molten pewter

PPE Personal protective equipment

PEWTER – the metal alloy used to make the pendant

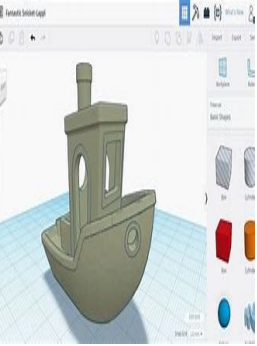
ALLOY is a mixture of two or more other metals.

SPRUE - A hole in a mould used to pour in the metal and allow hot air to come out

Design and Technology - Year 9 Swatch watch - Knowledge Organiser.

CAD (Computer Aided Design)

CAD is the use of computers in the creation of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation. CAD output is often in the form of electronic files for print, machining, or other manufacturing operations.



PLA & ABS

ABS (Acrylonitrile Butadiene Styrene) is a common thermoplastic well known in the injection molding industry. It is used for applications such as LEGO, electronic housings and automotive bumper parts. PLA (Polylactic Acid) is a biodegradable (under the correct conditions) thermoplastic derived from renewable resources such as corn starch or sugarcane. It is one of the most popular bioplastics, used for many applications ranging from plastic cups to medical implants



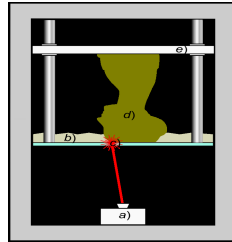
SWATCH (A name from the words "Second Watch")

Swatch was founded in 1983 by Nicolas Hayek. The Swatch product line was developed as a response to the "quartz crisis" of the 1970s and 1980s, in which Asian-made digital watches were competing against traditional European-made mechanical watches.

Swatch introduced the very first mechanical watch that could be manufactured using automatic assembly, effectively revolutionizing the industry. Swatch watches were used with fewer mechanical components as well as outer synthetic parts such as the plastic watchcases and watch straps which came in a wide array of colours, designs, and artwork — even some of the world-renowned artists have contributed to the designs of these Swatch watches.

Stereo lithography

Stereolithography is a form of 3D printing technology used for creating models in a layer by layer fashion using photochemical processes by which light causes chemical monomers and oligomers to cross-link together to form polymers. Those polymers then make up the body of a three-dimensional solid



3d printing

3D printing, also called **additive manufacturing**, is a family of processes that produces objects by adding material in layers that correspond to successive cross-sections of a 3D model. Plastics and metal alloys are the most commonly used materials for 3D printing, but it can work on nearly anything—from **concrete** to living tissue



SLICER

A 3D slicer is a 3D printer software program that you can import models into — for example in .STL or .OBJ file format. These 3D printer models form the basis of your print; they contain the edges, heights and basically every dimension of your print. Note: this article focuses on 3D slicers for FDM printing



Specification

It is usually a list of points, with each point referring to the research work. In the specification you need to show what you have learnt from

Key Words

Watch face, strap, clasp, holes, numbers, dial, battery, hands, solar powered, stop watch, date, second hand, hour hand, minutes, digital, male, female, unisex, theme, water proof, scratch resistant, light weight, strong, flexible, high impact polystyrene, toughened glass, diamonds, aluminium, steel, quartz, stainless steel.

Anthropometrics & Ergonomics

What is Anthropometrics ?

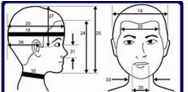
The scientific use of data linked to measurements of the human body. Eg the size of heads to help design helmets.

What is Ergonomics?

The interaction between an object and a human.

Designing products to fit the human body.

Eg, shaping the handle of a toothbrush to make it comfortable and easy to use.



Types of 3d printing? How do human factors effect design? Designers & design companies. What is a Specification?

Design and Technology - Year 9 PHONE STAND - Knowledge Organiser.

CAD – Computer Aided Design

Using computers to create/draw/present designs.
E.g. 2D Design or Tinkercad.

Accurate, easy to adapt/ share/ copy, links to CAM,
fast global communication. Expensive set up cost and
to train staff, security issues/ lost work.



CAM – Computer Aided Manufacture

Using computers to cut, print, paint, assemble or
package products. E.g. robotics, LASER cutters,
lathes, 3D printers, CNC milling machines, knitting
machines. Accurate and fast mass production, lower
product cost. Expensive set up cost.

— A C C E S S F M M —

A Aesthetics

F Features

C Cost

M Materials

C Client

M Manufacture

E Environment

S Size

Acronym to help you
analyse and evaluate

S Safety

Key Words

Mind map – a quick way to present lots of information.

Design Brief – a short description of what will be designed/made and who it's for.

Design Specification – a list of *specific* requirements that the design should be/have.

Product Analysis – detailed information about several aspects of a product.

Image Board – full-colour pictures/logos/notes presented to represent a theme.

Client/Customer – the person who will buy or use the product.

Acrylic

Acrylic is the polymer used to make the phone stand. It is a **thermoforming plastic**. It can be heated, shaped, reheated and reshaped. Available in many colours and transparent sheet. Easy to cut, bend and etch, weather proof and tough. Expensive to buy, difficult to recycle, made from fossil fuels.

LASER cutter

The **CAM** equipment used to cut out the acrylic.

The CAD (2D Design) drawings control the LASER cutter using a laptop. Excellent quality, batch production, accurate and perfect finish. Expensive to buy and can be slow.

Black lines= etch, Red lines=cut.

What type of plastic is acrylic? Why is CAM suitable for making the PHONE STAND? How does a product analysis help a designer?